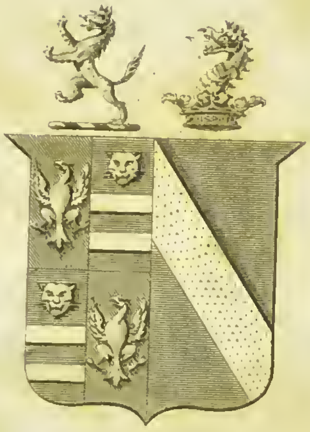

Anth^y G. Wright Biddulph.

THE

ENGLISH ENCYCLOPÆDIA.

LONDON:
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THE

ENGLISH ENCYCLOPÆDIA:

BEING

A COLLECTION OF TREATISES,

AND

A DICTIONARY OF TERMS,

ILLUSTRATIVE OF THE

ARTS AND SCIENCES.

COMPILED FROM MODERN AUTHORS OF THE FIRST EMINENCE IN THE DIFFERENT BRANCHES OF SCIENCE.

IN TEN VOLUMES.

THE WHOLE ILLUSTRATED WITH UPWARDS OF FOUR HUNDRED COPPER-PLATES.

VOL. II.

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SOLD BY BELL AND BRADFUTE, EDINBURGH; BRASH AND REID, GLASGOW; BROWN AND BY BURNETT, ABERDEEN; COLBERT, DUBLIN; AND ALL OTHER BOOKSELLERS IN THE UNITED KINGDOM.

1802.

THE

ENGLISH ENCYCLOPÆDIA.

BOOK-KEEPING

IS the art of recording mercantile tranfactions in a regular and fyftematic manner.

1. A merchant's books fhould contain every particular which relates to the affairs of the owner, and fhould be fo arranged, as to afford ready information in every point for which they may be confulted.

Thefe books fhould contain, Firft, The debts of and to the owner. Secondly, The articles of property which belonged to him; the quantity and value fold, or otherwife difpofed of; and the quantity and value which ftill remain in his poffeffion. Thirdly, The amount of his ftock when the books were opened; the fubfequent profits and loffes; and the amount of his ftock in confequence.

The method of book-keeping in common ufe is called the Italian method, by *double entry*; and the accountant who underftands it, will find little difficulty in following, or even in inventing, other methods better accommodated to a particular purpofe.

The Italian method requires three principal books; the Wafte-Book, Journal, and Leger.

Sect. I. *Of the* Waste-Book.

2. The wafte-book, or day-book, contains an exact regifter of all occurrences in bufinefs in the fame order as they take place. It begins with an inventory of every thing belonging to the owner, and a lift of his debts. The tranfaction of each day is then recorded in the plaineft and concifeft language as it takes place. It fhould be fo written that any perfon, however unacquainted with the bufinefs, may underftand it, though for the fake of brevity reference may be made to invoices and other accounts, for particulars. The accountant's firft care fhould be to have nothing defective or ambiguous; his fecond, to have nothing fuperfluous.

3. The date is written in text on the top of each page. The articles are feparated from each other by a line; and the tranfactions of one day are feparated from thofe of another by a double line, in the middle of which there is left a blank fpace for inferting the day of the month. This book muft be kept with the greater care, as it contains the materials from which the other books are compofed; and any error or defect will occafion a like one in the others. Befides, it is the book whofe authority is trufted to, and which muft be exhibited to judges, when an account is difputed.

4. From the wafte-book every information relating to the bufinefs may be obtained, but the labour of confulting it would be very great, very tedious, and expofed to the rifk of omiffions; to remedy which, another book is ufed, in which the articles are arranged in a methodical order. This book is called the *Leger*, and we fhall confider it next; becaufe the journal, though it comes before it in the order of writing, cannot be well underftood till the nature of the leger has been explained.

Sect. II. *Of the* Leger.

5. In the leger, articles of the fame kind are collected together under proper titles, to explain the nature of the account; and articles of oppofite kinds, which belong to the fame account, are placed on the oppofite pages of the fame folio: for inftance, money received on the one fide, and money paid on the other; or goods bought on the one fide, and goods fold on the other. The left-hand page is called the *Debtor* or *Dr.* fide of the account, and the right-hand page the *Creditor* or *Cr.* fide. The difference between the fums of the Dr. and Cr. fides is called the *Balance*.

Accounts in the leger are of three kinds.

6. Firft, Perfonal Accounts. An account is opened for every perfon or company with whom there are any dealings on credit. At opening the books, if they are indebted to the owner, the debt is entered on the Dr.; but, if he is indebted to them, it is entered on the Cr. During the courfe of the bufinefs, goods fold on truft, money paid, and every thing for which they are accountable to him, are entered on the Dr.; but goods bought on truft, money received, and every thing for which he is accountable to them, are entered on the Cr. The balance fhows how much they owe him, when the Dr. fide is greater; and how much he owes them, when the Cr. fide is greater.

7. Secondly, Real accounts, or accounts of property of whatever kind, fuch as ready money, goods, houfes, lands, fhips, fhares in public companies, and the like.

The account of ready money is intitled *Cafh*. On the Dr. fide, the money on hand at opening the books is entered, and afterwards every article of money received. On the Cr. fide, there is entered every article of money paid out; and the balance fhows how much ought to be on hand. The fum of the Dr. fide of this account is always greater than that of the Cr. fide.

8. Accounts of goods are generally ruled with inner columns for entering the quantities. The goods on hand are entered on the Dr. fide of the refpective accounts: the quantities being placed in the inner, and the values in the outer column. Goods bought are entered in the fame manner, and goods fold are entered on the Cr. fide; the quantities and values being placed in the proper columns. Charges laid out on goods are entered on the Dr. fide; and, when an incidental advantage arifes from them, fuch as public bounty, it is entered on the Cr.

If the fums of the inner columns on the oppofite fides are equal, it fhows that the goods are all fold, and then the balance of the money-column fhows the gain or lofs. If the Cr. fide

is greater, it is gain; if the Dr. fide is greater, it is lofs. If the fum of the inner column is greater on the Dr. fide, it fhows that part of the goods are on hand; and their value muft be added to the fum of the Cr. fide, in order to determine the gain or lofs.

9. Accounts of fhips contain on the Dr. the value of the fhip, and all expences laid out thereon: on the Cr. all freights received. In like manner, accounts of houfes or lands have the value of the fubject, and all repairs, or other charges, entered on the Dr. and all rents or other profits received on the Cr.

In general, real accounts contain the value of the property, and all charges, on the Dr. and the fales and other returns on the Cr. When the account is to be balanced, if any property remains, its value is placed on the Cr.; and then the balance fhows the lofs or gain, according as the Dr. or Cr. fide is greateft.

10. Thirdly, Accounts of STOCK, PROFIT and LOSS, and its fubfidiary accounts, which are fometimes called *fictitious accounts*.

The *ftock* account contains on the Dr. the amount of the debts which the owner owes when the books are opened; and on the Cr. the amount of ready money, goods, debts, and property of every kind belonging to him: therefore the balance fhows what his nett ftock is; or, in cafe of bankruptcy, how much his debts exceed his effects. There is nothing further entered on this account till the books are balanced: and then, if the bufinefs has yielded profit, the nett gain is entered on the Cr.; if it has been unfuccefsful, the nett lofs is entered on the Dr.: after which, the balance fhows the nett ftock at the time the books are clofed.

11. The *Profit and Lofs* account contains every article of gain on the Cr. and every article of lofs on the Dr. The balance fhows the nett gain or lofs, and is transferred to the proper fide of the ftock-account, as mentioned above. This account is partly compofed of articles that occur while the books are running. For example, legacies received are entered on the Cr.—goods deftroyed on the Dr. The reft of the articles are thofe of gain and lofs, arifing from the real accounts, which are collected when the books are balanced.

12. To fhorten and methodife the account of profit and lofs, fubfidiary accounts are ufed; fuch as,

Intereft account, which contains on the Dr. fums paid or incurred for intereft; and on the Cr. fums received, or become due for it.

Commiffion account, which contains on the Cr. articles of gain received or owing for trouble in tranfacting bufinefs for others. There are feldom any entries on the Dr.

Proper expences, containing on the Dr. money or any thing elfe, withdrawn from the trade for private ufe.

Lofs by bad debts, containing on the Dr. debts efteemed defperate; and on the Cr. debts unexpectedly recovered.

Infurance account, containing on the Cr. premiums received for making infurances; and, on the Dr. loffes fuftained on the fame. There may be feveral accounts of this kind, and the balance fhows the gain or lofs which arifes from being concerned in infurance.

More or fewer of thefe accounts may be ufed, according as the articles are frequent; and others may be invented to fuit the purpofes of the bufinefs for which the books are kept.

13. Every tranfaction in bufinefs belongs to two accounts, and muft be entered on the Dr. of the one and on the Cr. of the other. Thus, when a perfon becomes indebted to us, the article he owes muft be entered on the Dr. of his account; and, if it be for money paid him, it is alfo entered on the Cr. of cafh; if for goods fold, it is entered on the Cr. of the account of goods; if for any thing delivered him by another perfon at our defire, it is entered on the Cr. of the deliverer's account; if for any wager or bargain, by which we are gainers, it is entered on the Cr. of profit and lofs. Thus, in whatever way the debt arifes, it is entered on the Cr. of fome other account, as well as on the Dr. of the perfon's account who owes it.

In like manner, when we become indebted to any perfon, the article we owe muft be entered on the Cr. of his account. If it be for money received, it is entered on the Dr. of cafh; if for goods bought, it is entered on the Dr. of the account of goods; if for any thing delivered to another perfon at our defire, it is entered on the Dr. of the receiver's account; and if it is in confequence of a lofing bargain, it is entered on the Dr. of profit and lofs.

Again, when goods are received, the tranfaction is entered on the Dr. of the account of goods. If they are bought for ready money, it is entered on the Cr. of cafh; if on truft, it is entered on the Cr. of the feller; if they are exchanged for other goods, it is entered on the Cr. of the goods delivered; if they are obtained by fome profitable bufinefs, without any return, it is entered on Cr. of profit and lofs.

When goods are delivered, the tranfaction is entered on the Cr. of the account of goods; and, if they are fold for ready money, it is entered on the Dr. of cafh; if on credit, it is entered on the Dr. of the purchafer; if exchanged for other goods, it is entered on the Dr. of the goods received; and, if they are given gratis, or deftroyed, it is entered on the Dr. of profit and lofs.

Laftly, When any article of lofs occurs, the tranfaction is entered on the Dr. of profit and lofs; and as we muft either pay it in money or goods, or remain indebted to fome perfon for it, it muft be entered on the Cr. of cafh, or of goods delivered, or of the perfon entitled to receive it. And, when an article of gain occurs, it is entered on the Cr. of profit and lofs, and alfo on the Dr. of cafh or goods, if money or goods be received; and on the Dr. of the perfon accountable for it, if not immediately paid.

Hence it follows that, *If all the accounts in the leger are added, the amount of the fums of the Dr. will be equal to thofe of the Cr.*

SECT. III. *Of the* JOURNAL.

14. THE Journal is a fair record of all the tranfactions compiled from the wafte-book, in the fame order as they ftand there; but expreffed in a technical ftyle, that it may be transferred to the leger with more eafe.

To enter any article in the journal, we muft confider which accounts in the leger it will require to be placed to, both on the Dr. and Cr. and write [*the former account*] *Dr. to* [*the latter account*]; then we annex an explanation of the article, and place the fum in the money-column.

EXAMPLE.

Wafte-book). Sold for ready money, 30 yards linen, at 3s - - - L. 4 10 —

Journal). *Cafh Dr. to Linen.* Sold 30 yards, at 3s - - - - L. 4 10 —

Here we confider, that the article muft be entered on the Dr. of cafh, becaufe money is received; and on the Cr. of linen, becaufe linen is delivered: Therefore we write *Cafh Dr. to Linen*, to which we annex the nature of the tranfaction. The article thus entered is called a *journal-poft*; *Cafh* is called the *Dr.*; *Linen* the *Cr.*; the words "Cafh Dr. to Linen," the *Entry*, and the following words the *Narration*.

The learner will be able, from this example, to enter any fimple article in the journal, provided he knows the accounts

to which it ſhould be poſted on the Dr. and Cr. of the leger. This muſt be collected from the deſcription of the leger accounts already given, and the nature and tendency of the article.

15. General Rules *for the* Journal-entries.

I. *Every thing received, or perſon accountable to us, is* Dr.
II. *Every thing delivered, or perſon to whom we are accountable, is* Cr.

Rule I. *The perſon to whom any thing is delivered is* Dr. *to the thing delivered, when nothing is received in return.*

Therefore, when money is paid, the receiver is Dr. to caſh.
When goods or other property is ſold on credit, the purchaſer is Dr. to the thing ſold. Thus,

Waſte-book.) Paid John Wilſon in full - L. 52 — —
Journal.) *John Wilſon Dr. to Caſh,* paid him in full - - - - - 52 — —

16. Rule II. *A thing received is* Dr. *to the perſon from whom it is received, when nothing is delivered in return.*

Therefore, when money is received, Caſh is Dr. to the payer: when goods are bought, the goods are Dr. to the ſeller. Thus,

Waſte-book.) Bought from J. Hawkes 60 lb. of wool, at 9d - - - L. 2 5 —
Journal.) *Wool Dr. to J. Hawkes,* bought 60 lb. at 9d 2 5 —

17. Rule III. *A thing received is* Dr. *to the thing given for it.*

Therefore goods bought for ready money are Dr. to caſh.
When goods are ſold for ready money, Caſh is Dr. to the goods.
When goods are bartered, the goods received are Dr. to the goods delivered. Thus,

Waſte-book.) Bought for ready money 10 hds. wine, at L. 15 - - - L. 150 — —
Journal.) *Wine Dr. to Caſh,* bought 10 hds. at L. 15 - - - - 150 — —
Waſte-book.) Bartered 3 hds. wine, at L. 15, for 100 gallons rum, at 9s - - - 45 — —
Journal.) *Rum Dr. to Wine,* received 100 gallons, at 9s in barter for 3 hds. at L. 15 - 45 — —

18. Rule IV. *Goods and real accounts are* Dr. *for all charges laid out on them. If money is laid out, they are* Dr. *to Caſh; if any thing elſe is delivered, they are* Dr. *to the thing delivered; if the charge is taken in truſt, they are* Dr. *to the perſon to whom it is due.* Thus,

Waſte-book.) Delivered wood from my timber-yard for repairing the Angel-tavern - L. 15 — —
Journal.) *Angel-tavern Dr. to Wood,* delivered for repairing the ſame - - 15 — —
Waſte-book.) Due to William Carpenter for repairs to the Angel-tavern - - 12 — —
Journal.) *Angel-tavern Dr. to William Carpenter,* due to him for repairs - - 12 — —

19. Rule V. *When rents of houſes or lands, freights of ſhips, bounties on goods, or any other profits from real accounts are received, Caſh is* Dr. *to the account from which the profit ariſes: if any thing beſides money be received, the article received is* Dr.: *if they remain unpaid, the perſon who owes them is* Dr. *Thus,*

Waſte-book.) Received freight of the ſhip Traffick for a voyage to Briſtol - - L. 35 — —
Journal.) *Ship Traffick Dr. to Caſh,* received freight to London - - - 35 — —
Waſte-book.) John Griffin owes me a year's rent of the Angel-tavern - - 52 — —
Journal.) *John Griffin Dr. to Angel-tavern,* for a year's rent due by him - - 52 — —

20. Rule VI. *When an article of loſs occurs, Profit and Loſs, or ſome ſubſidiary account, is* Dr. *If the loſs is paid in ready money, it is* Dr. *to Caſh; if it is paid in any thing elſe, it is* Dr. *to the thing delivered. If it remains unpaid, it is* Dr. *to the perſon to whom it is owing.* Thus,

Waſte-book.) Given my daughter at her marriage - - - - L. 500 — —
Journal.) *Profit and Loſs Dr. to Caſh,* given my daughter at her marriage - - 500 — —

21. Rule VII. *When an article of gain occurs, that is not immediately connected with any real account, Caſh, the article received, or the perſon accountable for it, is* Dr. *to Profit and Loſs, or to ſome ſubſidiary account.* Thus,

Waſte-book.) Received in a gift from my father - - - L. 100 — —
Journal.) *Caſh Dr. to Profit and Loſs,* received from my father - - 100 — —

22. Rule VIII. *When one perſon pays money, or delivers any thing elſe to another on our account, the perſon who receives it is* Dr. *to the perſon who pays it.* Thus,

Waſte-book.) Arthur Young has delivered James Baker 100 quarters wheat, for which I am to account to him, at 30s - - L. 150 — —
Journal.) *James Baker Dr. to Arthur Young,* for 100 quarters wheat delivered him on my account, at 30s - - - 150 — —

23. An article which contains more Drs. or more Crs. than one, is called a *complex poſt.* The form of theſe will appear from the following examples.

Ex. 1.] Sold William Drapier,
25 pieces cloth, at L. 15 per piece - - L. 375 — —
130 ſtones wool, at 5s 6d per ſtone - - - 35 15 —
L. 410 15 —

If the two articles ſold to William Drapier were entered ſeparately in the waſte-book, and transferred to the journal by Rule I. they would ſtand thus:

William Drapier Dr. to Cloth, ſold him 25 pieces, at L. 15 - - - L. 375 — —
William Drapier Dr. to Wool, ſold him 150 ſtones, at 5s 6d - - - 35 15 —

And if theſe were poſted to the leger, there would be two articles placed to the Dr. of William Drapier, one to the Cr. of Cloth, and one to the Cr. of Wool.

But the ſales may be entered in the form of one complex journal poſt, as follows:

William Drapier Dr. to Sundries,
To Cloth, for 25 pieces, at L. 15 - - L. 375 — —
To Wool, for 130 ſtones, at 5s and 6d - - 35 15 —
L. 410 15 —

And then there is only one article on the Dr. of William Drapier in the leger.

Ex. 2.] Sold 10 pieces cloth to W. Drapier, at L. 15 L. 150 — —
12 ditto to J. Mercer, at ditto - 180 — —
— L. 330 — —
22

This example alſo falls under Rule I. But whereas there was one Dr. and two Crs. in the former example, there are two

Drs. and one Cr. in this: William Drapier and John Mercer, the purchaſers, are Drs. for their reſpective quantities: and cloth, which is the only thing delivered, is Cr. for the whole quantity. The journal poſt is,

Sundries Drs. to Cloth,

W. Drapier, for 10 pieces, at 15l.	L. 150 — —	
J. Mercer, for 12 ditto at 15l.	180 — —	
—		L. 330 — —
22		

24. In ſome articles, there are both more Drs. and more Crs. than one. Theſe may be entered in one journal-poſt, *Sundries Dr. to Sundries*, ſpecifying firſt the Drs. and then the Crs. But as this method is ſomewhat confuſed, we would recommend it as a better way to divide the tranſaction into two journal-poſts; ſo that the firſt may contain only one Dr. and the ſecond only one Cr.

Ex. Bartered with James Fotheringal 100 pieces oſnaburgs, at 12s - -	L. 60 — —	
100 lb. thread, at 3s 6d -	17 10 —	
		L. 77 10 —
For 10 hds lintſeed, at 50s -	L. 25 — —	
500 yds linen, at 1s 6d -	37 10 —	
And received the balance in money - -	15 — —	
		L. 77 10 —

Journal. *Sundries Dr. to Sundries,*

Lintſeed, for 10 hds at 50s -	L. 25 — —
Linen, for 500 yds, at 1s 6d -	37 10 —
Received in barter from J. Fotheringal	
Caſh, for balance - -	15 — —
	L. 77 10 —
To Oſnaburgs, for 100 pieces, at 12s - -	L. 60 — —
To Thread, for 100 lb. at 3s 6d -	17 10 —
Delivered him in barter -	L. 77 10 —

Or rather,

Sundries Dr. to James Fotheringal.

Lintſeed, for 10 hds at 50s -	L. 25 — —	
Linen, for 500 yds, at 1s 6d -	37 10 —	
Received in barter		
Caſh, received balance - -	15 — —	
		L. 77 10 —

James Fotheringal Dr. to Sundries.

To Oſnaburgs, for 100 pieces, at 12s - - -	L. 60 — —	
To Thread, for 100 lb. at 3s 6d -	17 10 —	
Delivered in barter -		L. 77 10 —

25. It is not neceſſary to enumerate all kinds of complex poſts that may occur in buſineſs. We ſhall here only mention the entries which occur at opening the books.

The firſt journal-poſt contains the ſubſtance of the inventory. The entry is *Sundries Drs. to Stock*; the particular Drs. are Caſh, the different kinds of goods and other property belonging to us, and the perſons indebted to us.

The ſecond journal-poſt contains the debts due by us. The entry is, *Stock Dr. to Sundries*; the particular Crs. are the perſons to whom we are indebted.

26. The journal ſhould be written by one perſon, in a fair hand and at leiſure hours. The articles are ſeparated, and the titles and dates marked in the ſame manner as in the waſte-book. The entries are written in half text, for ornament and diſtinction. In the inventory, the deſignation (or the buſineſs, ſtation, and place of reſidence) of every perſon is mentioned; and the ſame is done the firſt time that any name occurs in journal-entry. At other times, it is ſufficient to enter the name without the deſignation, unleſs we have dealings with two perſons of the ſame name; in which caſe, it is always neceſſary to annex the deſignation, in order to diſtinguiſh them. The narration ſhould be complete, without referring to the waſte-book; and ſo clear, that every perſon, acquainted with the ſtyle of the journal, may underſtand it with eaſe. When the poſt is written, we mark a daſh againſt the article, on the margin of the waſte-book, to ſhow how far the writing of the journal is advanced.

Sect. IV. *Of* Posting *and* Balancing *the* Leger.

27. The firſt thing to be done in the leger, is to allot a proper ſpace for each account. The accounts may be either opened in the ſame order that they occur in the journal; or accounts of the ſame kind may be placed together, the perſonal accounts in one part of the leger, and the real accounts in another. The accounts of Stock, and Profit and Loſs, are generally placed at the beginning. The room which each will require cannot be exactly known, but muſt be conjectured from the number of tranſactions that are likely to follow.

The number of the folio is marked in ſtrong text at each corner of the top-line; and the titles of the accounts are written in fair text through both folios, if neceſſary. The deſignations of the perſonal accounts may be written on half text, or Italian hand; and ſome write the titles in German text, for ornament. The word *Dr.* is prefixed to the title on the left-hand page; and *Contra Cr.* annexed to it on the right-hand page.

28. An Index muſt be provided, for pointing out the folios where the accounts are opened. The titles of the accounts are entered alphabetically in the index, and the number of the folio annexed. Perſonal accounts are entered by the firſt letter of the ſirname; companies, by the firſt letter of the ſirname of the firſt partner; and all other accounts, by the firſt letter of the firſt word. The moſt convenient kind of index is a long narrow book, of 24 leaves, one for each letter of the alphabet. A is marked on the top of the firſt leaf, and the paper pared away below it; B is marked on the ſecond leaf, under A; and the other letters on the following leaves, in the ſame manner; by means of which we can turn at once to any letter required.

29. In poſting the leger, proceed by the following directions. Firſt, look for the Dr. of the journal-poſt in the index, under the proper letter, and this directs you to the folio of the leger where the account is, if it is already opened: if not, you muſt allot a ſpace for it, write the title, and enter it in the index. Then enter the article on the left-hand page of the account under the title of the former article, by writing the date on the margin, and the name of the creditor on the line, with the word *To* prefixed, and a ſhort narration of the tranſaction annexed, and inſerting the ſum in the money column, and the quantity, if it is an account of goods, in the inner column. Then turn to the account of the Cr. of the journal-poſt, and enter the article in the right-hand page, prefixing the word *By* to the name of the Dr.

30. This being done, turn to the journal, and mark on the margin the number of the folios to which the article is poſted. The figures which point out the reference to the Dr. and Cr. folios ſhould be ſeparated by a line: for example, If the Dr. entry is on the third folio, and the Cr. entry on the fifth, the reference is marked $\frac{3}{5}$. Theſe figures ſhow how far the poſting is advanced, and are uſeful in comparing the books.

31. There is often a reference-column ruled in the leger, for pointing out the other entry, correfponding to any article. In this column, the folio of the Cr. entry is marked againft the Dr. article, and the folio of the Dr. entry againft the Cr. article.

32. In complex pofts, turn to the feveral Drs. or Crs. in their order, and enter the articles according to the foregoing directions; placing the fums belonging to each in the money-column, againft the refpective entries.

33. An article in the leger is generally comprehended in one line. The narration fhould be as full as can be contained in that bounds. If it cannot be narrated completely, the journal is referred to for further particulars, by writing *per Journal*, (or *p. J.*), either after an incomplete narration, or immediately after the Dr. or Cr. when there is no room for a proper narration. In complex pofts, there can feldom be any narration annexed to the fingle Dr. or the fingle Cr. The entry is generally *To Sundries per J.* or, *By Sundries per J.* If the fenfe of the whole article can be narrated, it fhould be done; but it is improper to narrate the firft or any other part of the article, and omit the others.

34. When the fpace allotted for an account in the leger is filled up, the account muft be tranfported to another folio. For this purpofe add the columns on both fides, and write againft the fum, *Tranfported to folio* , inferting the number of the folio where the new account is opened, in the reference-column, or on the line, if no reference-column is ufed. Then, after titling the new account, and entering the number of the folio in the index, write on the Dr. *To amount, brought from folio* , inferting the number of the folio where the old account was; and on the Cr. *By amount, brought from folio* ; and place the fums, and quantities, if any, in the proper columns.

When either fide of an account is full, both fides fhould be tranfported, and diagonal lines drawn, to fill up the vacant fpace of the fide which requires it.

35. The books fhould be fo kept that the journal may keep pace nearly with the wafte-book, and the leger with the journal. Each book fhould be carefully revifed, and compared with the book from which it is pofted. In comparing the leger, obferve the following directions:

Begin with the firft journal-poft, and turn to the folio of the leger where the Dr. is entered, which you are directed to by the marginal reference, and compare the date, entry, and fum. If you find them to correfpond, it is well; if not, the leger muft be altered till it correfpond with the journal. Then place a dot before the reference-figure in the journal, and a mark Λ before the fum in the leger.

Proceed in the fame manner to compare the Cr. of the journal-poft, and all the following pofts in their order. The dots in the journal fhow how far the comparifon is advanced, and the marks in the leger fhow what articles are compared.

The fums of accounts tranfported fhould be left blank till the books are compared; as an error in any article will occafion an alteration in the fum.

36. Some accountants correct all errors in the leger, without erafing any thing, by the following methods: 1ft, If too fmall a fum is entered, they make a fecond entry for the deficiency. 2d, If too large a fum has been entered, they make an entry on the oppofite fide for the excefs. 3d, If it is entered on the wrong fide of the account, they enter it twice on the other; once, to counterbalance the error, and a fecond time for the true entry. 4th, If it is entered on a wrong account, they charge the wrong account Dr. to, or Cr. by, the right one.

37. This gives the books a confufed appearance; and the following rules may be found more ufeful: 1ft, If an article is omitted, do not attempt to interline at the place where it fhould have been; but infert it under the laft article when you difcover the omiffion, and mark a crofs × againft it on the margin, and another at the place where it fhould have been. 2d, If you difcover a miftake immediately when committed, correct it without cancelling any thing, as in this example. *To Cafh, fay, To James Speirs received to account.* 3d, If you have written a line entirely wrong, or in a wrong place, write the word *Error* at the end, prefix a crofs, and omit or cancel the fum. 4th, Cancel errors, by drawing a line lightly through them, fo that the old writing may ftill be legible; by which it will be evident, that the book has not been vitiated for a fraudulent purpofe. The fame method fhould be followed in correcting errors in the journal.

38. When the comparifon of the books is finifhed, glance over the leger, to obferve if the mark of comparifon is affixed to every article. If not, you muft turn to the journal, and obferve if the articles are right which had not been marked.

39. Becaufe the whole fum of the Dr. fide of the leger fhould be equal to the whole fum of the Cr. it is proper to try if they correfpond. For this purpofe, you may add the Dr. of every account, except fuch as are already balanced, placing the fums in an inner column, and extending them at the end of one or more folios, as you find moft convenient, to the outer column: and, as you go along, add the Cr. in the fame manner. If the fum total of both fides are equal, it gives a prefumption that the books are right; if they differ, there is certainly fome miftake. This is called the *Trial-balance*. The labour beftowed upon it is not loft, as the fums may be referved for affifting us to collect the balances.

40. If the fums of the trial-balance do not correfpond, the books muft be examined again. For this purpofe, begin with the firft article on the Dr. fide of the firft account, and turn to the account where the correfponding entry is, which you will find by the figure in the reference-column. If the articles agree, mark them with a dot. Proceed in like manner with the other articles on the Dr. of the firft account; then with the articles on the Cr. of the fame; and then with the following accounts in their order, till the error or errors be difcovered. In complex entries, obferve if the amount of the fums on one fide be equal to the fum on the other. When you come to a dotted article, you may pafs it by, becaufe it has been examined already.

If the errors are not difcovered at the firft revifal, you muft repeat the fame operation again, till you bring the books to balance. Marks different from the former ones, or differently placed, may be ufed, to fignify that an article has been examined a fecond or third time.

41. When we fettle accounts with any perfon, and afcertain how much is owing at either hand, it is neceffary to balance his account in the leger, and open a new one, beginning with the fum that was due according to the fettlement; and when we clear accounts again, we muft go back to that article, and no farther.

If any articles are charged on either fide, at the time of fettling, they muft be immediately entered on the wafte-book; from which they will pafs in courfe to the journal and leger; and a remark muft be entered in the wafte-book, that the account was fettled, and the balance transferred to the proper fide of the new account. This remark is tranfcribed in the journal; and the leger account is balanced, when it occurs, in the courfe of pofting.

If the balance is due to you, write on the Cr. *By balance due by him to Dr. new account*, and infert the fum due to you; after which, the amount of both fides will be equal. Add the account, placing the fums oppofite to each other; and, if the fides are unequal, draw a diagonal line through the vacant fpace of the fhorter fide, and clofe the old account

by drawing lines under the ſums. Then open the new account immediately under the old one, or in a new folio if the old one is full, by writing on the Dr. *To balance of former account due by him.* If the balance is due by you to him, the entries are made on the oppoſite ſides, with the neceſſary alterations. When the new account is opened in the ſame folio, it is unneceſſary to repeat the title; but the year and month, as well as the day, are repeated at the date of the firſt article.

42. Sometimes when an account is balanced, one or more articles are left out on purpoſe: For example, goods lately bought on credit may be left out, and the ſettlement may only relate to articles of longer ſtanding. When this is the caſe, if the articles omitted are on the Dr. of the leger, we write on the Cr. thus, *By articles ſold him ſince 1ſt January replaced:* and when we have balanced the account, and opened a new one, we write on the Dr. *To articles replaced at ſettling, furniſhed ſince 1ſt January:* or, if the articles were left out for any other reaſon, we explain the ſame in the narration.

43. When we poſt any common article from the journal, we enter the ſum on the Dr. of one account, and on the Cr. of another: when we balance an account, we place the balance ſum on the Dr. of the old account, and on the Cr. of the new one, or contrary-wiſe: and when we replace an article, as above directed, to the Dr. or Cr. of the old account, we place it after balancing to the Cr. or Dr. of the new one.

44. It is proper, before balancing the books, which is generally done once a year, to ſettle as many perſonal accounts as poſſible; to clear all arrears and ſmall charges; to take an exact inventory of the goods on hand, as far as can be done; and affix a moderate value to each article, according to the current prices at the time; ſuch a value as you would be willing at preſent to buy for. It is better to value the goods on hand in conformity to the current prices, than at prime coſt: for the deſign of affixing any value is to point out the gain or loſs, and the gain is in reality obtained as ſoon as the prices riſe, or the loſs ſuffered as ſoon as they fall; therefore it is impoſſible to make up a juſt ſtate of the affairs, unleſs the preſent prices are attended to.

45. Theſe things being done, proceed to make the balance as follows: Prepare two ſheets of paper, ruled with money columns, in the form of Dr. and Cr.; write *Profit* and *Loſs* as the title of the firſt, and *Balance* as the title of the ſecond.

Prepare alſo ſome paper for computing the balances, and mark down the folios, titles, and ſums of each account in the leger, in a regular order. If a trial-balance was made, the ſums may be tranſcribed from it. Paſs by ſuch accounts as are already cloſed; alſo the accounts of Stock and Profit and Loſs, which are always the laſt of being balanced. Then ſubtract the leſſer ſum from the greater, and enter the difference on either of the ſheets that the nature of the article points out, and on the ſide of that ſheet which correſponds to the greater ſum of the account. More particularly,

In perſonal accounts, enter the difference, which is the debt owing to you, or by you, on the proper ſide of the balance-ſheet.

In the caſh-account, enter the difference, which is the money in hand, on the Dr. ſide of the balance-ſheet.

In accounts of goods or other property, if there is nothing remaining on hand, enter the difference, which is the gain or loſs, on the proper ſide of the profit and loſs ſheet.

If the whole is ſtill on hand, enter the preſent value on the Dr. of the balance-ſheet; and, if this is different from the prime coſt, charges included, enter the difference in the proper ſide of the profit and loſs ſheet.

If part is ſold, and part on hand, place the value of the quantity on hand under the ſum of the Cr. and add them. The ſum is the whole return that will be obtained, if the reſt of the goods are ſold at the eſtimated value; and this, being compared with the ſum of the Dr. which is the whole expence, ſhews the gain or loſs. Enter the ſame in the proper ſide of the profit and loſs ſheet, and enter the quantity and value on hand on the Dr. of the balance-ſheet.

Obſerve if the quantities in the inner columns are equal on both ſides, when the goods are all ſold; or, if the difference, when only part is ſold, is equal to the quantity on hand. If they correſpond, you have a juſt account of the goods. If the Dr. is greater, there is ſomething wrong, which you muſt enter on the Dr. of the balance-ſheet, and mark the cauſe of the deficiency. If the Cr. be greater, there is an exceſs, which you muſt enter on the Cr. of the balance-ſheet, together with the occaſion of it.

In accounts ſubſidiary to profit and loſs, enter the difference on the proper ſide of the profit and loſs ſheet.

When there is nothing written on one ſide of an account, enter the ſum of the article or articles on that ſheet which the kind of the account points out.

46. When you have collected all the balances, ſum up both ſheets, and add to the profit and loſs ſheet the ſums of the profit and loſs account in the leger: then ſubtract the leſſer ſum of each ſheet from the greater.

This being done, mark the ſums of the ſtock-account on your computation-paper, and add to it the balance of the profit and loſs ſheet on the ſide which correſponds with the greater ſum of that account: then ſubtract the ſmaller ſum from the greater. The remainder will be equal to the difference of the ſides of the balance-ſheet, if the books are right, and the balances exactly collected.

47. We ſhall prove, that this equality muſt always hold, from the nature of the articles collected. The Dr. of the balance-ſheet contains every kind of property belonging to you, and every debt owing to you; and the Cr. contains every debt owing by you: therefore the difference of the ſides ſhows what the nett amount of your eſtate is. The profit and loſs ſheet, when the articles from the leger are included, contains every thing you have gained on the Cr. and every thing you have loſt on the Dr.; and the difference of the ſides is your nett gain or loſs. The ſtock-account contained your effects and debts at the time the books were opened; and therefore, when the gain or loſs is added to the proper ſide, it muſt ſhow the extent of your nett eſtate at preſent. Thus the ſtock-account and the balance-ſheet both point out how much you are worth at preſent; the one from your former ſtock, allowance being made for your gains or loſſes; the other from a view of your preſent effects and debts; and they will correſpond, becauſe both muſt be agreeable to the truth, if the books are correct.

48. Though the books muſt balance, if free from error, yet it is ſometimes difficult to adjuſt them exactly, eſpecially when the buſineſs is extenſive, and the error trifling. If there is ſtill a difference, which we do not think it worth while to make further ſearch for, we may cloſe the books, by making Profit and Loſs Dr. or Cr. for the ſame. This introduces an article on one ſide of the leger, which has none correſponding to it on the other, but is balanced by ſome undiſcovered error.

49. The balance being ſtruck, your next work is to cloſe the books. Every article in the leger ſhould be poſted from the journal; therefore, the moſt regular way of finiſhing both is by inſerting the following articles in the journal, and poſting them in the common manner to the leger.

1ſt, *Profit and Loſs Dr. to Sundries, for loſs, on the following accounts.* The particulars are taken from the Dr. of the Profit and Loſs ſheet.

2d, *Sundries Dr. to Profit and Loſs, for gain, on the following accounts.* The particulars are taken from the Cr. of the Profit and Loſs ſheet.

 3d, *Ba-*

3d, *Balance-account Dr. to Sundries, for debts and property belonging to me.*

4th, *Sundries Dr. to Balance-account, for debts due by me.* The particulars of this and the former are taken from the reſpective ſides of the balance-ſheet.

5th, *Profit and Loſs Dr. to Stock, for nett gain*; or
Stock Dr. to Profit and Loſs, for nett loſs.

6th, *Balance-account Dr. to Stock, for nett ſtock.*

50. When the four firſt of theſe articles are poſted in the leger, all the perſonal, real, and ſubſidiary accounts will balance, and you may add them as you go along. In accounts of goods, if there is any deficiency, you muſt enter it on the Cr. in the inner column; and, if there is any exceſs, you muſt enter it on the Dr. before you add the account. Then the ſums of every account and every column on the oppoſite ſides will be equal.

The only accounts that remain open are, *Profit and Loſs, Stock, and Balance.* The fifth poſt balances the profit and loſs account, and the ſixth balances the ſtock-account. It was noticed, that the whole ſums of Dr. and Cr. of the leger are equal; and therefore, if the ſides of every account, except one, are balanced, that one will balance of its own accord. The balance-account alone remains open, and, upon trial, you will find that the ſides are equal.

51. Some chooſe to inſert the particulars of the profit and loſs and balance ſheets in the reſpective accounts of the leger. If this is done, it is unneceſſary to enumerate them alſo in the journal.—Some chooſe to balance the accounts of goods, whenever the quantity is ſold off; and this method leſſens the work at the general balance, which is always ſufficiently laborious.

52. Thus is the ſtate of a perſon's affairs brought together, in a ſhort compaſs, under his view; and the articles of the balance-ſheet ſupply materials for a new inventory. It is convenient, however, to alter the order, and arrange the real accounts together, and the perſonal ones together.

53. It is not neceſſary to begin new books, nor open the accounts anew, unleſs the old folios be full. The accounts may be continued in the former folios; but it is beſt to begin a new leger, if the old one is not likely to hold all the buſineſs of the next year. Where ſeveral ſets of books are uſed, it is common to diſtinguiſh them by the letters of the alphabet. The firſt waſte-book, journal, and leger, are marked A; the ſecond, B; and ſo on.

In the following ſpecimen, the waſte-book and journal are placed on oppoſite pages, that the learner may eaſily compare them; and the rules are referred to by their numbers.

(1) WASTE-BOOK.
London, JANUARY 1. 1789.

				L	s	d
√	INVENTORY of ready money, goods, and debts, belonging to James Oſwald.					
	Ready money - -		L 75 10 —			
	200 bolls meal, at 13s	L 130 — —				
	6 hds Port wine, at 15l	90 — —				
	70 reams paper, at 10s 6d	36 15 —				
	120 ſp. five hank yarn, at 2s 3d	13 10 —				
			270 5 —			
	A houſe in Whitechapel, value -		300 — —			
	James Boſwell merch. owes per account	L 73 4 —				
	Thomas Pirie owes per do,	12 3 8				
	Henry Hardy merch. Hull, per bill	75 — —				
	David Miller manufacturer Mancheſter per receipt	18 — —				
			178 7 8			
	§ 25			824	2	8
	LIST of debts by the ſaid James Oſwald.					
√	To the Bank per account -		L 230 — —			
	To Tho. Smith merchant per do		54 — —			
	To Will. Niſbet carpenter Leith per do		28 7 3			
	§ 25			312	7	3
	—3.—					
√	Bought for ready money 105 yards calicoe, at 3s 2d Rule III.			16	12	6
√	Sold James Cuthbert merchant Briſtol 50 bolls meal, at 13s 3d Rule I.			33	2	6
	—5.—					
√	Bartered 60 ſpindles five hank yarn, at 2s 4d, for 80 yards diaper, at 1s 9d Rule III.			7	—	—

JOURNAL. (1)
London, JANUARY 1. 1789.

				L	s	d
	Sundries Dr. to Stock, for articles belonging to James Oſwald.					
.1	*Caſh* on hand - -		L 75 10 —			
.1	*Meal.* For 200 bolls at 13s	L 130 — —				
.1	*Port-Wine.* For 6 hds at 15l	90 — —				
.2	*Paper.* For 70 rms, at 10s 6d	36 15 —				
.2	*Yarn.* For 120 ſp. five hank, at 2s 3d	13 10 —				
			270 5 —			
.2	*Houſe in Whitechapel*, value -		300 — —			
.2	*Ja. Boſwell* mer. per ac.	L 73 4 —				
.2	*Tho. Pirie* per do	12 3 8				
.2	*Henry Hardy* merchant Hull per bill -	75 — —				
.2	*David Miller* manufacturer Mancheſter per receipt	18 — —				
.1			178 7 8			
				824	2	8
.1	*Stock Dr. to Sundries.*					
.2	*To the Bank* per account -		L 230 — —			
.3	*To Tho. Smith* merch. per acc.		54 — —			
.3	*To Will. Niſbet* carpenter Leith per do		28 7 3			
				312	7	3
	—3.—					
.3 / .1	*Calico Dr. to Caſh.* Bought 105 yards at 3s 2d			16	12	6
.3 / .1	*James Cuthbert* merchant Briſtol, *Dr. to Meal*, ſold 50 bolls, at 13s 3d - -			33	2	6
	—5.—					
.3 / .2	*Diaper Dr. to Yarn.* Delivered 60 ſp. five hank in barter for 80 yards, at 1s 9d -			7	—	—

(2) WASTE-BOOK.

London, January 10. 1789.

	Entry		L	s	d
√	Paid William Nisbet in full - - Rule I.		28	7	3
	—13.—				
√	Bought from Will. Bruce merchant Bristol, 200 bushels salt, at 1s 8d	L16 13 4			
	320 stone iron, at 3s 4d	53 6 8	70	—	—
	Rule II.				
	—15.—				
√	Sold 30 rms paper to Ja. Boswell, at 12s	L18 — —			
	12 to John Henderson stationer at 12s - - -	7 4 —			
	5 for ready money, at 11s	2 15 —	27	19	—
	47 Rules I. III.				
	—19.—				
√	Sold Will. Hunter Malden 150 bush. salt, at 1s 9d L13 2 6				
	Received in part -	L10 — —			
	And he owes the balance -	3 2 6	13	2	6
	Rules I. III.				
	—22.—				
√	Received from Henry Hardy in payment of his bill - -	L75 — —			
	And for interest on do	2 10 —	77	10	—
	Rules II. VII.				
√	Paid the Bank - - - Rule I.		100	—	—
	—26.—				
√	Bought from Alex. Sharp merch. Dundee 500 sp. four hank yarn, at 1s 11d L47 18 4				
	Paid him in part - -	L15 — —			
	And the balance due to him is -	32 18 4	47	18	4
	Rules II. III.				
	—30.—				
√	Received 150 bolls meal, 13s 2d L98 : 15s, in barter for 6d hds. Port Wine, at L16	L96 — —			
	Paid the balance - -	2 15 —	98	15	—
	Rule III.				

London, 2d February 1789.

	Entry		L	s	d
√	Sold James Boswell				
	48 bush. salt, being the rem. at 1s $8\frac{1}{2}$d	L4 2 —			
	60 sp. five hank yarn, at 2s $3\frac{1}{2}$d	6 17 6			
	100 stone iron, at 3s $4\frac{1}{2}$d -	16 17 6	27	17	—
	Rule I.				
	—3.—				
√	Received from James Cuthbert in part Rule II.		30	—	—
	—10.—				
√	Bartered 22 reams paper, at 12s	L13 4 —			
	30 bolls meal, at 13s 6d	20 5 —			
		L33 9 —			
	For $334\frac{1}{2}$ sp. four hank yarn, at 2s Rule III.		33	9	—

JOURNAL. (2)

London, January 10. 1789.

Fol.	Entry		L	s	d
.3 / .1	*William Nisbet Dr. to Cash.* Paid him in full		28	7	
	—13.—				
	Sundries Drs. to William Bruce merchant Bristol.				
.3	*Salt.* For 200 bushels, at 1s 8d	L16 13 4			
.3	*Iron.* For 320 stones, at 3s 4d	53 6 8	70	—	—
.3					
	—15.—				
	Sundries Drs. to Paper.				
.2	*James Boswell, for* 30 rms, at 12s	L18 — —			
.4	*John Henderson* stationer for 12 12s	7 4 —			
.1	*Cash.* For - 5 11s	2 15 —			
.2	47		27	19	—
	—19.—				
	Sundries Drs. to Salt, for 150 bsh. at 1s 9d, L13 2 6				
.1	*Cash.* Received in part -	L10 — —			
.4	*William Hunter* Malden, for balance				
.3	due by him - -	3 2 6	13	2	6
	—22.—				
.1	*Cash Dr. to Sundries.*				
.2	*To Henry Hardy.* Rec. paym. of his bill	L75 — —			
.1	*To Profit and Loss.* Rec. interest on do	2 10 —	77	10	—
.2 / .2	*Bank Dr. to Cash.* Paid them - -		100	—	—
	—26.—				
.2	*Yarn Dr. to Sundries,* for 500 spindles four hank, at 1s 11d L47 18 4				
.1	*To Cash.* Paid in part -	L15 — —			
.4	*To Alex. Sharp* merch. Dundee, for bal.	32 18 4	47	18	4
	—30.—				
.1	*Meal Dr. to Sund.* for 150 bolls, at 13s 2d L98 : 15s				
.1	*To Port-Wine.* For 6 hds. delivered in barter, L16 - -	L96 — —			
.1	*To Cash.* Paid balance -	2 15 —	98	15	—

London, 2d February 1789.

Fol.	Entry		L	s	d
.2	*James Boswell Dr. to Sundries.*				
.3	*To Salt,* for 48 bush. being the rem. at 1s $8\frac{1}{2}$d - -	L4 2 —			
.2	*To Yarn,* for 60 sp. five hank, at 2s $3\frac{1}{2}$d	6 17 6			
.3	*To Iron,* for 100 stones, at 3s $4\frac{1}{2}$d	16 17 6	27	17	—
	—3.—				
.1 / .3	*Cash Dr. to James Cuthbert.* Received in part		30	—	—
	—10.—				
.2	*Yarn Dr. to Sundries.* For $334\frac{1}{2}$ sp. four hank yarn, at 2s L33 : 9s				
.2	*To Paper.* For 22 reams delivered in barter, at 12s -	L13 4 —			
.1	*To Meal.* For 30 bolls, at 13s 6d	20 5 —	33	9	—

(3) WASTE-BOOK.

London, 10*th* FEBRUARY, 1789.

			L	s	d
√	Taken for the ufe of my fhop the remaining ream paper, value - - -		—	10	6
	Rule VI.				
	—16.—				
√	Received from William Hunter in full	L3 2 6			
	from James Bofwell in part	70 — —	73	2	6
	Rule II.				
√	Paid the Bank - - -		100	—	—
	Rule I.				
	—19.—				
√	Bartered 100 yards calicoes, at 3s 6d	L17 : 10s			
	For one hd. Port-wine - -	L14 10 —			
	Received the balance - -	3 — —	17	10	—
	Rule III.				
√	Sold 30 bolls meal for ready money, at 13s 8d -	L20 10 —			
	45 to Henry Hardy, at 13s 10d	31 2 6			
	27 to William Hunter, at 13s 10d	18 13 6			
	52 to Baillie and Bell, Strand, at 13s 10d - -	35 19 4	106	5	4
	154 Rules I. III.				
	—23.—				
√	Drawn on the Bank - - -		120	—	—
	Rule II.				
√	Paid William Bruce in part -	L 50 — —			
	Alexander Sharp in full -	32 18 4			
	And Tho. Smith's bill on me at fight	35 — —	117	18	4
	Rule I.				

London, 2*d* MARCH, 1789.

			L	s	d
√	Paid charges and cellar-rent of falt -	L 1 2 6			
	Charges and loft rent of meal -	3 3 —	4	5	6
	Rule IV.				
	—4.—				
√	Received from Thomas Pirie in full	L 12 — —			
	Difcounted him - -	— 3 8	12	3	8
	Rules II. VI.				
	—5.—				
√	Sold James Dalton, Manchefter				
	60 fpindles four hank yarn, at 2s ¼d	L 6 1 3			
	300 do do at 1s 11¾d	29 13 9	35	15	—
	360 Rule I.				
	—12.—				
√	Received from Jan Jonkheer Rotterdam 6 bags clover feed, qt. 200 lb. each, amount per invoice *f*. 312, at 22d per *f*. -	L 28 12 —			
	Paid freight and charges -	1 5 —	29	17	—
	Rules II. IV.				

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London, 10*th* FEBRUARY, 1789.

Fol.			L	s	d
.4/.2	*Charges Merchandize Dr. to Paper*, taken for the ufe of fhop, 1 ream, value - -		—	10	6
	—16.—				
.1	*Cafh Dr. to Sundries.*				
.4	*To William Hunter.* Received in full	L3 2 6			
.2	*To James Bofwell* — in part	70 — —	73	2	6
.2/.1	*Bank Dr. to Cafh.* Paid them - -		100	—	—
	—19.—				
	Sundries Drs. to Calicoes. For 100 yards delivered in barter, at 3s 6d L17 : 10s				
.1	*Port Wine.* For 1 hd.	L14 10 —			
.1/.3	*Cafh.* Received balance -	3 — —	17	10	—
	Sundries Drs. to Meal.				
.1	*Cafh.* For 30 bolls, at 13s 8d	L 20 10 —			
.2	*Henry Hardy.* For 45 13s 10d	31 2 6			
.4	*William Hunter.* For 27 13s 10d	18 13 6			
.4/.1	*Baillie and Bell,* Strand For 52 13s 10d	35 19 4	106	5	4
	154				
	—23.—				
.1/.2	*Cafh Dr. to Bank.* Drawn on them		120	—	—
	Sundries Drs. to Cafh.				
.3	*William Bruce.* Paid him in part	L. 50 — —			
.4	*Alex. Sharp.* Paid him in full -	32 18 4			
.3/.1	*Tho. Smith.* Paid his bill on me at fight	35 — —	117	18	4

London, 2*d* MARCH, 1789.

Fol.			L	s	d
	Sundries Drs. to Cafh.				
.3	*Salt.* Paid charges and cellar-rent	L 1 2 6			
.1/.1	*Meal.* Paid charges and loft-rent -	3 3 —	4	5	6
	—4.—				
	Sundries Drs. to Thomas Pirie.				
.1	*Cafh.* Received in full -	L 12 — —			
.1/.2	*Profit and Lofs.* Difcounted him	— 3 8	12	3	8
	—5.—				
	James Dalton, Manchefter, *Dr. to Yarn.*				
.4/.2	For 60 fp. four hank, at 2s ¼d	L 6 1 3			
	And 300 do. at 1s 11¾d	29 13 9	35	15	—
	360				
	—12.—				
.4	*Clover-feed Dr. to Sundries.*				
.4	*To Jan Jonkheer*, for 6 bags, qt. 200 lb. each, is 1200 lb. amount per invoice, *f*. 312, at 22d - - -	L 28 12 —			
.1	*To Cafh.* Paid freight and charges	1 5 —	29	17	—

(4) WASTE-BOOK.

London, 17th March, 1789.

√	Bartered with James Bofwell 2 bags clover-feed, at 6l		
	L 12, for 2 hds. lintf. at 55s	L 5 10 —	
	Received in money	5 — —	
	And he owes the balance	1 10 —	12 — —
	Rules III. I.		
√	Paid Tho. Smith in full	L 19 — —	
	And for intereft	1 10 —	20 10 —
	Rules I. IV.		
	—21.—		
√	Sold 140 lb. clover-feed to John Scott farmer at Haugh-head, at 7½d	L 4 7 6	
	70 to James Cuthbert, at 7½d	2 3 9	
	120 for ready money, at 7¼d	3 12 6	10 3 9
	330		
	Rules I. II.		
	—24.—		
√	James Bofwell has paid the Bank on my acct. Rule VIII.		40 — —
	—25.—		
√	Bought from William Ainflie merchant Alloa ½ fhare of the fhip Hazard, for Rule II.		150 — —
	—28.—		
√	Sold Baillie and Bell,		
	150 ftone Iron, at 3 s 7 d	L 26 17 6	
	1 hd. Port-wine	15 5 —	42 2 6
	Rule I.		

London, 2d April, 1789.

√	Sold for ready money		
	50 yards diaper, at 1 s 11 d	L 4 15 10	
	30 bolls meal, at 13 s 7 d	20 7 6	
	1 hd. lint-feed	3 3 —	
	160 lb. clover-feed, at 7¾d	5 3 4	
	30 ftone iron, at 3 s 6½d	5 6 3	38 15 11
	Rule III.		
	—6.—		
√	Drawn on the Bank for Rule II.		60 — —
√	Bought for ready money		
	30 cafks train oil, at 22 s	L 33 — —	
	30 bolls meal, at 13s L 19 10 —		
	40 do. at 13 s 2 d 26 6 8		
	70	45 16 8	78 16 8
	Rule III.		
√	Sold Will. Ainflie 30 yds. diaper, at 2 s	L 3 — —	
	And paid him	30 — —	33 — —
	Rule I.		
	—8.—		
√	Baillie and Bell have paid Will. Ainflie, at my defire, balance of my fhare of the fhip Hazard. Rule VIII.		117 — —

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London, 17th March, 1789.

	Sundries Drs. to Clover-feed. For 2 bags, at 6l L 12		
.4	*Lint-feed*, for 2 hds. recd. in bart. 55s	5 10 —	
.1	*Cafh.* In part	5 — —	
.2	*James Bofwell*, for balance	1 10 —	12 — —
.4			
	Sundries Drs. to Cafh.		
.3	*Thomas Smith.* Paid him in full	L 19 — —	
.1	*Profit and Lofs.* Paid him intereft	1 10 —	20 10 —
.1			
	Sundries Drs. to Clover-feed.		
.5	*John Scott*, farmer at Haugh-head, for 140 lb. at 7½d	L 4 7 6	
.3	*James Cuthbert*, for 70 at 7½d	2 3 9	
.1	*Cafh* for 120 at 7¼d	3 12 6	10 3 9
.4	330		
.2 / .2	*Bank Dr. to James Bofwell.* Paid them by him		40 — —
	—25.—		
.5 / .5	*Share of fhip Hazard Dr. to William Ainflie* merchant Alloa, bought ½ fhare for		150 — —
	—28.—		
.4	*Baillie and Bell Drs. to Sundries.*		
.3	*To Iron.* For 150 ftone, at 3 s 7 d	L 26 17 6	
.1	*To Port wine.* For 1 hd.	15 5 —	42 2 6

London, 2d April, 1789.

.1	*Cafh Dr. to Sundries.*		
.3	*To Diaper.* For 50 yards, at 1s 11d	L 4 15 10	
.1	*To Meal.* For 30 bolls, at 13s 7d	20 7 6	
.4	*To Lint-feed.* For 1 hd.	3 3 —	
.4	*To Clover-feed.* For 160 lb. at 7¾d	5 3 4	
.3	*To Iron.* For 30 ftone, at 3s 6½d	5 6 3	38 15 11
	—6.—		
.1 / .2	*Cafh Dr. to Bank.* Drawn on them for		60 — —
	Sundries Drs. to Cafh.		
.5	*Train-oil.* For 30 cafks, at 22 s	L 33 — —	
.1	*Meal.* For 30 bolls, at 13 s L 19 10 —		
.1	And 40 at 13 s 2 d 26 6 8		
	70	45 16 8	78 16 8
	William Ainflie Dr. to Sundries.		
.5	*To Diaper.* For 30 yards, at 2 s	L 3 — —	
.3	*To Cafh.* Paid him	30 — —	33 — —
.1			
	—8.—		
.5 / .4	*William Ainflie Dr. to Baillie and Bell.* Paid him by them on my account, being balance of fhare of fhip Hazard		117 — —

(5) WASTE-BOOK.

London, 11th APRIL, 1789.

	Entry	L	s	d	L	s	d
√	Sold James Boswell 20 casks train-oil, at 27 s				27	—	—
	Rule I.						
	— 14. —						
√	Sold George Gordon mercht. Stirling						
	10 casks train oil, at 28 s	L 14	—	—			
	1 hd. lint-seed -	3	5	—			
	35 bolls meal, at 13s 8d -	23	18	4			
		L 41	3	4			
	Received in part -	L 35	—	—			
	And he owes the balance -	6	3	4			
					41	3	4
	Rules I. II.						
	— 16. —						
√	Paid Baillie & Bell's bill on me to C. Cowan, at sight				38	18	2
	Rule I.						
	— 18. —						
√	Taken for the use of my family, the remaining five yards calicoe, at 3s 2d				—	15	10
	Rule VI.						
	— 22. —						
√	The Bank has paid Jan Jonkheer's bill on me, 1 mdt. at my desire				28	12	—
	Rule VIII.						
	— 25. —						
√	Received my proportion of profits on a voyage to Rotterdam by the Hazard				33	—	—
	Rule V.						
	— 30. —						
√	Paid for small charges on my business since 1st January -	L 5	3	8			
	Personal and family expences -	32	—	—			
					37	3	8
	Rule VI.						
√	Due Thomas Sharp, my clerk, for wages -				8	—	—
	Rule VI.						
√	Due the Bank for interest - -				2	11	2
	Rule VI.						
	Previous to the balancing of my books, I have taken an inventory of the goods in my shop and ware-house,						
	124 bolls meal, at 13s 6d -	L 83	14	—			
	474 sp. four hank yarn, at 2s -	47	8	—			
	40 stone iron, at 3s 4d - -	6	13	4			
	300 lb. clover-seed, at 6d - -	7	10	—			
		L 145	5	4			
	I value my house at - -	300	—	—			
	And my share of ship Hazard -	140	—	—			
	-	L 585	5	4			

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London, 11th APRIL, 1789.

Fol.	Entry	L	s	d	L	s	d
.2 / .5	*James Boswell Dr. to Train-oil.* Sold him 20 casks at 27 s				27	—	—
	— 14. —						
.5	*George Gordon Dr. to Sundries.*						
.5	*To Train-oil.* For 10 casks, at 28 s	L 14	—	—			
.4	*To Lint-seed.* For 1 hd.	3	5	—			
.1	*To Meal.* For 35 bolls, at 13s 8d	23	18	4			
					41	3	4
.1 / .5	*Cash Dr. to George Gordon.* Received in part				35	—	—
	— 16. —						
.4 / .1	*Baillie and Bell Dr. to Cash.* Paid their bill on me to C. Cowan, at sight				38	18	2
	— 18. —						
.5 / .3	*Proper expences Dr. to Calicoes.* For 5 yards taken for family use, at 3s 2d - -				—	15	10
	— 22. —						
.4 / .2	*Jan Jonkheer Dr. to Bank.* For his bill on me 1 mdt. paid by them - -				28	12	—
	— 25. —						
.1 / .5	*Cash Dr. to Share of Ship Hazard.* Received my proportion of profits on a voyage to Rotterdam				33	—	—
	— 30. —						
	Sundries Dr. to Cash.						
.4	*Charges Merchandize.* Paid small charges since Jan. 1. - -	L 5	3	8			
.5 / .1	*Proper Exp.* Paid pers. and family charges	32	—	—			
					37	3	8
.4 / .5	*Charges of Merchandize Dr. to Thomas Sharp,* my clerk. Due him for wages - -				8	—	—
.1 / .2	*Profit and Loss Dr. to Bank.* Due them for int.				2	11	2
.1	*Profit and Loss Dr. to Sundries,* for articles of loss.						
.5	*To Salt* - -	L —	11	4			
.4	*To Charges Merchandize* -	13	14	2			
.5	*To Proper Expences* - -	32	15	10			
	See § 49.				47	1	4
	Sundries Drs. to Profit and Loss, for articles of gain.						
.1	*Meal* - - -	L 9	18	—			
.1	*Port-wine* - - -	6	15	—			
.2	*Paper* - - -	4	18	6			
.2	*Yarn* - -	2	3	2			
.3	*Calicoes* - - -	1	13	4			
.3	*Diaper* - - -	—	15	10			
.3	*Iron* - - -	2	7	11			
.4	*Clover-seed* - -	5	—	1			
.4	*Lint-seed* - -	—	18	—			
.5	*Share of ship Hazard* - -	23	—	—			
.5	*Train-oil* - - -	8	—	—			
.1					65	9	10

(6) JOURNAL.

London, 30th April, 1789.

Fol.	Particulars	L	s	d	L	s	d
.5	*Bal. Account Dr. to Sun.* for articles belonging to me.						
.1	*To Cash* - - -	L 8	3	10			
.1	*To Meal.* For 124 bolls, at 13s 6d	83	14	—			
.2	*To Yarn.* For 474 sp. at 2s, missing ½ spindle. -	47	8	—			
.2	*To House in Whitechapel* -	300	—	—			
.2	*To James Boswell* - -	37	11	—			
.2	*To Henry Hardy* - -	31	2	6			
.2	*To David Miller* - -	18	—	—			
.3	*To James Cuthbert* - -	5	6	3			
.3	*To Iron.* For 40 stone, at 3s 4d -	6	13	4			
.4	*To John Henderson* - -	7	4	—			
.4	*To William Hunter* - -	18	13	6			
.4	*To James Dalton* - -	35	15	—			
.4	*To Clover-seed.* For 300 lb. at 6d Inlake 10 lb.	7	10	—			
.5	*To John Scott* - -	4	7	6			
.5	*To Share of ship Hazard* -	140	—	—			
.5	*To George Gordon* - -	6	3	4			
					757	12	3
	Sundries Drs. to Balance-account.						
.1	*Meal.* Outcome 3 bolls.						
.2	*Bank* - - -	L 201	3	2			
.3	*William Bruce* - -	20	—	—			
.5	*Thomas Sharp* - -	8	—	—			
					229	3	2
.5 / .1	*Profit and Loss Dr. to Stock,* for nett gain				16	13	8
.1 / .1	*Stock Dr. to Balance-Account,* for nett stock				528	9	1
.5							

The next JOURNAL would begin thus:

Particulars	Items	Subtotals	Amount	Total
Sundries Drs. to Stock.				
Cash on hand - -			L 8 3 10	
Meal. For 124 bolls, at 13s	L 83 14 —			
Yarn. For 474 sp. 4-hank, at 2s	47 8 —			
Iron. For 40 stone, at 3s 4d	6 13 4			
Clover-seed. For 300 lb. at 6d	7 10 —			
			145 5 4	
House in Whitechapel, value	L 300 — —			
Share in ship Hazard. For one third -	140 — —			
			440 — —	
James Boswell, due by him	L 37 11 —			
Henry Hardy, Hull.	Do 31 2 6			
David Miller, Manchester.	Do 18 — —			
James Cuthbert, Leith.	Do 5 6 3			
John Henderson	Do 7 4 —			
William Hunter, Malden.	Do 18 13 6			
James Dalton, Manchester.	Do 35 15 —			
John Scott, Haughhead.	Do 4 7 6			
George Gordon, Stirling.	Do 6 3 4			
			164 3 1	
				757 12 3
Stock Dr. to Sundries.				
To Bank. Due them -			L 201 3 2	
To William Bruce, Leith. Due him			20 — —	
Thomas Sharp, my clerk. Do -			8 — —	
				229 3 2

(1) LEGER. (1)

Dr. *Stock,*

Date			Particulars	Fo.	L	s	d
1789	Jan.	1	To Sundries per J.		312	7	3
	Apr.	30	To Balance-account, for nett ftock	5	528	9	1
					840	16	4

Contra Cr.

Date			Particulars	Fo.	L	s	d
1789	Jan.	1	By Sundries, per J.		824	2	8
	Apr.	30	By Profit and Lofs, for nett gain	1	16	13	8
					840	16	4

Dr. *Profit and Lofs,*

Date			Particulars	Fo.	L	s	d
1789	Mar.	4	To Thomas Pirie, difcounted him	2	—	3	8
	Apr.	17	To Cafh, paid Tho. Smith intereft	1	1	10	—
		30	To Bank, for intereft due them	2	2	11	2
		—	To Sundries, per J.		47	1	4
		—	To Stock, for nett gain	1	16	13	8
					67	19	10

Contra Cr.

Date			Particulars	Fo.	L	s	d
1789	Jan.	22	By Cafh, received int. on Hen. Hardy's bill	1	2	10	—
	Apr.	30	By Sundries, per J.		65	9	10
					67	19	10

Dr. *Cafh,*

Date			Particulars	Fo.	L	s	d
1789	Jan.	1	To Stock on hand	1	75	10	—
		15	To Paper, for 5 reams, at 11s	2	2	15	—
		19	To Salt, in part, per J.	3	10	—	—
		22	To Sundries for Hen. Hardy's bill, with int.		77	10	—
	Feb.	3	To James Cuthbert, in part	3	30	—	—
		16	To Sundries, per J.		73	2	6
		19	To Calicoes, for bal. of 100 yards, per J.	3	3	—	—
		—	To Meal, for 30 bolls, at 13s 8d	1	20	10	—
		20	To Bank, drawn on them	2	120	—	—
	Mar.	4	To Thomas Pirie, in full	2	12	—	—
		17	To Clover feed, in part, for 2 bags	4	5	—	—
		21	To Clover-feed, for 120 lb. at 7¼d	4	3	12	6
	Apr.	2	To Sundries, per J.		38	15	11
		6	To Bank, drawn on them	2	60	—	—
		14	To George Gordon, in part	5	35	—	—
		25	To fhare of fhip Hazard for fhare profits p. J.	5	33	—	—
					599	15	11

Contra Cr.

Date			Particulars	Fo.	L	s	d
1789	Jan.	3	By Calicoes, for 105 yards, at 3s 2d	3	16	12	6
		10	By William Nifbet, in full	3	28	7	3
		22	By Bank, paid them	2	100	—	—
		26	By Yarn, in part, for 500 fp. four hank	2	15	—	—
		30	By Meal, paid balance of 150 bolls	1	2	15	—
	Feb.	16	By Bank, paid them	2	100	—	—
		21	By Sundries, per J.		117	18	4
	Mar.	2	By Sundries per J.		4	5	6
		12	By Clover-feed, paid freight and charges	4	1	5	—
		17	By Sundries, paid Tho. Smith, with int. per J.		20	10	—
	Apr.	6	By Sundries, per J.		78	16	8
		—	By William Ainflie, paid him	5	30	—	—
		16	By Baillie and Bell, paid their bill on me ft.	4	38	8	2
		30	By Sundries, for charges and expences per J.		37	3	8
		—	By Balance-account	5	8	3	10
					599	15	11

Dr. *Meal,*

Date			Particulars	Bolls	Fo.	L	s	d
1789	Jan.	1	To Stock on hand, at 13s	200	1	130	—	—
		30	To Sundries, per J. at 13s 2d	150		98	15	—
	Mar.	2	To Cafh, paid charges and loft-rent	—	1	3	3	—
		6	To Cafh, per J.	70	1	45	16	8
	Apr.	30	To Profit and Lofs, for gain	—	1	9	18	—
			Outcome	3				
				423		287	12	8

Contra Cr.

Date			Particulars	Bolls	Fo.	L	s	d
1789	Jan.	3	By James Cuthbert, at 13s 3d	50	3	33	2	6
	Feb.	10	By Yarn in barter, at 13s 6d	30	2	20	5	—
		19	By Sundries, per J.	154		100	5	4
	Apr.	2	By Cafh, at 13s 7d	30	1	20	7	6
		14	By George Gordon, at 13s 8d	35	5	23	10	4
		30	By Balance-account, at 13s 4d	124	5	83	14	—
				423		287	12	8

Dr. *Port-wine,*

Date			Particulars	Hds	Fo.	L	s	d
1789	Jan.	1	To Stock on hand, at L 15	6	1	90	—	—
	Feb.	19	To Calicoes, in barter	1	3	14	10	—
	Apr.	30	To Profit and Lofs, for gain		1	6	15	—
				7		111	5	—

Contra Cr.

Date			Particulars	Hds.	Fo.	L	s	d
1789	Jan.	10	By Meal in barter, at L 16	6	1	96	—	—
	Mar.	28	By Baillie and Bell	1	4	15	5	—
				7		111	5	—

(2) LEGER. (2)

Paper, Dr.

1789			R.	Fo.	£	s	d
Jan.	1	To Stock on hand, at 10s 6d	70	1	36	15	—
Apr.	30	To Profit and Loss, for gain		1	4	18	6
			70		41	13	6

Contra Cr.

1789			R.	Fo.	£	s	d
Jan.	15	By Sundries, per J.	47		27	19	—
Feb.	10	By Yarn in barter, at 12s	22	2	13	4	—
	—	By Charges Merchandize, for shop-use	1	4	—	10	6
			70		41	13	6

Yarn, Dr.

1789			Spindles 4 H	Spindles 5 H	Fo.	£	s	d
Jan.	1	To Stock on hand, at 2s 3d	——	120	1	13	10	—
	26	To Sundries, per J. at 1s 11d	500	——		47	18	4
Feb.	10	To Sundries per J. at 2s	334½	——		33	9	—
Apr.	30	To Profit and Loss, for gain	——	——	1	2	3	2
			834½	120		97	—	6

Contra Cr.

1789			Spindles 4 H	Spindles 5 H	Fo.	£	s	d
Jan.	5	By Diaper, at 2s 4d	——	60	3	7	—	—
Feb.	2	By James Boswell, at 2s 3½d	——	60	2	6	17	6
Mar.	5	By James Dalton, per J.	360	—	4	35	15	—
Apr.	30	By Balance-account, at 2s	474	—	5	47	8	—
		Missing	½	—		—	—	—
			834½	120		97	—	6

House in Whitechapel, Dr.

1789			Fo.	£	s	d
Jan.	1	To Stock, for value	1	300	—	—

Contra Cr.

1789			Fo.	£	s	d
Apr.	30	By Balance-account	5	300	—	—

Ja. Boswell merchant, Dr.

1789			Fo.	£	s	d
Jan.	1	To Stock due by him, per account	1	73	4	—
	15	To Paper, for 30 reams, at 12s	2	18	—	—
Feb.	2	To Sundries, per J.		27	17	—
Mar.	17	To Clover-seed, for bal. of 2 bags, per J.	4	1	10	—
Apr.	11	To Train-oil, for 20 casks, at 27s	5	27	—	—
				147	11	—

Contra Cr.

1789			Fo.	£	s	d
Feb.	16	By Cash in part	1	70	—	—
Mar.	24	By Bank, paid in by him	2	40	—	—
Apr.	30	By Balance-account	5	37	11	—
				147	11	—

Thomas Pirie, Dr.

1789			Fo.	£	s	d
Jan.	1	To Stock due by him, per account	1	12	3	8

Contra Cr.

1789			Fo.	£	s	d
Mar.	4	By Sundries in full, with discount per J.		12	3	8

Henry Hardy merchant Hull, Dr.

1789			Fo.	£	s	d
Jan.	1	To Stock due by him per bill	1	75	—	—
Feb.	19	To Meal, for 45 bolls, at 13s 10d	1	31	2	6

Contra Cr.

1789			Fo.	£	s	d
Jan.	22	By Cash in full	1	75	—	—
Apr.	30	By Balance-account	5	31	2	6

David Miller manufacturer Manchester, Dr.

1789			Fo.	£	s	d
Jan.	1	To Stock due by him per receipt	1	18	—	—

Contra Cr.

1789			Fo.	£	s	d
Apr.	30	By Balance-account	5	18	—	—

Bank, Dr.

1789			Fo.	£	s	d
Jan.	22	To Cash, paid them	1	100	—	—
Feb.	16	To Cash, paid them	1	100	—	—
Mar.	24	To Ja. Boswell, paid them by him	2	40	—	—
Apr.	30	To Balance-account	5	201	3	2
				441	3	2

Contra Cr.

1789			Fo.	£	s	d
Jan.	1	By Stock, due them per account	1	230	—	—
Feb.	23	By Cash, drawn on them	1	120	—	—
Apr.	6	By Cash drawn on them	1	60	—	—
	22	By J. Jonkheer, for his bill paid them, p. J.	4	28	12	—
	30	By Profit and Loss, for interest due them	1	2	11	2
				441	3	2

(3) LEGER. LEGER. (3)

Dr.		*Tho. Smith merchant,*	Qty	Fo.	£	s	d			*Contra* Cr.	Qty	Fo.	£	s	d
1789								1789							
Feb.	23	To Caſh, paid his bill on me at ſight		1	35	—	—	Jan.	1	By Stock, due him per account		1	54	—	—
Mar.	17	To Caſh, in full - -		1	19	—	—								
					54	—	—						54	—	—

Dr.		*Will. Niſbet carpenter Windſor,*	Qty	Fo.	£	s	d			*Contra* Cr.	Qty	Fo.	£	s	d
1789								1789							
Jan.	10	To Caſh, paid him in full -		1	28	7	3	Jan.	1	By Stock, due him per account		1	28	7	3

Dr.		*Calicoes,*	*Yds.*	Fo.	£	s	d			*Contra* Cr.	*Yds.*	Fo.	£	s	d
1789								1789							
Jan.	3	To Caſh, at 3s 2d - -	105	1	16	12	6	Feb.	19	By Sundries, per J. at 3s 6d -	100		17	10	—
Apr.	30	To Profit and Loſs, for gain -		1	1	13	4	Apr.	19	By proper Expences taken at 3s 2d	5	5	—	15	10
			105		18	5	10				105		18	5	10

Dr.		*Ja. Cuthbert merchant Liverpool,*	Qty	Fo.	£	s	d			*Contra* Cr.	Qty	Fo.	£	s	d
1789								1789							
Jan.	3	To Meal, for 50 bolls, at 13s 3d		1	33	2	6	Feb.	3	By Caſh in part - -		1	30	—	—
Mar.	21	To Clover-ſeed, for 70 lb. at 7½d		4	2	3	9	Apr.	30	By Balance-account - -		5	5	6	3
					35	6	3						35	6	3

Dr.		*Diaper,*	*Yds.*	Fo.	£	s	d			*Contra* Cr.	*Yds.*	Fo.	£	s	d
1789								1789							
Jan.	5	To Yarn in barter, at 1s 9d	80	2	7	15	10	Apr.	2	By Caſh at 1s 11d - -	50	1	4	15	10
Apr.	30	To Profit and Loſs, for gain -		1	—	—	—		3	By William Ainſlie, at 2s -	30	5	3	—	—
			80		7	15	10				80		7	15	10

Dr.		*Salt,*	*Buſh.*	Fo.	£	s	d			*Contra* Cr.	*Buſh.*	Fo.	£	s	d
1789								1789							
Jan.	13	To William Bruce, at 1s 8d -	200	3	16	13	4	Jan.	19	By Sundries, per J. at 1s 9d	150		13	2	6
Mar.	2	To Caſh, paid charges and cellar-rent		1	1	2	6	Feb.	2	By J. Boſwell, for the rem. at 1s 8½d	48	2	4	2	—
								Apr.	30	By Profit and Loſs, -		1	—	11	4
										Inlake	2				
			200		17	15	10				200		17	15	10

Dr.		*William Bruce merchant Briſtol,*	Qty	Fo.	£	s	d			*Contra* Cr.	Qty	Fo.	£	s	d
1789								1789							
Feb.	23	To Caſh in part - -		1	50	—	—	Jan.	13	By Sundries, per J. - -			70	—	—
Apr.	30	To Balance-account - -		5	20	—	—								
					70	—	—						70	—	—

Dr.		*Iron,*	*Stones,*	Fo.	£	s	d			*Contra* Cr.	*Stones.*	Fo.	£	s	d
1789								1789							
Jan.	13	To William Bruce, at 3s 4d -	320	3	53	6	8	Feb.	2	By James Boſwell, at 3s 4½d	100	2	16	17	6
Apr.	30	To Profit and Loſs, for gain -		1	2	7	11	Mar.	28	By Baillie and Bell, at 3s 7d	150	4	26	17	6
								Apr.	2	By Caſh, at 3s 6½d -	30	1	5	6	3
									30	By Balance-account, at 3s 4d	40	5	6	13	4
			320		55	14	7				320		55	14	7

(4) LEGER. Fo. | LEGER. (4) Fo.

				Fo.	£	s	d					Fo.	£	s	d
Dr.		*Jo. Henderſon ſtationer,*								*Contra* Cr.					
1789 Jan.	14	To paper, for 12 reams at 12s -		2	7	4	—	1789 Apr.	30	By Balance-account - -		5	7	4	—
Dr.		*William Hunter merchant Malden,*								*Contra* Cr.					
1789 Jan.	19	To Salt, for balance of 150 buſhels, per J.		3	3	2	6	1789 Feb.	16	By Caſh in full - -		1	3	2	6
Feb.	19	To Meal, for 27 bolls, at 13s 10d		1	18	13	6	Apr.	30	By Balance-account - -		5	18	13	6
Dr.		*Alexander Sharp merchant Dundee,*								*Contra* Cr.					
1789 Feb.	23	To Caſh, in full - -		1	32	18	4	1789 Jan.	20	By Yarn, for balance of 300 ſpindles, per J.		2	32	18	4
Dr.		*Charges Merchandize,*								*Contra* Cr.					
1789 Feb.	10	To paper, taken for ſhop-uſe, 1 ream		2	—	10	6	1789 Apr.	30	By Profit and Loſs - -		1	13	14	2
Apr.	30	To caſh, for ſmall charges ſince 1ſt Jan.		1	5	3	8								
		To Tho. Sharp, for wages -		5	8	—	—								
					13	14	2						13	14	2
Dr.		*Baillie and Bell, Strand,*								*Contra* Cr.					
1789 Feb.	19	To Meal, for 52 bolls, at 3s 10d		1	35	19	4	1789 Apr.	8	By William Ainſlie, paid him by them		5	117	—	—
Mar.	28	To Sundries per J.			42	2	6								
Apr.	16	To Caſh, pd their bill on me to C. Cowan, ſt		1	38	18	2								
					117	—	—						117	—	—
Dr.		*James Dalton Mancheſter,*								*Contra* Cr.					
1789 Mar.	5	To Yarn, for 360 ſpindles four hank, per J.		2	35	15	—	1789 Apr.	7	By Balance-account, - -		5	35	15	—
Dr.		*Clover-ſeed,*	lb.							*Contra* Cr.	lb.				
1789 Mar.	12	To Sundries per J. for pr. coſt and char.	1200		29	17	—	1789 Mar.	7	By Sundries per J. - -	400		12	—	—
Apr.	30	To Profit and Loſs, for gain		1	5	—	1		17	By Sundries per J. - -	330		10	3	9
								Apr.	2	By Caſh, at 7¾d - -	160	1	5	3	4
									30	By Balance account, at 6d -	300	5	7	10	—
										Inlake -	10				
			1200		34	17	1				1200		34	17	1
Dr.		*J. Jonkbeer merchant Rotterdam,*								*Contra* Cr.					
1789 Apr.	22	To Bank, for his bill on me paid by them		2	28	12	—	1789 Mar.	12	By Clover-ſeed, for 6 bags, per J. -		6	28	12	—
Dr.		*Lint-ſeed,*	Hds.							*Contra* Cr.	Hds.				
1789 Mar.	17	To Clover-ſeed, in barter at 55s	2	4	5	10	—	1789 Apr.	2	By Caſh - -	1	1	3	3	—
Apr.	30	To Profit and Loſs, for gain	—	1	—	18	—		14	By George Gordon -	1	5	3	5	—
			2		6	8	—				2		6	8	—

(5) LEGER. Fo. | LEGER. (5) Fo.

Dr. *John Scott farmer at Haughhead,*

Date		Particulars	Fo.	£	s	d
1789 Mar.	21	To Clover-seed, for 140 lb. at $7\frac{1}{2}$d	4	4	7	6

Contra **Cr.**

Date		Particulars	Fo.	£	s	d
1789 Apr.	30	By Balance-account - -	5	4	7	6

Dr. *Share of ship Hazard,*

Date		Particulars	Fo.	£	s	d
1789 Mar.	25	To William Ainslie, bought $\frac{1}{2}$ share for	5	150	—	—
Apr.	30	To Profit and Loss, - -	1	23	—	—
				173	—	—

Contra **Cr.**

Date		Particulars	Fo.	£	s	d
1789 Apr.	25	By Cash, for share profit of a voyage to Rot.	1	33	—	—
	30	By Balance-account - -	5	140	—	—
				173	—	—

Dr. *William Ainslie merchant Alloa,*

Date		Particulars	Fo.	£	s	d
1789 Apr.	6	To Sundries, per J. - -		33	—	—
	10	To Baillie and Bell, for bal. paid him by them	4	117	—	—
				150	—	—

Contra **Cr.**

Date		Particulars	Fo.	£	s	d
1789 Mar.	25	By Share of Ship Hazard, for $\frac{1}{2}$ bt. from him	5	150	—	—
				150	—	—

Dr. *Train-oil,*

Date		Particulars	Casks	Fo.	£	s	d
1789 Apr.	6	To Cash, at 22s - -	30	1	33	—	—
	30	To Profit and Loss, for gain -		1	8	—	—
			30		41	—	—

Contra **Cr.**

Date		Particulars	Casks	Fo.	£	s	d
1789 Apr.	11	By James Boswell, at 27s -	20	2	27	—	—
	14	By George Gordon, at 28s -	10	5	14	—	—
			30		41	—	—

Dr. *George Gordon merchant Stirling,*

Date		Particulars	Fo.	£	s	d
1789 Apr.	14	To Sundries, per J.		41	3	4
				41	3	4

Contra **Cr.**

Date		Particulars	Fo.	£	s	d
1789 Apr.	14	By Cash in part - -	1	35	—	—
	30	By Balance-account - -	5	6	3	4
				41	3	4

Dr. *Proper Expences,*

Date		Particulars	Fo.	£	s	d
1789 Apr.	18	To Calicoes, for 5 yards, at 3s 2d	3	—	15	10
	30	To Cash, for charges since 1st January	1	32	—	—
				32	15	10

Contra **Cr.**

Date		Particulars	Fo.	£	s	d
1789 Apr.	30	By Profit and Loss - -	1	32	15	10
				32	15	10

Dr. *Thomas Sharp, my clerk,*

Date		Particulars	Fo.	£	s	d
1789 Apr.	30	To balance-account - -	5	8	—	—

Contra **Cr.**

Date		Particulars	Fo.	£	s	d
1789 Apr.	30	By Charges Merchandize, due him for wages	4	8	—	—

Dr. *Balance-account,*

Date		Particulars	Fo.	£	s	d
1789 Apr.	30	To Sundries, per J. - -		757	12	3
				757	12	3

Contra **Cr.**

Date		Particulars	Fo.	£	s	d
1789 Apr.	30	By Sundries, per J. - -		229	3	2
		By Stock - - -	1	528	9	1
				757	12	3

TRIAL BALANCE.

	Dr.	L	s	d	L	s	d	*Cr.* L	s	d	L	s	d
1	Stock	L 312	7	3				L 824	2	8			
	Profit and Lofs	4	4	10				2	10	—			
	Cafh	599	15	11	L 916	8	—	591	12	1	L 1418	4	9
2	Meal	L 277	14	8				L 103	18	8			
	Port wine	104	10	—				111	5	—			
	Paper	36	15	—				41	13	6			
	Yarn	94	17	4				49	12	6			
	1 Houfe in Whitechapel	300	—	—	813	17	—	—	—	—	406	9	8
3	James Bofwell	L 247	11	—				L 110	—	—			
	Henry Hardy	31	2	6				—	—	—			
	David Miller	18	—	—				—	—	—			
	Bank	140	—	—	436	13	6	441	3	2	551	3	2
4	Calicoes	L 16	12	6				L 18	5	10			
	James Cuthbert	35	6	3				30	—	—			
	Diaper	7	—	—				7	15	10			
	Salt	17	15	10	76	14	7	17	4	6	73	6	2
5	Iron	L 53	6	8				L 49	1	3			
	William Bruce	50	—	—				70	—	—			
	John Henderfon	7	4	—				—	—	—			
	William Hunter	18	13	6				—	—	—			
	Charges Merchandize	13	14	2	142	18	4	—	—	—	119	1	3
6	James Dalton	L 35	15	—				L —	—	—			
	Clover-feed	29	17	—				27	7	1			
	Flax feed	5	10	—				6	8	—			
	John Scott	4	7	6				—	—	—			
	Share of Ship Hazard	150	—	—	225	9	6	33	—	—	66	15	1
7	Train oil	L 33	—	—				L 41	—	—			
	George Gordon	41	3	4				35	—	—			
	Proper Expences	32	15	10				—	—	—			
	Thomas Sharp	—	—	—	106	19	2	8	—	—	84	—	—
					L 2719	—	1				L 2719	—	1

COMPUTATIONS.

	Dr.	Cr.
Cash - -	L 599 15 11	L 591 12 1
	591 12 1	
	L 8 3 10	
2 Meal - -	L 277 14 8	L 203 18 8
Dr. 420 bolls - -		83 14 —
Cr. 299 - -	L 83 14 —	
		L 287 12 8
121		277 14 8
124		
	Profit	L 9 18 —
3 outcome		
Port-wine - -	L 104 10 —	L 111 5 —
		104 10 —
	Profit	L 6 15 —
Paper - - -	L 36 15 —	L 41 13 6
		36 15 —
	Profit	L 4 18 6
Yarn - - -	L 94 17 4	L 49 12 6
Spindles - -		47 8 —
834½ 120	L 47 8 —	
360 120		L 91 — 6
		94 17 4
474½		
Milling ½ - -	Profit	L 2 3 2
House in Whitechapel.	L 300 — —	
3 Ja. Boswell -	L 147 11 —	L 110 — —
	110 — —	
	L 27 11 —	
Henry Hardy - -	L 31 2 6	
David Miller - -	L 18 — —	
Bank - - -	L 240 — —	L 441 3 2
		240 — —
		L 201 3 3
4 Calicoes - -	L 16 12 6	L 18 5 10
		16 12 6
	Profit	L 1 13 4
J. Cuthbert - -	L 35 6 3	
	30 — —	
	L 5 6 3	
Diaper - -	L 7 — —	L 7 15 10
	Profit	L — 15 10

	Dr.	Cr.
4 Salt - -	L 17 15 10	L 17 4 6
	17 4 6	
Loss	L — 11 4	
5 William Bruce -	L 50 — —	L 70 — —
		50 — —
		L 20 — —
Iron - - -	L 53 6 8	L 49 1 3
320 stone - -		L 6 13 4
280	L 6 13 4	
		L 55 14 7
40		53 6 8
	Profit	L 2 7 11
J. Henderson -	L 7 4 —	
W. Hunter -	L 18 13 6	
Char. Merchan. -	L 13 14 2 loss	
6 Ja. Dalton - -	L 35 15 —	
Clover seed - -	L 29 17 —	L 27 7 1
1200 lb. - -		7 10 —
890	L 7 10 —	
		L 34 17 1
310		29 17 —
300		
	Profit	L 5 — 1
10 inlake		
Lint-seed - -	L 5 10 —	L 6 8 —
		5 10 —
	Profit	L — 18 —
J. Scott - -	L 4 7 6	
Share Hazard -	L 150 — —	33 — —
		140 — —
	L 140 — —	
		L 173 — —
		150 — —
	Profit	L 23 — —
7 Train-oil - -	L 33 — —	L 41 — —
		33 — —
	Profit	L 8 — —
George Gordon -	L 41 3 4	L 35 — —
	35 — —	
	L 6 3 4	
Proper Ex. -	L 32 15 10 loss.	
Thomas Sharp - -	-	L 8 — —
STOCK - -	L 312 7 3	L 824 2 8
Balance - -	528 2 1	prof. 16 13 8
	L 840 16 4	L 840 16 4

PROFIT AND LOSS SHEET.

Salt	L — 11 4	Meal	L 9 18 —
Charges Merchandize	13 14 2	Port wine	6 15 —
Proper Expences	32 15 10	Paper	4 18 6
		Yarn	2 3 2
	L 47 1 4	Calicoes	1 13 4
In Leger	4 4 10	Diaper	— 15 10
		Iron	2 7 11
	L 51 6 2	Clover-feed	5 — 1
		Lint feed	— 18 —
		Share of ſhip Hazard	23 — —
		Train oil	8 — —
			L 65 9 10
Nett gain	16 13 8	In Leger	2 10 —
	L 67 19 10		L 67 19 10

BALANCE-SHEET.

Caſh	L 8 3 10	Meal, outcome 3 b.	
Meal, 124 b. at 13s 4d	83 14 —	Bank	L 201 3 2
Yarn, 474 ſp. at 2s	47 8 —	William Bruce	20 — —
Milling ½		Thomas Sharp	8 — —
Houſe in Whitechapel	300 — —		
James Boſwell	37 11 —		L 229 3 2
Henry Hardy	31 2 6		
David Miller	18 — —		
J. Cuthbert	5 6 3		
Iron, 40 ſtone, at 3s 4d	6 13 4		
J. Henderſon	7 4 —		
W. Hunter	18 13 6		
James Dalton	35 15 —		
Clover ſeed, 300 lb. at 6d	7 10 —		
Inlake 10 lb.			
J. Scott	4 7 6		
Share of ſhip Hazard	140 — —		
George Gordon	6 3 4	STOCK	528 9 1
	L 757 12 3		L 757 12 3

Subſidiary Books *uſed by Merchants.*

Though all merchant-accounts may be kept by the *Waſte-book*, *Journal*, and *Leger*, alone; yet men of great buſineſs find it convenient, either for abridging theſe, or for other ends, to uſe ſome others, generally called *Subſidiary* or *Subſervient Books*; the moſt common of which are theſe nine following, *viz.*

1. *Caſh-book.* This book is kept in a folio form, like the leger, and ſerves to abridge the caſh-account there. On the left-hand page, or Dr. ſide, *Caſh* is charged Dr. for all the ſums received; and on the right-hand page, *Caſh* is made Cr. for all the ſums paid. Once a week, or, which is more ordinary, once a month, this book is poſted to the leger; or, if you pleaſe, firſt to the journal, by two entries, *viz. Caſh* Dr. to *Sundries*, for all the receipts, and *Sundries* Drs. to *Caſh*, for all the payments. By this means the caſh-account in the leger will be ſo far contracted as to conſiſt 12 lines, *viz.* one for each month in the year.

2. *Book of Charges of Merchandize.* This book is only paged, and deſigned to abbreviate the caſh-book. It contains particular charges on goods and voyages; ſuch as carriage, cuſtom, freight, cranage, wharfage, &c.: as alſo other expences that affect trade in general; ſuch as, warehouſe-rent, ſhop-rent, accountant's wages, poſtage of letters, and the like. At the end of each month the money-columns of this book are added up, and the ſum carried to the credit-ſide of the caſh-book.

3. *Book of Houſe-expences.* This book is alſo paged, and deſigned likewiſe to eaſe the caſh-book. It contains all diſburſements for family proviſions, ſervant's wages, houſe-rent, apparel, utenſils, &c. The money-columns of this book are alſo added up at the end of each month, and the ſum tranſferred to the credit-ſide of the caſh-book.

4. *Invoice-book.* This book, which is uſed chiefly by factors, is paged, and contains doubles or copies of the invoices of goods ſent to ſea, or of goods received from abroad.

5. *Sales-book.* This book too is chiefly uſed by factors;

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and into it are poſted, from the waſte-book, the particular ſales of every conſigned cargo; by which means the ſeveral articles of a ſale, that lie ſcattered in the waſte-book, are brought together, and repreſented under one view, and that in a manner more full and minute than they are collected in the leger account.

6. *Bill-book.* The deſign of this *Bill-book*, or *Month-book*, is to furniſh a merchant with a ready way of knowing the time when bills or other debts become payable to or by him. It conſiſts of 12 folios, one for each month in the year. The left-hand page contains the debts that fall due to the merchant in the month on the top, and the right-hand page contains the debts payable by him to others in the ſame month.

7. *Receipt-book.* In this book a merchant takes receipts of the payments he makes. The receipt ſhould contain the date; the ſum received, expreſſed in words at large, and alſo in figures in the money-columns; the reaſon why; and whether in full or in part; and muſt be ſigned by the perſon receiving.

8. *Letter-book.* It is very imprudent in any perſon to ſend away a letter of buſineſs, without keeping a duplicate of it himſelf; and therefore to prevent the bad conſequences of ſuch a careleſs practice, merchants are provided with a large book in folio, into which is copied *verbatim* every letter of buſineſs before it be ſent off. So that this book, together with the letters received (which muſt alſo be carefully kept in files or boxes), makes a complete hiſtory of all the dealings that paſs betwixt a merchant and his correſpondents; which may be very uſeful and neceſſary on many occaſions.

9. *Pocket-book.* This is a ſmall book, of a portable ſize, in which a merchant ſets down the bargains he makes, the expences he is at, the debts he pays, or ſums he receives, with every other part of buſineſs he tranſacts while abroad. And when he comes home to his counting-houſe or ſhop, he tranſfers the things contained in this book, each to their proper places in the waſte-book, or books ſubſidiary.

Factors of great buſineſs ſometimes keep another ſmall book, called the *Memorandum-book*. Into this book are copied, from letters as they come to hand, ſhort notes of the ſeveral commiſſions for buying goods contained in them; and as the commiſſions are effected, the notes are croſſed, or have ſome mark affixed to them. This is more convenient in doing buſineſs, than to be continually running to the letters themſelves.

The above are the ſubſidiary books moſt in uſe: but a merchant is not tied down or reſtricted to them; he may keep ſome, and neglect others, or invent more as the nature of his buſineſs requires, and he finds convenient.

BOOKSELLER, one who trades in books, whether he prints them himſelf, or gives them to be printed by others. Among us, they are the ſame with *bibliopolæ* among the ancients, whoſe office was diſtinct from that of *librarii*. Petty dealers, or venders of ſmall ware, like ſome with us, were more particularly denominated *libelliones*. At Rome, the Argiletum was the mart of books, as Paternoſter-Row, St. Paul's Church-yard, or Fleet-ſtreet, ſtill are in London. Bookſellers in many places are ranked among the members of univerſities, and entitled to the privileges of ſtudents: as at Tubingen, Saliſburg, and Paris, where they have always been diſtinguiſhed from the vulgar and mechanical traders, and favoured by an exemption from divers taxes.

Formerly, the offices of bookſeller and printer were united in the ſame perſons. Labbe gives a liſt of learned bookſellers; moſt of whom were alſo authors. Of late bookſellers have drawn their buſineſs into leſs compaſs, and, leaving the labour of compoſing books to one ſet of perſons, and that of printing them to another, content themſelves with the gainful part; thus miniſtering to the republic of letters not with the head or the hand, but the purſe only. In this view, they have been very important and uſeful agents between authors and the public; and have contributed in no ſmall degree to the encouragement of genius and literary induſtry, and the ſpread of ſcience. There are few authors, who have undertaken the printing and publiſhing of any work likely to be tranſmitted to poſterity, without being connected with ſome bookſeller, or bookſellers, eminent in the trade.

An acquaintance with the bookſellers' marks or ſigns, frequently expreſſed on the title-pages of their books, is of ſome uſe; becauſe many books, eſpecially in the laſt century, have no other deſignation either of printer, bookſeller, or even city. The anchor is the mark of Raphelengius at Leyden; and the ſame with a dolphin twiſted round it, of the Manutii at Venice and Rome; the Arion denotes a book printed by Oporinus at Baſil; the caduceus, or pegaſus, by the Wechelinſes at Paris and Francfort; the cranes, by Cramoiſy; the compaſs, by Plantin at Antwerp; the fountain, by Vaſcoſan at Paris; the ſphere in a balance, by Janſon or Blaew, at Amſterdam; the lily, by the Juntas at Venice, Florence, Lyons, and Rome; the mulberry-tree, by Morel at Paris; the olive tree, by the Stephenſes at Paris and Geneva, and the Elzeviers at Amſterdam and Leyden; the bird between two ſerpents, by the Frobeniuſes at Baſil; the truth, by the Commelins at Heidelberg and Paris; the Saturn, by Colinæus; the printing-preſs, by Badius Aſcencius, &c.

The traffic of books was anciently very inconſiderable, inſomuch that the book-merchants of England, France, Spain, and other countries, were diſtinguiſhed by the appellation of *ſtationers*, as having no ſhops, but only ſtalls and ſtands in the ſtreets. During this ſtate, the civil magiſtrates took little notice of the bookſellers, leaving the government of them to the univerſities, to whom they were ſuppoſed more immediate retainers; who accordingly gave them laws and regulations, fixed prices on their books, examined their correctneſs, and puniſhed them at diſcretion. But when, by the invention of printing, books and bookſellers began to multiply, it became a matter of more conſequence; and governments took the direction of them into their own hands, giving them new ſtatutes, appointing officers to fix prices, granting licences, privileges, &c.

BOOM, in the ſea language, a long piece of timber with which the clew of the ſtudding ſail is ſpread out; and ſometimes the boom is uſed to ſpread or boom out the clew of the main-maſt.

Boom, denotes alſo a cable ſtretched athwart the mouth of a river or harbour; with yards, top-maſts, battling or ſpars of wood laſhed to it, to prevent an enemy's coming in.

BOOMING, among ſailors, denotes the application of a boom to the ſails. A ſhip is ſaid to come booming forwards, when ſhe comes with all the ſail ſhe can make.

BOOPTHALMUS, a kind of agate with large circles in it, bearing ſome reſemblance to an ox's eye, from whence it has got this name.

BOOPS, in zoology, the trivial name of a ſpecies of balæna. See Balæna.

BOOSHATTER, formerly the city of Utica, famous for the retreat and death of Cato, lies about ſeven miles inland from Porto Farina in the bay of Tunis.

BOOT, a leathern cover or defence for the leg, uſed on

horſeback, both to keep the body more firm, and defend the part from the injuries of the weather. Boots ſeem to have taken their name from the reſemblance they bear to a ſort of jacks or leathern bottles formerly in uſe, called *bottes*; in the old French, *bouts*. Borel derives the name from the old French word *bot*, a ſtump, becauſe the boot gives the leg this appearance. The Chineſe have a kind of boots made of ſilk or fine ſtuff lined with cotton, a full inch thick, which they always wear at home. This people are always booted; and when a viſit is made them, if they happen to be without their boots, their gueſt muſt wait till they put them on. They never ſtir out of doors without their boots on; and their ſcrupuloufneſs in this reſpect is the more remarkable, as they are always carried in their palanquins.

The boot was much uſed by the ancients, by the foot as well as by the horſemen. It was called by the ancient Romans *ocrea*; in middle-age writers, *greva*, *gamberia*, *bainberga*, *bembarga*, or *benbarga*. The boot is ſaid to have been the invention of the Carians. It was at firſt made of leather, afterwards of braſs or iron, and was proof both againſt cuts and thruſts. It was from this that Homer calls the Greeks *brazen-booted*. The boot only covered half the leg; ſome ſay the right leg, which was more advanced than the left, it being advanced forwards in an attack with the ſword; but in reality it appears to have been uſed on either leg, and ſometimes on both. Thoſe who fought with darts or miſſile weapons, advanced the left leg foremoſt, ſo that this only was booted.

Fiſhing-boots, are a thick ſtrong ſort uſed in dragging ponds, and the like. *Hunting-boots*, a thinner kind uſed by ſportſmen. *Jack-boots*, a kind of very ſtrong boots uſed by the troopers.

Boot, was likewiſe a kind of torture for criminals; formerly uſed to extort confeſſion. It was a kind of buſkin made of parchment; which being put on the leg moiſt, and brought near the fire, in ſhrinking ſqueezed the leg violently, and occaſioned intolerable pain.

Boot-Tree, or *Boot-laſt*, an inſtrument uſed by ſhoe-makers to widen the leg of a boot. It is a wooden cylinder ſlit into two parts, between which, when it is put into the boot, they drive by main force a wedge or quoin.

BOOTES, a conſtellation of the northern hemiſphere, conſiſting of 23 ſtars according to Ptolemy's catalogue, of 18 in Tycho's, of 34 in Bayer's, of 52 in Hevelius's, and of 54 in Mr. Flamſtead's catalogue.

BOOTY, whatever is taken from an enemy in time of war. Among the Greeks, the booty was divided in common among the army, the general only claiming a larger ſhare. By the military diſcipline of the Romans, ſpoils taken from the enemy belonged to the republic, particular perſons having no right to them: but the generals who piqued themſelves on their probity carried it wholly to the public treaſury. Sometimes indeed they divided it among the ſoldiery, to animate them, and ſerve in lieu of a reward. But this diſtribution depended on the generals, who were to conduct themſelves herein with great equity and moderation; otherwiſe it became a puniſhable crime to lay hands on the pillage, which regularly belonged to the ſtate. The conſuls Romulus and Vaturius were condemned for having ſold the booty taken from the Æqui.—Among the Jews, the booty was divided equally between the army and the people, though under the kings a different kind of diſtribution obtained.—Among the Mahometans, two thirds of the ſpoils are allowed to the army: the other third to God, to Mahomet and his relations, and to the orphans, the poor, and the pilgrims.—Among us, formerly the booty was divided among the ſoldiery. If the general be in the field, every body takes what he can lay hold on: if the general be abſent, the booty is diſtributed among the ſoldiery, two parts being allowed to the cavalry, and one to the infantry. A captain is allowed ten ſhares, a lieutenant ſix, and a cornet four.

BOPPART, a town of Germany, in the circle of the Rhine. E. long. 7. 35. N. lat. 50. 19.

BOPSINGEN, a town of Suabia in Germany, ſeated on the river Egar, in E. long. 9. 55. N. lat. 48. 51.

BOQUINIANS, in church-hiſtory, a ſect of heretics, ſo called from Boquinus their founder, who taught that Chriſt did not die for all mankind, but only for the faithful, and conſequently was only a particular Saviour.

BORAGO, in botany, a ſynonime of the Anchusa.

BORAK, among Mahometans, a fabulous animal, ſuppoſed to be of the middle kind between an aſs and a mule, whereon their prophet was carried in his nocturnal flight from Jeruſalem into the heavens. This animal the Arabians call *Al-Borak*, q. d. *ſhining*. The night when the journey was performed is called *Lailat al Meeraga*, i. e. *the night of aſcenſion*; and the flight itſelf *Al Meſra*; concerning which there are a multitude of traditions.

BORAX, from the Greek Βοραχιον, a ſalt in appearance ſomewhat ſimilar to cryſtals of alum, brought originally from the Eaſt Indies in an impure ſtate, and afterwards purified by the chemiſts. It was long doubted whether this ſalt were a natural or factitious ſubſtance; but it is now known to be produced in the mountains of Thibet, from whence other parts of the eaſtern continent are ſupplied. Mr. Kirwan, in his Mineralogy, informs us, that Mr. Grill Adamſon ſent ſome to Sweden in the year 1772, in a cryſtalline form, as dug out of the earth in the kingdom of Thibet, where it is called *pounxa*, *my poun*, and *houi poun*. It is ſaid to have been found in Saxony in ſome coal-pits. In the Philoſophical Tranſactions, vol. xxvii, we have two different accounts of the place where it is found, and the manner of obtaining it.

Mr. Fourcroy informs us that borax is found in commerce in three different ſtates. 1. Crude borax, tincal, or chryſocolla, which comes from Perſia. He deſcribes it as conſiſting of a greeniſh maſs of a greaſy feel, or in opaque cryſtals of an olive green, which are ſix-ſided priſms terminated by irregular priſms. There are two varieties of theſe cryſtals, differing in magnitude: this ſalt is very impure by the addition of foreign matters. Mr. Kirwan tells us, that this kind is called *brute borax*, *tincal*, or *chryſocolla*, and that it is in the form of large, flat, hexangular, or irregular cryſtals, of a dull white or greeniſh colour, greaſy to the touch; or in ſmall cryſtals, as it were cemented together by a rancid, yellowiſh, oily ſubſtance, intermixed with marl, gravel, and other impurities. Mr. Engeſtrom, he adds, has a ſuſpicion that the tincal is only the reſiduum of the mother liquor of borax evaporated to dryneſs; and that the greaſineſs ariſes from its being mixed with buttermilk, to prevent its efflorefcence. 2. Borax of China is ſomewhat purer than the foregoing, and is met with in the form of ſmall plates or maſſes irregularly cryſtallized, and of a dirty white. It appears to conſiſt of fragments of priſms and pyramids confounded together without any ſymmetrical arrangement; a white powder is obſerved on the ſurface, which is thought to be of an argillaceous nature. 3. The Dutch or purified borax, in the form of portions of tranſparent cryſtals of conſiderable purity. Pyramids with ſeveral facets may be obſerved among them, the cryſtallization appearing to have been interrupted. "This form (ſays Mr. Fourcroy) ſhows to a certainty that the Dutch refine this ſalt by ſolution and cryſtallization."—Mr. Kirwan ſays, that it is purified by ſolution, filtration, and cryſtallization; and the cryſtals thus obtained are calcined, to free them ſtill farther from greaſineſs; and then diſſolved, filtered, and cryſtallized a ſecond time. Sometimes more mineral alkali is added, as tincal is ſaid to contain an exceſs of ſedative ſalt. Mr. Fourcroy tells us, that

a purified borax, not inferior to the Dutch, but perhaps even of greater purity, is prepared by some chemists at Paris.

The same author informs us, that Mr. La Pliame, an apothecary at Paris, has discovered, that it is continually formed in the soap-suds and refuse-waters of the kitchen, which a person preserves in a kind of ditch; and from which, at the end of a certain time, he obtains true borax in fine crystals. "All that we can deduce (says he) from the known facts concerning its formation, is simply, that it is produced in stagnant waters which contain fat matters." Some authors affirm, that it is produced by art in China. A mixture of greafe, clay, and dung, is said to be deposited in a ditch, *stratum super stratum*. This mixture is sprinkled with water, and suffered to remain for some years; at the end of which time it is lixiviated, and affords crude borax by evaporation. Others have supposed that it is obtained from water, which filters through copper mines. Mr. Beaumé positively asserts, that the former of these processes succeeded very well with him; but Dr. Black gives little credit to his assertions. According to Mr. Kirwan, 100 parts of purified borax contain 32 of real boracic acid, 17 of mineral alkali, and about 47 of water; but of this quantity of mineral alkali only about five parts are saturated; whence, in many cases, borax acts as an alkali. Bergman informs us, that it requires an equal weight of acid to make the alkaline properties entirely disappear; and Dr. Withering, that double the quantity of acid is required for this purpose, both in the tincal and refined borax.

This acid, like the borax in substance, is made use of to fuse vitrifiable earths, with which it forms clear and nearly colourless glasses: by the assistance of heat it dissolves the earth precipitated from the liquor of flints. It unites with ponderous earth, magnesia, lime, and alkalis, and forms, with these different substances, salts distinguished by one general name of borax, though only that formed by the combination of *sedative salt* and mineral alkali is used in the arts. It is used in many other chemical operations as a flux, besides that of glass-making; and the dyers also use it for giving a gloss to silks. In medicine it has been given as a narcotic and febrifuge, under the title of *sal sedativum*.

BORBONIA, in botany; a genus of the decandria order, belonging to the diadelphia class of plants; and in the natural method ranking under the 32d order, *Caryophylleæ*. The stigma is emarginated; the calyx has pointed spines; and the legumen is pointed.—There are six species, all of which are natives of warm countries. They are a kind of broom; and in the places where they grow naturally, they rise to the height of ten or twelve feet, but in Europe seldom to more than four or five. They must be kept constantly in the stove, and may be propagated by laying down the young shoots; but as these are generally two years before they put forth proper roots, the most eligible method is by seeds, which must be procured from those places where they grow naturally, as they do not come to perfection in this country.

BORBORITES, in church-history, a sect of gnostics, in the second century, who, besides embracing the errors of those heretics, denied the last judgment. Their name comes from the Greek *borbores*, filth: on account of a custom they had of daubing their faces and bodies with dirt and filth.

BORCH, a town of the duchy of Magdeburgh in Lower Saxony. E. long. 12. 14. N. lat. 52. 25.

BORCHLOEN, a town of the bishopric of Leige in Germany, situated in E. long. 5. 28. N. lat 50. 50.

BORD-HALFPENNY, a small toll by custom paid to the lord of the town for setting up boards, tables, booths, &c. in fairs and markets.

BORD *Lands*, the demesnes which lords keep in their hands for the maintenance of their board or table.

BORD *Lode*, a service required of tenants to carry timber out of the woods of the lord to his house. It is also used to signify the quantity of provision which the bordarii or bordmen paid for their bord-lands.

BORD-*Service*, the tenure of bord-lands, by which some lands in certain places are held of the bishop of London, and the tenants now pay sixpence per acre, in lieu of sending provision according to ancient custom for their lord's table.

BORDAT, in commerce, a small narrow stuff, which is manufactured in some parts of Egypt, particularly at Cairo, at Alexandria, and Damieta.

BORDER, in gardening, a narrow bed made to inclose parterres, that they may not be trodden upon by passengers. They are made either circular or straight, or turned into knots, scrolls, volutes, &c.

BORDURE, or BORDER, in heraldry, a kind of addition on the limb of a shield, in form of a hem, or girdle, encompassing it all round, and parallel to the boundary of the escutcheon, and serving as a DIFFERENCE. See HERALDRY.

BORE, among engineers, denotes the diameter of the barrel of a gun or cannon, or rather its whole cavity.

BOREAS, a Greek name, now in common use for the north wind. Pezron observes, that anciently Boreas signified the *north-east wind* blowing at the time of the summer solstice. The Greeks erected an altar to Boreas. He is represented on the temple at Athens with his robe before his mouth, as if he felt the cold of the climate over which he presides, agreeably to the description of Ovid, who calls him *gelidus tyrannus*, "the shivering tyrant." But he is usually described by the Roman poets as violent and impetuous.

BORGO, an ancient town of Sweden, seated on the gulf of Finland. E. long. 26. 27. N. lat. 60. 34.

BORGO *de St. Sepulchro*, a town of Tuscany, in Italy, situated in E. long. 13. 0. N. lat. 43. 30.

BORGO *de val de Faro*, a town of Italy, in the duchy of Parma, in E. long. 10. 36. N. lat. 44. 35.

BORGO-*Forte*, a town of the Mantuan in Italy, situated at the confluence of the rivers Po and Menzo. E. long. 11. 0. N. lat. 44. 50.

BORGO *San Domino*, a town of Italy, in the duchy of Parma. E. long. 10. 31. N. lat. 41. 53.

BORIA, a small town of Spain, in the kingdom of Arragon. W. long. 2. 2. N. lat. 41. 50.

BORING, in a general sense, the art of perforating, or making a hole through any solid body. The method of boring *water-pipes* is as follows. The poles of alder, which is a very useful wood for making pumps, water-pipes, &c. being laid on horses or trassels of a foot high, to rest the augre upon while they are boring, they set up a lathe to turn the least end of the poles, to fit them to the cavities of the great end of the others. They turn the small ends of the poles about five or six inches in length, to the size they intend to bore the larger ends about the same depth, viz. five or six inches. This is designed to make a joint to shut each pair of poles together, the concave part being the female part, and the other the male part of the joint. In turning the male part, they turn a channel in it, or a small groove at a certain distance from the end; and in the female part they bore a small hole to fit over this channel. This being done, they bore the poles through; and to prevent them from boring out at the side, they stick great nails at each end to be a guide in boring. It is usual, however, to bore them at both ends; so that, if a pole be crooked one way, they can bore it through and not spoil it.

BORING, in farriery, a cruel and absurd method of treating a wrenched shoulder, now disused.

BORING, in mineralogy, a method of piercing the earth with scooping irons, which being drawn back at proper times,

bring up with them famples of the different ftrata through which they have paffed; by the examination of which the fkilful mineralogift will be able to guefs whereabouts a vein of ore may lie, or whether it will be worth while to open a mine there or no.

BORIQUEN, one of the Caribbee iflands in North America, near Porto Rico. W. long. 64. 35. N. lat. 18. 0.

BORKELO, a town in the United Provinces, in the county of Zutphen. E. long. 6. 30. N. lat. 52. 15.

BORMIO, a town of the country of the Grifons, capital of a county of the fame name, in Switzerland. It is 40 miles S. E. of Coire. Long. 10. 5. E. Lat. 46. 25. N.

BORNE, a market town of Lincolnfhire in England. W. long. 0. 20. N. lat. 52. 40.

BORNEO, an ifland of Afia, in the Eaft Indies, and one of the three great Sunda Iflands. It is thought to be the largeft ifland in the world, next to New Holland; being 1500 miles in circumference. It lies E. of Malacca and Sumatra. Long. 111. 27. E. Lat. 4. 55. N.

BORNHOLM, an ifland in the Baltic fea, to the S. E. of the province of Schonen in Sweden. E. long. 14. 56. N. lat. 55. 15.

BORNOU, a kingdom or province of Zaara in Africa, extending from 12 to 22 degrees of eaft longitude, and from 17 to 21 degrees of north latitude.

BOROUGH, BURROUGH, *Borow*, or *Burgh*, is frequently ufed for a town or corporation which is not a city. Borough, in its original Saxon *borge*, or *borgh*, has been fuppofed to mean a tithing or company, of ten families, who were bound and combined together as each others pledge. Afterwards, as Verftegan informs us, borough came to fignify a town that had fomething of a wall or inclofure about it: fo that all places which among our anceftors had the denomination borough, were one way or other fenced or fortified. But, in later times, the fame appellation was alfo beftowed on feveral of the *villæ infigniores*, or country towns of more than ordinary note, though not walled.

The ancient Saxons, according to Spelman, gave the name burgh to thofe called, in other countries, cities. But divers canons being made for removing the epifcopal fees from villages and fmall towns to the chief cities, the name *city* became attributed to epifcopal towns, and that of borough retained to all the reft; though thefe too had the appearance of cities, as being governed by their mayors, and having laws of their own making, and fending reprefentatives to parliament, and being fortified with a wall and caftle, and the like.

BOROUGH, or *burgh*, is now particularly appropriated to fuch towns and villages as fend burgeffes or reprefentatives to parliament. Boroughs are equally fuch, whether they be incorporate or not; there being great numbers of our Englifh boroughs not incorporated; and, on the contrary, feveral corporations that are not boroughs; *c. gr.* Kingfton, Deal, Kendal, &c.

Royal BOROUGHS, in Scotland, are corporations made for the advantage of trade, by charters granted by feveral of their kings; having the privilege of fending commiffioners to reprefent them in parliament, befides other peculiar privileges. The Royal Boroughs are not only fo many diftinct corporations, but do alfo conftitute one entire body, governed by, and accountable to, one general court, anciently called *the court of four boroughs*, held yearly to treat and determine concerning matters relating to the common advantage of all boroughs. The four boroughs which formerly compofed this court were, Edinburgh, Stirling, Roxburgh, and Berwick; which two laft falling into the hands of the Englifh, Linlithgow and Lanerk were put in their places; with a faving to the former, whenever they fhould return to their allegiance. But this court not being fufficient to anfwer the neceffities of the royal boroughs, they were all empowered, under James III. in 1487, to fend commiffioners to a yearly convention of their own, which was then appointed to be held at Inverkeithing, but is now held at Edinburgh, under the denomination of the *convention of boroughs*. Many abufes are faid to fubfift in the royal boroughs, with regard to the right of election, infomuch that petitions to parliament have been prefented, though as yet without producing any relief to the petitioners.

BOROUGH-*Courts*, are certain courts held in boroughs, by prefcription, charter, or act of parliament: fuch are the fheriff's court, and court of huftings, in London.

BOROUGH-*Englifh*, a cuftomary defcent of lands or tenements, in fome ancient boroughs and copy-hold manors, by which the youngeft fon, and not the eldeft, fucceeds to the burgage tenement on the death of his father. For which Littleton gives this reafon; becaufe the younger fon, by reafon of his tender age, is not fo capable as the reft of his brethren to help himfelf. Other authors have given indeed a much ftranger reafon for this cuftom; as if the lord of the fee had anciently a right to break the feventh commandment with his tenant's wife on her wedding night; and that therefore the tenement defcended, not to the eldeft, but to the youngeft fon, who was more certainly the offspring of the tenant. But it cannot be proved that this cuftom ever prevailed in England, though it certainly did in Scotland (under the name of *mercheta*, or *marcheta*), till abolifhed by Malcolm III. But perhaps a more rational account than either may be brought from the practice of the Tartars; among whom, according to Father Duhalde, this cuftom of defcent to the youngeft fon alfo prevails. That nation is compofed totally of fhepherds and herdfmen; and the elder fons, as foon as they are capable of leading a paftoral life, migrate from their father with a certain allotment of cattle, and go to feek a new habitation. The youngeft fon, therefore, who continues lateft with his father, is naturally the heir of his houfe, the reft being already provided for. And thus we find, that among many other northern nations it was the cuftom for all the fons but one to migrate from the father, which one became his heir. So that poffibly this cuftom, wherever it prevails, may be the remnant of that paftoral ftate of the ancient Britons and Germans which Cæfar and Tacitus defcribe.

BOROUGH-*head*, or *Head-borough*, called alfo *borough-holder*, or *burfholder*, the chief man of the decenna, or hundred, chofen to fpeak and act in behalf of the reft. *Head-borough* alfo fignifies a kind of head conftable, where there are feveral chofen as his affiftants, to ferve warrants, &c.

BOROUGHBRIDGE, a town in the north riding of Yorkfhire in England. W. long. 1. 15. N. lat. 54. 10.

BOROZAIL, or the zeal of the Ethiopians, a difeafe epidemic in the countries about the river Senegal. It principally affects the pudenda, but is different from the lues venerea, though attributed to exceffive venery. In the men this diftemper is called *afab*, and in women *affabatus*.

BORRACHIO. See CAOUTCHOUC.

BORRAGE. See ANCHUSA.

BORRELISTS, in church hiftory, a Chriftian fect in Holland; fo denominated from their founder Borrel, a perfon of great learning in the Hebrew, Greek, and Latin tongues. They reject the ufe of the facraments, public prayer, and all other external acts of worfhip. They affert, that all the Chriftian churches of the world have degenerated from the pure apoftolical doctrines, becaufe they have fuffered the word of God, which is infallible, to be expounded, or rather corrupted, by doctors who are not infallible. They lead a very auftere life, and employ a great part of their goods in alms.

BORROWING AND HIRING, in law, are contracts by which a qualified property may be transferred to the hirer or borrower; in which there is only this difference, that hiring is always for a price or stipend, or additional recompense; borrowing is merely gratuitous. But the law in both cases is the same. They are both contracts, whereby the possession and transient property are transferred for a particular time or use, on condition and agreement to restore the goods so hired or borrowed, as soon as the time is expired, or the use performed, together with the price or stipend (in case of hiring) either expressly agreed upon by the parties, or left to be implied by law, according to the value of the service. By this mutual contract, the hirer or borrower gains a temporary property in the thing hired, accompanied with an implied condition to use it with moderation, and not to abuse it; and the owner or lender retains a reversionary interest in the same, and acquires a new property in the price or reward. Thus, if a man hires or borrows a horse for a month, he has the possession and a qualified property therein during that period; on the expiration of which his qualified property determines, and the owner becomes (in case of hiring) intitled also to the premium or price for which the horse was hired. There is one species of this price or reward the most usual of any, but concerning which many good and learned men have in former times very much perplexed themselves and other people, by raising doubts about its legality *in foro conscientiæ*. That is, when money is lent on a contract to receive not only the principal sum again, but also an increase by way of compensation for the use, which is generally called *interest* by those who think it lawful, and *usury* by those who do not so.

BORSEHOLDER, among the Anglo-Saxons, one of the lowest magistrates, whose authority extended only over one freeburgh, tithing, or decennary, consisting of ten families. Every freeman who wished to enjoy the protection of the laws, and not to be treated as a vagabond, was under the necessity of being admitted a member of the tithing where he and his family resided; and in order to obtain this admission, it was as necessary for him to maintain a good reputation; because all the members of each tithing being mutual pledges and sureties for each other, and the whole tithing sureties to the king for the good behaviour of all its members, they were very cautious of admitting any into their society who were of bad or doubtful characters. Each tithing formed a little state or commonwealth within itself, and chose one of its most respectable members for its head, who was sometimes called the *alderman* of such a tithing or freeburgh, on account of his age and experience, but most commonly *borsholder*, from the Saxon words *borh*, a surety, and *alder*, a head or chief. This magistrate had authority to call together the members of his tithing, to preside in their meetings, and to put their sentences in execution. The members of each tithing, with their tithing-man or borseholder at their head, constituted a court of justice, in which all the little controversies arising within the tithing were determined. If any dispute of great difficulty or importance happened, or if either of the parties was not willing to submit to a sentence given in the tithing-court, the cause was referred or appealed to the next superior court, or court of the hundred.

BORSET, or BORSETT, celebrated for its sulphureous baths; a place about half a league from Aix-la-Chapelle in Germany.

BOS, *the Ox* in zoology, a genus of quadrupeds belonging to the order of pecora. The characters of this genus are, that the horns are yellow and turned forward, bent like crescents, and smooth on the surface. The fore teeth are 8 in number, and the canine teeth are wanting. Linnæus enumerates 5 species, viz.

1. The TAURUS, including the bull and cow, has cylindrical horns bent outwards, and loose dewlaps. The bull, or male, is naturally a fierce and terrible animal. When the cows are in season, he is perfectly ungovernable, and often altogether furious. When chased, he has an air of sullen majesty, and oft tears up the ground with his feet and horns. The principal use of the bull is to propagate the species; for although he might be trained to labour, his obedience cannot be depended on. A bull, like a stallion, should be the most handsome of his species. He should be large, well-made, and in good heart; he should have a black eye, a fierce aspect, but an open front; a short head; thick, short, and blackish horns, and long shaggy ears; a short and straight nose, large and full breast and shoulders, thick and fleshy neck, firm reins, a straight back, thick fleshy legs, and a long tail well covered with hair. Castration remarkably softens the nature of this animal; it destroys all his fire and impetuosity, and renders him mild and tractable, without diminishing his strength; on the contrary, after this operation, which is usually performed before the animal is 2 years old, his weight is increased, and he becomes fitter for the purposes of plowing, &c.

The females of all those species of animals which we keep in flocks, and whose increase is the principal object, are much more useful than the males. The cow produces milk, butter, &c. which are principal articles of our food. She receives the bull, from the beginning of May to the middle of July, and the time of gestation is 9 months, which naturally brings veal to our markets from the beginning of January to the end of April. However, luxury has fallen upon methods by which veal may be had almost every month in the year. The cow comes to the age of puberty in 18 months, but the bull requires two years. A milk-cow ought to be chosen young, fleshy, and with a brisk eye.

The heaviest and most bulky animals neither sleep so profoundly nor so long as the smaller ones. The sleep of the ox is short and slight; he wakes at the least noise. He lies generally on the left side, and the kidney of that side is always larger than the other. There is great variety in the colour of oxen, and a reddish or black is most esteemed. The hair should be glossy, thick, and soft; for when otherwise, the animal is either not in health, or has a weakly constitution. The best time for inuring them to labour is at the age of two and a half or three years. The ox eats very quick, and soon fills his first stomach; after which he lies down to ruminate or chew the cud. The first and second stomachs are continuations of the same bag, and very capacious. After the grass has been chewed over again, it is reduced to a kind of mash, not unlike boiled spinage; and under this form it is sent down to the third stomach, where it remains and digests for some time; but the digestion is not fully completed till it comes to the fourth stomach, from which it is thrown down to the bowels. Whenever then the two first stomachs are distended with food, they contract, and this compresses the food, and makes it endeavour to get out: now the gullet being larger than the passage between the second and third stomachs, the pressure of the stomach necessarily forces it up the gullet. The action of ruminating, however, appears to be in a great measure voluntary; as animals of this kind have a power of increasing the reaction of their stomachs. After the food has passed through all the four stomachs, it is reduced to a perfect mucilage, every way prepared for being taken up by the lacteals, and converted into nourishment.

Bulls, cows and oxen, are fond of licking themselves, especially when lying at rest. But this practice should be prevented as much as possible; for as the hair is an undigestible substance, it lies in the stomach or guts, and is gradually coated by a glutinous substance, which in time hardens into round balls of a considerable bulk, which sometimes kill them, but

always prevent their fattening, as the ftomach is rendered incapable of digefting the food to well as it ought.

The age of thefe animals may be diftinguifhed by the teeth and horns. The firft fore-teeth fall out at the age of fix months, and are fucceeded by others of a darker colour, and broader. At the end of fixteen months, the next milk-teeth likewife fall out; and at the beginning of the fourth year all the fore-teeth are renewed, and then they are long, pretty white, and equal. However, as the animal advances in years, they become unequal and blackifh. The horns of oxen four years of age are fmall pointed, neat, and fmooth, but thickeft near the head: this thick part next feafon is pufhed further from the head by a horny cylinder, which is alfo terminated by another fwelling part, and fo on (for as long as the ox lives, the horns continue to grow); and thefe fwellings become fo many annular knots by which the age may be eafily reckoned: But from the point to the firft knot muft be counted three years, and every fucceeding knot only one year. The bull, cow, and ox. generally live about fourteen or fifteen years.

The northern countries of Europe produce the beft cattle of this kind. Indeed, they bear cold better than heat; and for this reafon are not fo plenty in the fouthern countries. There are but few in Afia to the fouth of Armenia, or in Africa beyond Egypt and Barbary. America produced none till they were carried there by the Europeans. But the largeft are to be met with in Denmark, Podolia, the Ukrain, and among the Calmuck Tartars.

In Lapland, they are moftly white, and many of them want horns.

The Britifh breed of cattle, Mr. Pennant obferves, has in general been fo much improved by foreign mixture, that it is difficult to point out the original kind of thefe iflands. Thofe which may be fuppofed to have been originally Britifh are far inferior in fize to thofe in the northern part of the European continent: the cattle of the Highlands of Scotland are exceedingly fmall; and many of them, males as well as females, are hornlefs: the Welfh runts are much larger: the black cattle of Cornwall are of the fame fize with the laft. The large fpecies that is now cultivated through moft parts of Great Britain, are either entirely of foreign extraction, or our own improved by a crofs with the foreign kind. The Lincolnfhire kind derive their fize from the Holftein breed; and the large hornlefs cattle that are bred in fome parts of England, come originally from Poland.

2. The BONASUS, has a long mane; its horns are bent round towards the cheek, and are not above a fpan long. It is about the fize of a large bull, and is a native of Africa and Afia. When enraged, he throws out his dung upon dogs or other animals that annoy him; the dung has a kind of cauftic quality, which burns the hair off any animal it falls upon.

3. The BISON, has fhort black rounded horns, with a great interval between their bafes. On the fhoulders is a vaft hunch, confifting of a flefhy fubftance, much elevated. The fore-parts of the body are thick and ftrong; the hind-part, flender and weak. The hunch and head are covered with a very long undulated fleece, divided into locks, of a dull ruft-colour: this is at times fo long, as to make the fore-part of the animal of a fhapelefs appearance, and to obfcure its fenfe of feeing. During winter, the whole body is clothed in the fame manner. In fummer the hind part of the body is naked, wrinkled, and dufky. The tail is about a foot long; at the end is a tuft of black hairs, the reft naked. It inhabits Mexico and the interior parts of North America. It is found in great herds in the Savannas; and is fond of marfhy places, where it lodges amidft the high reeds. In Louifiana they are feen feeding in herds innumerable, promifcuoufly with multitudes of ftags and deer, during morning and evening; retiring in the fultry heats into the fhade of tall reeds, which border the rivers of America. They are exceedingly fhy; and very fearful of man, unlefs they are wounded, when they purfue their enemy, and become very dangerous.

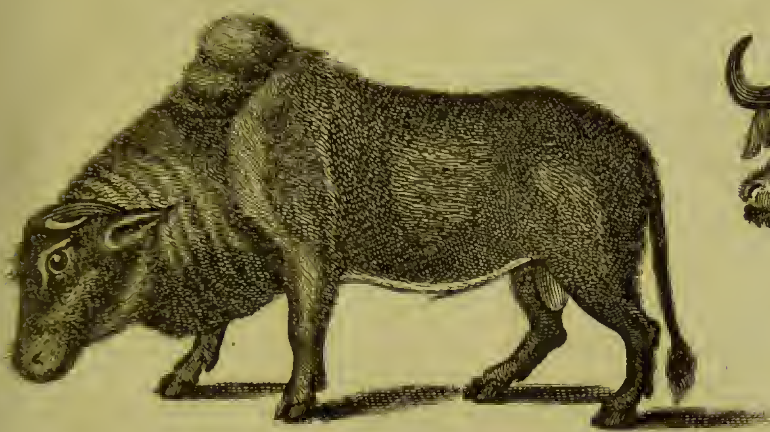
The chafe of thefe animals is a favourite diverfion of the Indians; and is effected either by fhooting them fingly, in which cafe the markfman muft take great care to go againft the wind; for their fmell is fo exquifite, that they foon get fcent of him and retire; or by driving a number of them into a groupe, by fetting fire to the dry grafs all around them and afterwards difpatching them; a method which, owing to their dread of fire, is eafily effected. Their fagacity however in defending themfelves againft the attacks of wolves is admirable. When they fcent the approach of a drove of thofe ravenous creatures, the herd puts itfelf into the form of a circle. The weakeft keep in the middle; the ftrongeft are ranged on the outfide, prefenting to the enemy an impenetrable front of horns. Attempts have been made to tame and domefticate the Bifon, by catching the calves and bringing them up with the common kind, in hopes of improving the breed; but it has not yet anfwered; for notwithftanding they for a time loft their favage nature, yet they at laft always grew impatient of reftraint, would break down the ftrongeft inclofures, and entice the tame cattle into the corn-fields. They have been known to engender together, and to breed.

The *mufk-ox* of Hudfon's bay, a variety of this fpecies, wants the hump between the fhoulders (fee Pl. 51). It is about the fize of a Scotch bullock; has a thick body, and fhort legs. The horns are large, and very remarkable from being united at their origin in the fkull; though immediately after, they fall down on each fide of the crown of the head, taper away fmall, and their points turn upwards. The hair is black, grows to a great length, and covers a fine wool fuperior to Vigonia wool. The male only has the curious fcalp juft defcribed; the female is covered with hair. Thefe animals frequent the country about 100 miles inwards to the N. W. of Churchill river in Hudfon's bay, where they are very numerous, and live in herds of 30 or 40 up to 80 or 100. The bulls are very few in proportion to the cows; for it is rare to fee more than two or three full grown bulls even with the largeft herd; and from the number of males which at times are found dead, the Indians are of opinion that they kill each other in contending for the females at the rutting feafon, when they are remarkably furious, and jealous of their miftreffes. They delight moft in the ftoney and mountainous parts of barren grounds; and though of a bulky and unwieldy form, yet they will climb the rocks with the eafe and agility of a goat, and like that animal will feed on any thing. They feem indeed fondeft of grafs, but in winter they eat mofs and any other herbage they can find. This animal obtains its name from a very ftrong mufky fmell, which is chiefly perceptible in its urine. Indeed its penis is always lubricated with a brown gummy fubftance, fo highly fcented with mufk, as not to lofe this quality, though kept for many years. The Indians kill great numbers of them; 2000 to 4000 lb. weight of the flefh frozen being annually brought to Prince of Wales's fort, and ferved out as provifions to the Europeans.

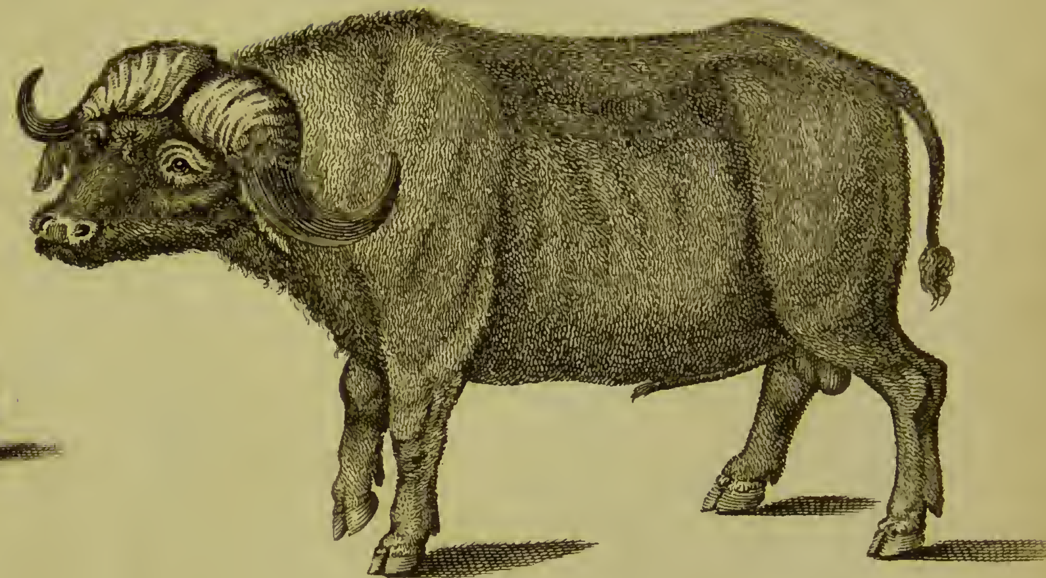
The *Cape Buffalo*, or *Bos Caffer* of Sparrman, another variety (fee the plate), inhabits the interior parts of Africa N. of the Cape of Good Hope, but does not extend to the N. of the Tropic. They are faid to be greatly fuperior in fize to the largeft Englifh ox; hang their heads down, and have a moft ferocious and malevolent appearance. They are in fact exceffively fierce and dangerous, and will lie quietly in wait in the woods, and rufh fuddenly on paffengers, and trample them, their horfes, and oxen of draught, under their feet. They are very fwift, and prodigioufly ftrong: the lion, which can break

BOS.

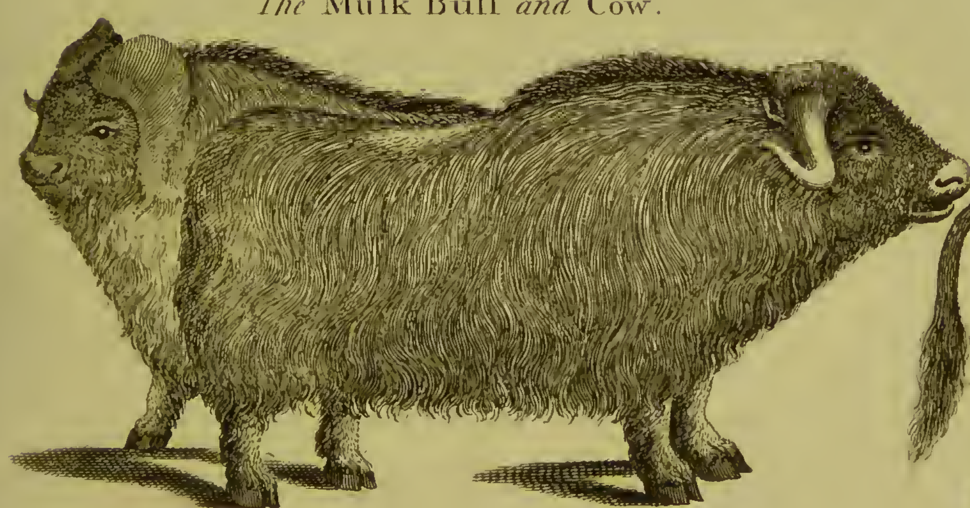
Bos Indicus, *or* Little Indian Buffalo.



Bos Caffer, *or* Cape Buffalo.

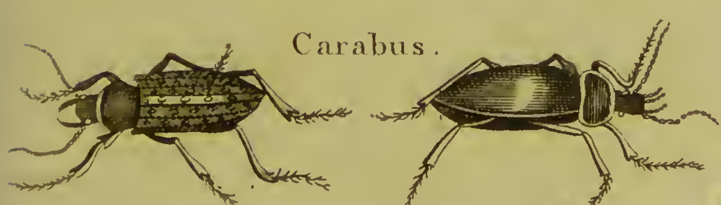


The Mufk Bull *and* Cow.



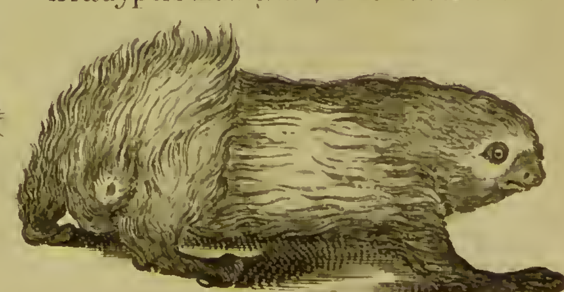
Bubalus, *or* Common Buffalo.

Carabus.

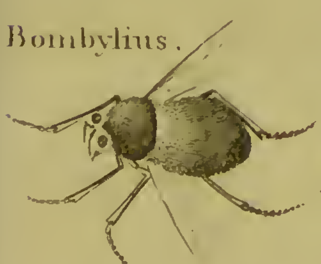


Beaver.

Bradypus *didactylus*, Two-toed Sloth.



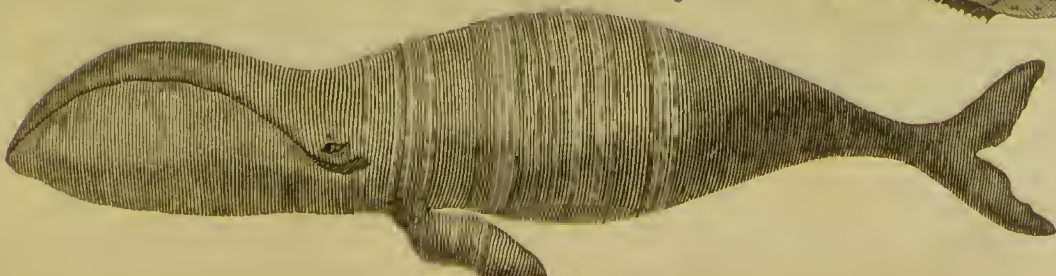
Bombylius.



Bupreftis.

Balifles *Monoceros*, *or* Unicorn Fifh.

Balœna *Mysticetus* _ *The* Whale.



Balifles *Vetula*, *or* Old Wife.

the back of the ftrongeft domeftic ox at one blow, cannot kill this fpecies, except by leaping on its back, and fuffocating it by fixing his talons about its nofe and mouth. The lion however very often perifhes in the attempt; but leaves the marks of his fury about the mouth and nofe of the beaft. They live in great herds, efpecially in Krake-Kamma, and other deferts of the Cape, but they are alfo found in the interior parts of Guinea; and retire during the day into the thick forefts. They are reckoned good meat by the Dutch of the Cape, where they are called *Aurochs*, but differ totally from the European fpecies. Of this animal we have a very circumftantial account by Dr. Sparrman, who was the firft that gave an accurate delineation and defcription of it.

4. The GRUNNIENS, or hog-cow, has cylindrical horns bent backwards. The body is fo hairy, that the hair hangs down upon its knees like a goat. The colour of the body is black, but the front is white. It has briftles on its back, tail, and hind-legs, and it grunts like a hog. It is an inhabitant of the north of Afia.

The INDICUS is a variety of the *Bos Grunniens*, but has a vaft hump on the fhoulders. Thefe animals differ much in their fize and in the form of their horns. Some are very large, and of a reddifh colour, with horns fhort, and bending clofe to the neck (fee Pl. 51); others very fmall, with horns almoft upright, bending a little forward. In Surat is a minute kind not bigger than a great dog, which have a very fierce look, and are ufed to draw children in fmall carts. In Celebes is a fmall fpecies not bigger than a middle-fized fheep, called *Anoa*, very fierce and wild, of a dark afh-colour, inhabiting the rocks.

5. The BUBALUS, or common buffalo, has large black horns bent backward and inward, and plain before. The hair on the back is very hard, but thinly fcattered over the body. It is a native of Afia; but they are tamed in Italy, and ufed for the fame purpofes as black cattle in other countries. They draw carriages, and are guided by a rope tied to a ftring thruft through their nofes. This buffalo is larger than an ox, has a thicker body, and a very hard hide. His pace is flow; but he will carry a great burden. They feed in herds like cows; and yield plenty of milk, of which very good butter and cheefe are made. Their flefh is pretty good, but not to be compared to beef. The wild buffalo (fee the plate) is a very fierce and dangerous animal; he often attacks travellers, and tears them to pieces. However, they are not fo much to be feared in woods as in the plains, becaufe their horns, which are fometimes ten feet long, are apt to be entangled in the branches of trees, which gives thofe who are furprifed by them time to efcape. They are excellent fwimmers, and will crofs the largeft rivers without any difficulty. They run wild in great troops on the coaft of Malabar; for which reafon ftrangers are allowed to hunt and kill them at pleafure.

Bos, in antiquity, was peculiarly ufed for an ancient Greek filver coin, which was *didrachmus*, or equivalent to two drachms. It was fo called as having on it the impreffion of an ox, and chiefly obtained among the Athenians and Delians; being fometimes alfo ftruck of gold. From this arofe the phrafe *Bos in lingua*, applied to thofe who had taken bribes to hold their tongue.

BOSA, a maritime town in the weftern part of the ifland of Sardinia. E. long. 8. 30. N. lat. 40. 19.

BOSCAGE, the fame with a grove or thicket.

BOSCAGE, in a law fenfe, is that food which trees yield to cattle; as maft, &c. But Manwood fays, to be quit of bofcage is to be difcharged of paying any duty for windfall wood in the foreft.

BOSCAGE, among painters, denotes a landfcape reprefenting wood and trees in abundance.

BOSCAWEN (Edward), a brave Britifh admiral, the fecond fon of Hugh late lord vifcount Falmouth. The Englifh hiftory abounds with records of the extraordinary naval talents and gallant fervices of this great man from the time of his being appointed captain of the Shoreham in 1740, to that of his defeating the Toulon fleet under M. de la Clue, in 1759. He died in 1761.

BOSCO, or BOSCHI, a town of Italy, in the Milanefe, feated on the river Orbe. E. long. 9. 44. N. lat. 44. 53.

BOSCOI, or BOSCI, in ecclefiaftical hiftory, denotes a fpecies or tribe of monks in Paleftine, who fed on grafs like the beafts of the field. The word is Greek, βοσκοι, q. d. grazers; formed from βοσκω *pafco*, I feed. The Bofcoi are ranked among the number of Adamites, not fo much on account of their habit, as food. They took no care about provifion; but when eating-time came, or any of them was hungry, they went into the fields, with each his knife in his hand, and gathered and ate what they could find.

BOSEA, GOLDEN-ROD TREE; a genus of the digynia order, belonging to the pentandria clafs of plants: and in the natural method ranking under the 53d order, *Scabridæ*. The calyx is pentaphyllous; there is no corolla; and the berry is monofpermous. Of this genus there is but one fpecies, viz. the yervamora. This is a native of the Canary iflands, and alfo of fome of the Caribbees. It has been long an inhabitant of the Britifh botanic gardens, but never flowers in this country. It is a pretty ftrong woody fhrub, growing with a ftem as large as a middling perfon's leg; the branches come out very irregular, and make confiderable fhoots every fummer, which fhould be fhortened in the fpring. Thefe branches retain their leaves till towards the fpring, when they fall away; and new leaves are produced in their place. It may be propagated by cuttings planted in the fpring; and the plants muft be houfed in winter, for they are too tender to bear the open air at that feafon of the year.

BOSHIES-MEN, a fpecies of Hottentots, fo called, according to Dr. Sparrman, from their dwelling in woody or mountainous places. They are fworn enemies to a paftoral life. Some of their maxims are, to live on hunting and plunder, and never to keep any animal alive for the fpace of one night. By this means they render themfelves odious to the reft of the inhabitants of the Cape; and are purfued and exterminated like the wild beafts, whofe manners they have affumed. Others of them again are kept alive, and made flaves of. Their weapons are poifoned arrows, which fhot out of a fmall bow will fly to the diftance of 200 paces, and will hit a mark with a tolerable degree of certainty at the diftance of 50 or even 100 paces. From this diftance they can by ftealth, as it were, convey death to the game they hunt for food, as well as to their foes, and even to fo large and tremendous a beaft as the lion; this noble animal thus falling by a weapon which perhaps it defpifed, or even did not take notice of. The Hottentot, in the mean time, concealed and fafe in his ambufh, is abfolutely certain of the operation of his poifon, which he always culls of the moft virulent kind; and it is faid he has only to wait a few minutes in order to fee the wild beaft languifh and die. The dwellings of thefe foes to a paftoral life are generally not more agreeable than their maxims and manners.

BOSNA-SERAGO, a large and ftrong town of Turky in Europe, and capital of the province of Bofnia. E. long. 18. 57. N. lat. 44. 40.

BOSNIA, a province of Turky in Europe, feated between Sclavonia and Dalmatia.

BOSPHORUS, or BOSPORUS, in geography, a long and narrow fea, which it is fuppofed a bullock may fwim over. In a more general fenfe, it is a long narrow fea running in between two lands, or feparating two continents, and by

which two seas, or a gulph and a sea, are made to communicate with each other. In this sense, bosphorus amounts to the same with what we otherwise call an *arm* of the sea, channel, or strait; the Italians, *faro*; the Latins, *fretum*; and the French, *pas manche*. The word is Greek, βοσπορος, formed from βες, bullock, and πορος passage.—The name *bosphorus* is chiefly confined to two straits in the Mediterranean sea, viz. the *bosphorus of Thrace*, commonly called the *straits of Constantinople* or *channel of the Black Sea*; and the *Cimmerian* or *Scythian bosphorus*, so called, it seems, from its resemblance to the Thracian; now more commonly the *straits of Kapha*, or *Kiderleri*, from two cities standing on it.

BOSQUETS, in gardening, groves so called from *boschetto*, an Italian word which signifies a *little wood*. They are compartments in gardens formed by branches of trees disposed either regularly in rows, or wildly and irregularly, according to the fancy of the owner. A bosquet is either a plot of ground inclosed with palisadoes of horn beam, the middle of it being filled with tall trees, as elm or the like, the tops of which make a tuft or plume; or it consists of only high trees, as horse-chesnut, elm, &c. Bosquets are only proper for spacious gardens, and require a great expence to keep them up.

BOSSAGE, in architecture, a term used for any stone that has a projecture, and is laid rough in a building, to be afterwards carved into mouldings, capitals, coats of arms, &c. Bossage is also that which is otherwise called *rustic work*; and consists of stones which advance beyond the naked, or level of the building, by reason of indentures or channels left in the joinings. These are chiefly used in the corners of edifices, and thence called *rustic quoins*. The cavities or indentures are sometimes round, sometimes chain-framed, or bevelled: sometimes in a diamond form, sometimes inclosed with a cavetto, and sometimes with a listel.

BOSSINEY, or BOSS-CASTLE, a town of Cornwall, in England. W. lon. 5. 0. N. lat. 50. 40.

BOSSUPT, a town of the Austrian Netherlands, in the province of Brabant. E. long. 4. 30. N. lat. 50. 52.

BOST, a very strong town of Persia, and capital of the province of Zablestan. E. long. 64. 15. N. lat. 31. 50.

BOSTANGIS, in the Turkish affairs, persons employed in the garden of the seraglio, out of whose number are collected those that are to row in the Grand Signior's brigantines, when he has a mind to divert himself with fishing, or to take the air upon the canal. They who row on the left hand are only capable of mean employments in the gardens: but they who row on the right hand may be promoted to the charge of bostangibachi, who has the general intendency of all the Grand Signior's gardens, and commands above 10,000 bostangis.

BOSTON, a corporation-town of Lincolnshire in England, seated on both sides the river Witham. E. long. 0. 15. N. lat. 53. 3.

BOSTON, the capital of New England in North America, built in 1630, in a peninsula of about four miles in circumference, at the bottom of Massachusets bay, in a very convenient situation for trade. The town stands in W. long. 71. 5. N. lat. 42. 24. about 9 miles from the mouth of the bay. The late unfortunate American war began here by the attack at Bunker's hill, where many brave men lost their lives.

BOSWORTH, a town of Leicestershire in England, situated in W. long. 1. 24. N. lat. 52. 45.

B O T A N Y,

THE science of plants; or that part of physiology which treats of plants, their several kinds, forms, virtues, and uses. The word is derived from βοτανη *herb*; and that from βοτο·, of βοω *I feed*, because vegetables are the natural food of most animals.

Authors are divided about the precise object and extent of the term *Botany*, which some will have to include the whole province of plants, in all their states, uses, and relations; whilst others restrain it to the knowledge of the classes, genera, species, external figures, and description of plants, exclusive of their origin and generation, which belong to *Physiology*; of their culture and propagation, which belong to *Gardening* and *Agriculture*; and of their virtues, which are the objects of consideration in *Physic* and *Pharmacy*.

HISTORY OF BOTANY.

THIS science was cultivated in some degree among the antients; though chiefly with a view to its medical application and use; but as they adopted no regular system of distribution and arrangement, they made a slow progress, and the knowledge they gained was soon and easily lost. The first author on the subject whose writings now remain, is Hippocrates, who has enumerated about 250 different plants. After him Aristotle, or rather Theophrastus, the disciple of Aristotle, who flourished about 300 years before Christ, is the only Botanist on whose writings we can depend as genuine. There remain nine books of his on the history of plants, and six on the causes of them: he reckons about 500 plants. Among the Romans, Cato, Varra, Virgil, and Columella might be mentioned. But the most eminent were Dioscorides, who lived under Anthony and Cleopatra; and C. Plinius Secundus, under Vespasian and Titus. The former is called the prince of botanists, though the number of plants he has described amount only to 600; whilst the latter enumerates more than 1000 plants. Galen, of Pergama in Asia, who lived at Rome about the year 133, though he did not write professedly on *botany*, has introduced many incidental observations on this subject; and other physicians prosecuted this study, as far as it was immediately connected with their profession, from the second to the sixth century of the Christian æra; such as Oribasius, Aetius, Trallianus, and P. Ægineta. The principal Arabian *botanists*, who mostly with the same views cultivated this science from the eighth to the twelfth century, were Mesue, Serapio, Razis, Avicenna, and Averrhoes. The succeeding period, till the fifteenth century, was very unfavourable to every kind of science: however, in this century, and especially in the next, *botany* was revived in numerous and laboured commentaries on Theophrastus, Dioscorides, Pliny, &c. from the pens of Leonicenus, Brasavolus, Cordus, Fuchsius, Bodæus, Matthiolus, Dalechampius, and others. Turner, Gerard, and Tradescant were the first *botanists* in England: they applied themselves to the culture of medical and rare plants towards the close of the sixteenth century. But it was after this period that *botany* began to acquire a considerable degree of importance and reputation; and that ingenuity and industry were employed in collecting and classing new species of plants. It would be tedious so much as to recount all the names of those who are distinguished in this respect; let it suffice to mention Gesner, Dodonæus, Cæsalpinus, Prosper Alpinus, the two Bauhins, Columna, Parkinson, Plukenet,

Morrison, Malpighi, Grew, Hermannus, Ray, Magnol, Tournefort, Sloan, Sherrard, Linnæus, and Miller. In a word, *botany* is arrived at a degree of perfection among the moderns, to which the antients were strangers; not only as to the method of classing, distributing, and characterising plants, but also as to the *copia* or number of plants known and described. The numerous travels and voyages of *botanists* have also very much contributed to the perfection of this science.

But of all the means which have been thought conducive to the successful cultivation of the science of Botany, none have proved of so much importance as the clear and distinct methods of arrangement suggested by modern Botanists; whereby the several classes, genera, species, and varieties, may be readily distinguished. Indeed it is easy to foresee, that in proportion as the *system of Linnæus* prevails, and different writers agree in adopting the same language, the study of *botany* must be greatly facilitated and promoted. That celebrated writer distributes the systems which have already obtained into *heterodox* and *orthodox*. The former are founded in an alphabetical arrangement; in the structure of the root; in the different species of flowers; in the *habit* of plants; their time of flowering; their native soil and climate; their medicinal use, and the order of the dispensaries. The *orthodox* systems, as he calls them, are either universal or partial; such as belong to plants in general, or such as are accommodated to the nomenclature and arrangement of particular kinds. The universal systems are four; though, by various modifications, this number has been considerably augmented. Linnæus has distinguished the several patrons of them under the classes and appellations of *Fructistæ*, *Corolistæ*, *Calycistæ*, and *Sexualistæ*. The *Fructistæ* are such as form the several classes of vegetables from the *pericarpium*, the *seed*, and the *receptacle*; of this number are Cæsalpinus, Morrison, Ray, Knaut, Hermann, and Boerhaave. The *Corolistæ* distinguish the several classes by means of the *corolla* and *petals*; such are Rivinus and Tournefort, and their disciples. The *Calycistæ* distribute them from the *calyx*, as Magnol; and the *Sexualistæ* found their system on the different sexes of plants. To this compendious abstract of the history and principal systems of *botany*, it may be proper to add, that Cæsalpine, who was an Italian physician in 1583, was the first systematic writer; and he distributed plants into classes according to the form of their seeds. Ray, from being first a *Fructist*, became afterwards a *Corolist*. Boerhaave endeavoured to combine the systems of Hermann, Ray, and Tournefort; but as the system of the latter was at one time very generally received, and, notwithstanding the prevalence of the Linnæan or sexual system, has still some advocates, it may be proper to observe, that Tournefort considers plants as composed of five parts, viz. roots, stalks, leaves, flowers, and fruit; neglecting the three former parts, he distributes them into various *classes*, according to the disposition and structure of the flower; and in resolving them into genera, he takes into consideration both the flower and fruit. Mr. Ray, urged chiefly by the short duration of the flower, sought the characters of the several genera, not merely in the flower and fruit, but in the figure of the organical parts, as the leaves, stalks, and roots, and in their colour, smell, taste, and the outward surface of the whole plant.

The *Sexual System* of Botany, as its title imports, is founded on a discovery that there is in vegetables, as well as in animals, a *distinction of the sexes*. This was not wholly unknown to the ancients; but their knowledge of it was very imperfect. It will be seen hereafter, that the flowers of the generality of vegetables are *Hermaphrodite*, containing in themselves the characters of both sexes; but that in the classes *Monœcia and Diœcia*, the sexes are parted, and allotted to different flowers; and that in the class *Diœcia* in particular, the sexes are even on different plants, the male flowers growing all upon one plant, and the female upon another. Now this last circumstance the ancients had observed: indeed it could hardly escape their notice; for the palm-tree, whose fruit was in esteem, being of the class *Diœcia*, a very little observation was requisite to teach them, that in these trees the flowers of the male were necessary to ripen the fruit of the female. Accordingly we find, in Book I. of the account given by *Herodotus* of the country about *Babylon*, where these trees are in plenty, that it was a custom with the natives, in their culture of this plant, to assist the operations of nature, by gathering the flowers of the male trees, and carrying them to the female. By this means they secured the ripening of the fruit; which might else, from unfavourable seasons, or the want of a proper intermixture of the trees of each sex, have been precarious, or at least not have been produced in equal quantities.

It seems pretty extraordinary, that this discovery should not have led the ancients to detect the whole process of nature in the propagation of the various species of vegetables; and yet it does not appear, by any of their writings, that are come down to us, that they went farther than this obvious remark upon the palm-tree, and some similar notions concerning the fig. They had indeed, from what they saw in these plants, formed a notion that all others were male and female likewise; but this notion was false, the far greater part having hermaphrodite flowers, and serves to convince us, that what they discovered of the palm and fig, was only a right guess, and not founded on any knowledge of the anatomy of flowers, either in those trees, or any other.

In this dark state the doctrine of the sexes of vegetables remained, not only through all the ages of antiquity, but almost to the end of the last century, the moderns seeing no more of this doctrine than the ancients had done before them; and hence we have to this very hour in use, the false distinctions of *male* and *female* species of *Cornus*, *Pæony*, *Cistus*, and many others, which have all hermaphrodite flowers, the distinction in these cases being grounded on nothing more than some difference in the habit of the two species with which the sexes are no ways concerned.

The honour of having first suggested the true sexual distinctions in plants appears to be due to our own countryman, Sir *Thomas Millington*; from whose hints Dr. *Grew*, as the Doctor himself acknowledges, was led to the observations he has given on this subject, in his *Anatomy of Plants*. After this, *Camerarius*, *Moreland*, *Geoffroy*, *Vaillant*, *Blair*, *Jussieu* and *Bradley*, pursued their enquiries and experiments so far as to remove all doubt concerning these discoveries; and, lastly, the great *Linnæus* founded thereon the system of Botany, of which it is the object of these pages principally to treat.

The Sexual Hypothesis, on its first appearance, was received with all that caution that becomes an enlightened age: and nature was traced experimentally through all her variations, before it was universally assented to. *Tournefort* refused to give it any place in his system; and *Pontedera*, though he had examined it, treated it as chimerical; but the proofs which Dr. *Linnæus* has stated amongst the aphorisms of his *Fundamenta Botanica*, and farther explained and illustrated in his *Philosophia Botanica*, are so clear, that the birth of animals is not more evidently the consequence of an intercourse between the sexes, than that of vegetables; and it would be now as ridiculous for any one, who has investigated the subject, to doubt of the one as of the other.

We shall not attempt to lay all these proofs before the reader, our business is to explain, not demonstrate: but as it may be satisfactory to see some one fact established, that carries conviction with it, we shall here introduce an extract from Mr. Mylius's letter from *Berlin*, which is inserted in the *Philo-*

fophical Tranfactions, vol. xlvii, concerning a remarkable experiment made on the palm-tree. "The fex of plants (fays Mr. Mylius) is very well confirmed, by an experiment that has been made here on the *palma major foliis flabelliformibus*. There is a great tree of this kind in the garden of the royal academy. It has flowered and borne fruit thefe thirty years, but the fruit never ripened, and when planted it did not vegetate. The palm-tree, as you know, is a *Planta Diœcia*, that is, one of thofe in which the male and female parts of generation are upon different plants. We having therefore no male plants, the flowers of our female were never impregnated with the farina of the male. There is a male plant of this kind in a garden at *Leipfic*, twenty *German* miles from *Berlin*. We procured from thence, in *April* 1749, a branch of male flowers, and fufpended it over our female ones; and our experiment fucceeded fo well, that one palm-tree produced more than an hundred perfectly ripe fruit, from which we have already eleven young palm-trees. This experiment was repeated laft year, and our palm-tree bore above two thoufand ripe fruit." Thus has become eftablifhed the fact, which was attefted by the ancients, concerning the palm-tree, which fome may perhaps have looked upon as fabulous; and, as the fructification in other vegetables, though perhaps differing in particular circumftances, has yet in general a manifeft conformity with that of the palm-tree, in refpect to the parts fuppofed to be the organs of generation, which are difcoverable either on the fame, or on a feparate flower, in all but the clafs *Cryptogamia*, where they are too minute for obfervation; fo from this fingle experiment we may fairly decide in favour of the whole fexual hypothefis: but there ftill remain other and better proofs, if others were wanting, than thofe adduced by *Linnæus*; and whoever defires farther fatisfaction concerning this point, may fee the feveral demonftrations collected, and methodically connected, in the *Sponfalia Plantarum* of *J. Guftavus Walkbloom*, publifhed in the *Amœnitates Academicæ* at *Leyden*, in 1749.

Having thus given an outline of the hiftory of the Science, and explained, as far as feems neceffary, the new principles upon which the reformation of the former vicious fyftems of Botany has been undertaken by the later botanifts, we fhall now fpeak of vegetation, or that procefs of nature by which plants are produced.

PART I.

OF VEGETATION.

Sect. I. *Of the Structure of Plants.*

Of the theory of vegetation, or of the growth, propagation, and nutriment of vegetables, our knowledge is flight and fuperficial. A clofe infpection into the ftructure of plants affords the beft ground for reafoning on this fubject, and, indeed, every thing beyond it is little better than mere fancy and conjecture.

On making a tranfverfe fection of a tree, it appears to confift of three diftinct parts—the bark, the wood, and the medulla, or pith.

1. The bark confifts of two parts, the cuticle, and the true bark. The cuticle of plants affords an external covering to all their parts. It confifts of numerous layers, eafily feparable from each other, and of which the fibres are circular. The true bark may be confidered as a congeries of cellular fubftance, in which are placed two kinds of organs, the veffels peculiar to the plants, and the longitudinal fibres. Of the ufe of thefe, nothing can be faid at prefent.

2. On removing the bark, the wood appears. Its fubftance is denfer that the bark, and its ftructure more difficult to be demonftrated. But it has been difcovered likewife to contain vafa propria, and longitudinal fibres, and, befides thefe, large veffels with fpiral coats, which run from one end of the tree to the other, and are denominated vafa aëria, or air veffels. Between the wood and the pith lies a green coloured fubftance, firft accurately defcribed by Dr. John Hill, and by him affirmed to contain all the parts of the plant in embryo: he gave it the name of Corona.

3. In the centre of the tree refides the pith, which, in young plants, is very abundant. As they approach to maturity it grows drier, and appears in a fmaller quantity; and, in very aged trees, it is entirely obliterated. Its fubftance is cellular, and, according to the author juft mentioned, it is of a fimilar ftructure in all plants. Thefe are the folid parts of vegetables.

But there are likewife fluids or juices in vegetables; and thefe are of two kinds. The one is of the fame nature in all the variety of vegetables: the other varies according to the different plants in which it exifts. The former, which is called the *fuccus communis*, when collected early in the fpring, from an incifion made in the birch or vine, differs little from common water. The latter, which is named the *fuccus proprius*, poffeffes various properties in various plants, and gives to each its fenfible qualities. Thefe two juices never mingle with each other in the tree, and the latter is found in the *vafa propria* only.

It is not yet afcertained, whether the juices of plants are tranfmitted through veffels, or a cellular fubftance. Each fide of the queftion has had its advocates, who have fupported their refpective opinions with probable arguments; but it is to be regretted, that, on fo interefting a fubject, no conclufion can be formed from the actual diffection of vegetables. It, however, feems moft probable, that all the fluids of plants are tranfmitted through veffels.

Sect. II. *Of the Courfe of the Succus Communis, or Sap.*

Botanists have made many experiments to afcertain the courfe of the fap. Early in the fpring, when the fap begins to flow, incifions have been made in the trunk and branches of trees, as far as the pith; and, in fuch cafes, it has been conftantly found, that a larger quantity of fap flowed from the fuperior, than from the inferior margin of the incifion. This circumftance led to the opinion, that in the beginning of the fpring, great quantities of moifture are abforbed by trees from the atmofphere, and hence the fource of the abundance of fap. But this conclufion is found to difagree with the phænomena of nature, from the two following experiments.

1. Incifions of various heights being made in the ftem of feveral plants, their roots were immerfed in a decoction of logwood. The roots abforbed the coloured liquor, which at length began to flow from the fuperior, and not from the inferior margins of the incifions; nor had the liquor extended itfelf much upwards, beyond the margin of the incifion from which it was difcharged.

2. In the feafon when the fap flows moft abundantly, called the bleeding feafon, a deep cut was made into the branch of a

growing vine, and the greateft quantity of fap was difcharged from the upper margin of the incifion: but a branch of the fame tree, cut in the fame manner, being inverted, the fap flowed moft copioufly from the other margin of the incifion, which of courfe was now that next the root. On the other hand, many experiments may be brought to prove directly, that, in the bleeding feafon, the fap afcends from the roots towards the branches; the following however may fuffice.

1. Early in the fpring, when little or no fap had as yet entered the plant, Dr. Hope made a number of incifions, of different altitudes, into the root and ftem of a birch. As the fap rofe, it firft flowed from the fuperior margin of the loweft incifion, and then, in regular fucceffion, from the upper margins of the other incifions, till, at laft, it reached the higheft.

2. If, in the beginning of the bleeding feafon, before the fap is found in the ftem or branches, an incifion be made in the root of a vine, a confiderable flow of fap will follow the wound.

3. The quantity of fap is very generally proportioned to the humidity of the foil.

Sect. III. *Of the Courfe of the Succus Proprius.*

When a portion of the bark and wood of the pine is cut from the ftem, the *fuccus proprius* flows in confiderable quantity, both from the upper and under margin of the incifion. Hence it occurred to botanifts, that this juice might have little or no motion, and that its efflux from fuch an orifice might depend entirely on its being freed from the preffure of the bark and wood. But we cannot accede to this opinion: for although in the beginning, the *fuccus proprius* flows from both margins of the incifion, in a little while, it is difcharged from the fuperior margin only.

Hence it appears clearly, that the courfe of this juice, in its veffels, is never from the roots towards the branches, but always in the contrary direction.

Befides the veffels of the fuccus proprius, and thofe conveying the fap, a third kind are found in vegetables, named air-veffels, or *vafa aëria*. Thefe are chiefly fituated in the wood, leaves, and petals; but are wanting in the bark of trees, and in the herbaceous plants. They are formed by a number of fmall filaments, fpirally rolled up, fo as to form a cavity in the middle. The name of *vafa aëria* has been given them, becaufe they are empty of liquor, and becaufe a great quantity of air is certainly found in the wood of plants, where thefe veffels are chiefly placed, and where there is no peculiar organization. They are fuppofed to be the inftruments of refpiration in vegetables; but in what manner this function is performed, is not clearly underftood.

Dr. Hill has demonftrated, that the cuticle of plants is an organized fubftance, containing veffels. In trees and fhrubs thefe veffels have an external opening; but in the herbaceous plants this is wanting. Trees and fhrubs only are poffeffed of *vafa aëria*, and, when a plant is placed under the exhaufted receiver of an air-pump, the air enters through the cuticle, and only iffues from the wood, in which the *vafa aëria* are fituated. From thefe circumftances taken together, and confidered attentively, we have reafon to conclude, that the air's proper entrance to the *vafa aëria* is through thefe cuticular veffels. Thus, in the early part of the fpring, the gentle heat expands the mouths of thefe veffels, before contracted by the winter's cold. Into thefe orifices the external air rufhes and preffes down to the roots. To thefe it gives energy, as it does to the moving fibres of animals; and, by its preffure, it may affift in propelling the juices upwards. An additional quantity of air is evolved by the internal motions of the plant, and the whole paffes off with the perfpirable matter. In this way, there feems to be a circulation of air through plants, affifting and affifted by the powers which move the juices.

On this account, trees overgrown with mofs have few leaves, weak fhoots, and no fruit. The practice of gardeners is, therefore, to be commended, who, in the fpring, ftrip the mofs from the bark of aged trees, and, thus facilitating the acceffion of the air, reftore them to verdure and fruitfulnefs.

Sect. IV. *Of the Motion of the Fluids in Plants.*

Capillary attraction has generally been accounted the caufe of the motion of the juices of plants; and the permanence of the action of this power has been fuppofed to depend on the evaporation from the leaves. Of late years, indeed, botanifts have afcribed to plants a vital power, which they believe affifts the flow of the juices; and this opinion is fupported by the following reafons.

1. The defcent of the juices, that is, their return from the branches to the roots, cannot be explained without the fuppofition of a vital power regulating the motion. A flow of fluids, through capillary tubes, will only take place when the refiftance at the one end is diminifhed. This might account for the rifing of the fap, when warmth is applied to the leaves, but cannot account for its defcending in the fame circumftances, that is, when the atmofphere is warmer than the earth. But this takes place conftantly, with refpect to the fuccus proprius, and it is probable that part of the fap has the fame courfe both in the day and night.

2. The exertions of many plants, on the application of ftimuli, afford another argument in fupport of their mufcular power, and the fpontaneous motions of other plants confirm the fame opinion.

3. Light, admitted to plants, increafes their perfpiration, and caufes a leaf, before inverted, to refume its natural pofition. The influence of darknefs counteracts thefe effects, and it produces what is called fleep in plants, although the heat of the atmofphere be not diminifhed. Thefe facts feem to prove the irritability, or mufcular power of vegetables.

4. If the fluids of plants are conveyed through veffels, can we fuppofe thefe tubes to be of fo fmall a diameter, as, by capillary attraction alone, to raife the juices from the roots to the fummits of the loftieft trees?

5. On the fuppofition of the fluids being moved entirely by capillary attraction, how happens it, that the fap of the vine flows from an incifion made in the fpring, and not from one made in fummer? In this cafe, as the veffels remain the fame, and the heat is at leaft not diminifhed, the efflux of fap ought to be equally copious in fummer as in fpring.

6. Capillary tubes, filled with liquor, do not difcharge their contents when broken acrofs. But from the ftem of a vine, cut tranfverfely, a large quantity of fluids is difcharged, as has been demonftrated by Dr. Hales.

Plants, as well as animals, perfpire, and, in both cafes, this function is effential to health. By the experiments of Dr. Hales, and M. Guettard, it appears, that the perfpirable matter of vegetables differs in no refpect from pure water, excepting that it becomes rather fooner putrid. The quantity perfpired varies, according to the extent of the furface from which it is emitted, the temperature of the air, the time of the day, and the humidity of the atmofphere. As the leaves form the greateft part of the furface, it is natural to fuppofe, that the quantity of thefe will very materially affect the quantity of the perfpiration. Accordingly, the experiments of Dr. Hales have afcertained, that the perfpiration of vegetables is increafed or diminifhed, chiefly, in proportion to the increafe or diminution of their foliage. The degree of heat in which the plant was kept, according to the fame author, varied the

quantity of matter perſpired; this being greater, in proportion to the greater heat of the ſurrounding atmoſphere. The degree of light has likewiſe conſiderable influence in this reſpect; for Mr. Philip Miller's experiments prove, that plants uniformly perſpire moſt in the forenoon, though the temperature of the air, in which they are placed, ſhould be unvaried. Mr. Guettard likewiſe informs us, that a plant, expoſed to the rays of the ſun, has its perſpiration increaſed to a much greater degree than if it had been expoſed to the ſame heat, under the ſhade. Finally, the perſpiration of vegetables is increaſed in proportion as the atmoſphere is dry, or, in other words, diminiſhed in proportion as the atmoſphere is humid.

The more vigorous and healthy the plant, the more copious the perſpiration; this function, like the reſt, depending much on the vital energy. Exceſſive perſpiration ſeems to hurt, and even ſometimes to deſtroy vegetables; defective perſpiration is equally injurious. It is alſo found, that this function is performed, chiefly, if not altogether, by the leaves and young ſhoots. That it may be properly carried on, all leaves are deciduous; in thoſe trees called ever-greens, there being a conſtant ſucceſſion of leaves, to prevent the organ of perſpiration from becoming rigid.

Dr. Hales firſt obſerved, that a quantity of moiſture is abſorbed by plants, when expoſed to a humid atmoſphere. This abſorption, as well as the perſpiration, is performed by the leaves; but in what manner has not yet been aſcertained. Experiments made by M. Guettard ſhew, that perſpiration is more conſiderable from the upper, than from the under ſurface of leaves, and thoſe of the ſame author, of Duhamel and Bonnet demonſtrate, that abſorption, on the contrary, is much greater at the inferior ſurface than at the ſuperior. To prove this, the ſuperior ſurface of one leaf, and the inferior ſurface of another, were covered with varniſh, and the conſequence was, that the former, in a given time, ſuffered little diminution of weight, but the latter became much lighter. Again, ſimilar leaves were laid upon a ſurface of water, and it followed, that thoſe which had their ſuperior ſurface inverted, gained little weight, and for the moſt part died in a few days; while ſuch as had their inferior ſurface applied to the water, became much heavier, and flouriſhed many months. Theſe facts make it evident, that perſpiration, and abſorption, are not performed by the ſame veſſels, but that each has its peculiar organs.

It has been commonly ſuppoſed, that perſpiration takes place, chiefly, when the air is warm; and abſorption, on the other hand, when it is cold and moiſt. But, unleſs the veſſels peculiar to abſorption, which are placed in the under ſurface of the leaves, were kept conſtantly in action, they would neceſſarily collapſe or decay. All abſorbing organs have a peculiar ſtructure, and an action depending on life: that ſuch an organization is preſent in the leaves of plants, it is reaſonable to conclude, becauſe dried leaves do not abſorb. The ſame reaſoning is applicable to the abſorption performed by the roots: for when a ſmall portion of the root of a hyacinth, growing in water, is cut off, the whole root dies, and new roots are ſhot out, having their extremities peculiarly adapted to the abſorption of nouriſhment.

The noxious matter, carried off by perſpiration, requires large dilution to prevent its hurting the delicate ſtructure of the leaves, and in this ſtate accordingly it is thrown out on their ſurface. Here the noxious part is excreted, but part of the diluting fluid is reabſorbed, to ſerve the purpoſe of ſecretion, which could not be performed, unleſs the common juice, or ſap, were previouſly prepared. In the ſame manner, in the animal body, the ſaline and putrid matter, carried off by the urine, muſt be liberally diluted, to prevent it from injuring the tender ſtructure of the kidneys; yet, when it is ſafely lodged in the bladder, a part is reabſorbed, and the groſſer excrementitious matter is alone thrown out. Something of the ſame kind happens in the perſpiration of animals. They certainly take in ſomething uſeful from the ſurface of their bodies, and this is probably performed by veſſels opening outwards, different from the common exhalants. The great quantity of water, abſorbed during the uſe of the pediluvium, and that ſingular ſymptom in diabetes, of the patient's voiding a much greater quantity of urine, than there is liquor taken in by the mouth, ſeem to confirm this aſſertion.

Plants are poſſeſſed of a power of forming their different parts, and this is done by ſecretion. We may conjecture what the agents are which produce this effect, but in reſpect to the manner of their operation we are entirely in the dark. In animals, where the vital power is ſtrong, this is the principal agent in producing the new arrangement of parts, which is made in every ſecretion; but in plants, where this power is weaker, it would be unequal to perform the function, if it were not aſſiſted by abſorption and fermentation. Wherever any firm matter is to be ſecreted, the veſſels have a convoluted courſe, to allow the juice to be fermented, and the thinner parts to be abſorbed. In this manner, the ſtones and kernels of fruits are ſupplied with nouriſhment by fibres, which are much convoluted. The proper juice ſeems to be formed only when the ſap has aſcended towards the leaves, and is deſcending to the roots.

The pabula, from which vegetables receive the matter of ſecretion, are contained in the ſurrounding elements.

Some botaniſts have conceived, that plants, as well as animals, have a regular circulation of their fluids. Others think this very improbable. On both ſides, recourſe has been had to experiments; and, from theſe, concluſions perfectly oppoſite have been deduced. When a ligature has been fixed round a tree, in ſuch a manner that no juice could be tranſmitted through the bark, the tree has been found to thicken above the ligature; but below it, to continue of the ſame circumference. Hence ſome have concluded, that the ſap aſcends through the wood, and deſcends through the bark. Thoſe who are of a contrary opinion have found, that, in certain caſes, the juice aſcends through the bark only: for when a portion of the wood has been cut out, and the bark exactly replaced, the growth of the tree has been found to go on unchanged: hence it is ſaid, that the juice is tranſmitted equally through all parts of vegetables. The experiments adduced on each ſide of the queſtion are juſt, but the reaſonings on theſe, by each party, ſeem equally inconcluſive. The analogy of animal nature appears to favour the opinion, that the juice riſes through the wood only, and deſcends only through the bark; but this analogy is not complete throughout. The arteries are not placed in the internal parts alone, nor the veins in the external, but they accompany each other through every part of their diſtribution.

In vegetables, the ſap riſes *from* the roots, but the proper juice deſcends *towards* them; in the deſcent of the juice, the wood acquires its growth, and abſorption is a conſtant action of the leaves. Theſe obſervations render it probable, that there is a circulation of the juices; and if there be, the veſſels which perform it, we may reaſonably believe, accompany each other through every part of their courſe.

Sect. V. *Of the ſeveral Parts which compoſe a Plant.*

A perfect plant is compoſed of a root, of a ſtem with its branches, of leaves, flower, and fruit; for in botany, by fruit, in herbs as well as in trees, we underſtand the whole fabric of the ſeed. But there is a principal part which requires an examination more at large; the *fructification*, that is, the *flower* and the *fruit*. For on this part, as has been obſerved, Linnæus has founded his celebrated Syſtem of Botany. To under-

ftand this, take a lily, for inftance. Before it opens, there is evidently, at the top of the ftem, an oblong greenifh bud, which grows whiter the nearer it is to opening; and when it is quite open, we perceive that the white cover takes the form of a bafon, or vafe, divided into feveral fegments. This is called the *corolla*, and not the *flower*, as it is vulgarly named; fince the flower is a compofition of feveral parts, of which the corolla only is not the principal.

The corolla of the lily is not of one piece. When it withers and falls, it feparates into fix diftinct pieces, which are called *petals*. Thus the corolla of the lily is compofed of fix petals. A corolla confifting of feveral pieces like this is called a *polypetalous* corolla. If it were all of one piece, like the bell-flower, or bind-weeds, it would be called *monopetalous*.

Exactly in the middle of the corolla is a fort of little column rifing from the bottom, and pointing directly upwards. This, taken in its whole, is called the *piftil*, or *pointal*: taken in its parts, it is divided into three. 1. The fwollen bafe, with three blunted angles, called the *germ*, or *ovary*. 2. A thread placed upon this, called the *ftyle*. 3. The ftyle crowned by a fort of capital, with three notches: this capital is called the *ftigma*.

Between the piftil and the corolla of the lily there are fix other bodies, entirely feparate from each other, which are called the ftamens. Each ftamen is compofed of two parts, one long and thin, by which it is faftened to the bottom of the corolla, and called the *filament*; the other thicker, placed at the top of the filament, and called *anthera*, or *anther*. Each anther is a box which opens when it is ripe, and throws out a yellow duft, which has a ftrong fmell; this is called *pollen*, or *farina*.

Such is the general analyfis of the parts which conftitute a flower. As the corolla fades and falls, the germ increafes, and becomes an oblong triangular capfule, within which are flat feeds in three cells. This capfule, confidered as the cover of the feeds, takes the name of *pericarpium*.

The parts here mentioned are found in the flowers of moft other plants, but in different proportion, fituation, and number. By the analogy of thefe parts, and their different combinations, the families of the vegetable kingdom are determined: and thefe analogies are connected with others, in thofe parts of the plant which feem to have no relation to them. For inftance, this number of fix ftamens, fometimes only three, of fix petals or divifions of the corolla, and that triangular form of the germ, with its three cells, determine the liliaceous tribe; and in all this tribe, which is very numerous, the roots are *bulbs* of fome fort or other. That of the lily is *fquamous*, or compofed of fcales; in the afphodel, it is a number of oblong folid bulbs, connected together; in the crocus and faffron there are two bulbs, one over the other; in the colchicum they are placed fide by fide.

The lily is deficient, however, in one of the conftituent parts of a perfect flower, namely, the *calyx* which is that outer green part of the flower, ufually divided into five parts, or compofed of five fmall leaves, fuftaining and embracing the corolla at the bottom, and enveloping it entirely before it opens, as may be remarked in the rofe. The calyx which accompanies almoft all other flowers, is wanting in the greater part of the liliaceous tribe; as the tulip, the hyacinth, the narciffus, the tuberofe, &c. and even in the onion, leek, garlic, &c. which are alfo liliaceous, though they appear very different at firft fight.

PART II.

OF THE CLASSES, ORDERS, AND GENERA.

Sect. I. *Of the Sexual Syftem.*

THE Linnæan fyftem of claffing plants, as has been obferved, is founded upon the fuppofition, that vegetables propagate their fpecies in the fame manner as animals.

How much fuperior is this to all other modern fyftems, and ftill more to the crude notions of the ancient botanifts, whofe only guide were the feven diftinguifhing characters of plants, viz. their generation; their place of growth; their fize, as trees and fhrubs; their ufe, as pot-herbs and efculent grains; and their lactefcence, or liquor that flows from them when cut! Diofcorides divided them into aromatics, alimentary, medicinal, and vinous plants. The good properties of this method are, that the botanift as it were comes to the point at once; and when he knows the plant, knows alfo its virtues and ufes, or at leaft part of them: but this convenience is greatly over-balanced by innumerable difadvantages; for the qualities and virtues of plants are neither fixed and invariable, nor are they impreffed in legible characters on the plants themfelves. The different parts of a plant often poffefs different and even oppofite virtues; fo that, fuppofing the virtues to be known, and applied to the purpofe of vegetable arrangement, the root muft frequently fall under one divifion, the leaves under a fecond, and the flower and fruit under a third. Befides, if we reflect that the fole end of fuch arrangement is to facilitate the knowledge of plants to others, the infufficiency and even abfurdity of methods founded upon their virtues will immediately appear. If a ftalk of vervain, for inftance, is prefented to us, which we are required to inveftigate from a prefuppofed knowledge of the virtues of plants; before we can fettle the clafs to which it belongs, we muft difcover whether or not it has the virtues belonging to any of the plants with which we are acquainted; and this difcovery being the refult of experiments on the human body, may poffibly require a long period of time for its accomplifhment. But to return to the fexual fyftem of *Linnæus*.

The *ftamina* he confiders as the male, or fœcundating part, and the *piftil* as the female. In fome fpecies the male and female flowers are different, and in fome, as the palm-tree, they grow upon different plants. But in the majority, the male and the female are found within the fame *corolla*, and this large divifion of vegetables he ftyles *hermaphrodite* plants. It is of little confequence to the botanift, who wifhes only to become acquainted with the genus and character of a plant, whether this fyftem be philofophically true or not; it is fufficient that it has been found the moft commodious method of claffification hitherto invented. On thefe principles Linnæus has arranged all the known genera of plants in twenty-five claffes, and thefe again are fubdivided into orders. The genera are diftinguifhed by attending to the other parts of the fructification, as the calyx, corolla, pericarpium, &c. &c.

ANALYSIS of the SEXUAL SYSTEM of LINNÆUS.

According to this ingenious Method all Vegetables are furniſhed with Flowers, *which are either*

	Classes.	Examples.
Viſible		
Stamina and pointal in the ſame flower,		
Male and female organs diſtinct,		
Stamina not united either above or below,		
Of equal length,		
In Number,		
One, — — —	1 *Monandria,*	Ginger, Indian arrow-root, turmerick, blite.
Two, — — —	2 *Diandria,*	Jeſſamy, privet, olive, lilac, ſpeedwell.
Three, — — —	3 *Triandria,*	Valerian, tamarind, iris, and the graſſes.
Four, — — —	4 *Tetrandria,*	Scabious, teazel, madder, holly, woodroof.
Five, — — — —	5 *Pentandria,*	Bell-flower, bind-weed, mullein, thorn-apple, periwinkle, and the rough leaved and umbelliferous plants.
Six, — — — —	6 *Hexandria,*	Snow-drop, narciſſus, tulip, aloe, hyacinth.
Seven, — — —	7 *Heptandria,*	Horſe cheſnut.
Eight, — — —	8 *Octandria,*	Indian-creſs, heath, French-willow.
Nine, — — —	9 *Enneandria,*	Bay rhubarb.
Ten, — — — —	10 *Decandria,*	Fraxinella, rue, rhododendron, lychnis.
Twelve, — — —	11 *Dodecandria,*	Purſlane, houſe-leek, aſarabacca.
Many, frequently twenty, attached to the calyx,	12 *Icoſandria,*	Peach, medlar, apple, roſe, cinquefoil.
Many, generally upwards of twenty, not attached to the calyx,	13 *Polyandria,*	Herb chriſtopher, poppy, lark-ſpur, columbine.
Of unequal length,		
Two long, and two ſhort,	14 *Didynamia,*	Savory, hyſſop, ground-ivy, balm, toad-flax, fox-glove, agnus caſtus, bear's-breech.
Four long, and two ſhort,	15 *Tetradynamia,*	Scurvy-graſs, candytuft, water-creſs, ſtock, woad.
Stamina united		
by the filaments, into one body,	16 *Monadelphia,*	Geranium and the mallow tribe.
into two bodies,	17 *Diadelphia,*	Fumatory, milk-wort, and the pea-bloom flowers.
into many bodies,	18 *Polyadelphia,*	Orange, chocolate-nut, St. John's-wort.
by the antheræ, or tops, into a cylinder,	19 *Syngeneſia,*	Violet, balſam, cardinal-flower, and the flowers termed compound, as dandelion, ſuccory, thiſtle, cudweed, tanſey, blue-bottle.
Male organs (ſtamina) attached to, and ſtanding upon the female (piſtillum) —	20 *Gynandria,*	Orchis, ladies-ſlipper, arum, vanelloe, birthwort, paſſion-flower.
Stamina and pointal in different flowers		
on the ſame plant, — —	21 *Monœcia,*	Mulberry, nettle, oak, cypreſs, fir, cucumber.
on different plants, — —	22 *Diœcia*	Willow, hop, ſpinnage, poplar, mercury, juniper.
on the ſame, or different plants along with hermaphrodite flowers,	23 *Polygamia,*	White hellebore, pellitory, orach, fig.
Or lie concealed from view, and cannot be diſtinctly deſcribed	24 *Cryptogamia,*	Ferns, moſſes, muſhrooms, flags.

Observation. The principal merit of this Syſtem is its uniformity; the author never loſing ſight of the ſtamina, which are his leading and ſole character. Its facility, which has been ſo highly extolled by ſome, will admit of a doubt; for in practice it has been thought by ſome botaniſts very intricate. None of the claſſes are completely natural, though ſome, particularly the 15th, 16th, 17th, 19th, and 20th, might have been rendered ſuch without any material violence to the principles of the method.

TABLE of the CLASSES and ORDERS.

[In the following table the claſſes are diſtinctly exhibited, with the orders into which each claſs is ſubdivided. In plate 52, the claſſes are all expreſſed, and with each particular claſs ſome one of the orders.]

Classes.	Orders.
1. Monandria	1. *Monogynia.* 2. *Digynia.*
2. Diandria	1. *Monogynia.* 2. *Digynia.* 3. *Trigynia.*
3. Triandria	1. *Monogynia.* 2. *Digynia.* 3. *Trigynia.*
4. Tetrandria	1. *Monogynia.* 2. *Digynia.* 3. *Tetragynia.*
5. Pentandria	1. *Monogynia.* 2. *Digynia.* 3. *Trigynia.* 4. *Tetragynia.* 5. *Pentagynia.* 6. *Polygynia.*
6. Hexandria	1. *Monogynia.* 2. *Digynia.* 3. *Trigynia.* 4. *Tetragynia.* 5. *Polygynia.*
7. Heptandria	1. *Monogynia.* 2. *Digynia.* 3. *Tetragynia.* 4. *Heptagynia.*
8. Octandria	1. *Monogynia.* 2. *Digynia.* 3. *Trigynia.* 4. *Tetragynia.*
9. Enneandria	1. *Monogynia.* 2. *Trigynia.* 3. *Hexagynia.*
10. Decandria	1. *Monogynia.* 2. *Digynia.* 3. *Trigynia.* 4. *Pentagynia.* 5. *Decagynia.*
11. Dodecandria	1. *Monogynia.* 2. *Digynia.* 3. *Trigynia.* 4. *Pentagynia.* 5. *Dodecagynia.*
12. Icosandria	1. *Monogynia.* 2. *Digynia.* 3. *Trigynia.* 4. *Pentagynia.* 5. *Polygynia.*
13. Polyandria	1. *Monogynia.* 2. *Digynia.* 3. *Trigynia.* 4. *Tetragynia.* 5. *Pentagynia.* 6. *Hexagynia.* 7. *Polygynia.*

BOTANY.

PL. 52.

14. Didynamia	1. *Gymnospermia.* 2. *Angiospermia.*
15. Tetradynamia	1. *Siliculosa.* 2. *Siliquosa.*
16. Monadelphia	1. *Triandria.* 2. *Pentandria.* 3. *Octandria.* 4. *Enneandria.* 5. *Decandria.* 6. *Endecandria.* 7. *Dodecandria.* 8. *Polyandria.*
17. Diadelphia	1. *Pentandria.* 2. *Hexandria.* 3. *Octandria.* 4. *Decandria.*
18. Polyadelphia	1. *Pentandria.* 2. *Icosandria.* 3. *Polyandria.*
19. Syngenesia	1. *Polygamia æqualis.* 2. *Polygamia superflua.* 3. *Polygamia frustranea.* 4. *Polygamia necessaria.* 5. *Polygamia segregata.* 6. *Monogamia.*
20. Gynandria	1. *Diandria.* 2. *Triandria.* 3. *Tetrandria.* 4. *Pentandria,* 5. *Hexandria.* 6. *Decandria.* 7. *Dodecandria.* 8. *Polyandria.*
21. Monœcia	1. *Monandria.* 2. *Diandria.* 3. *Triandria.* 4. *Tetrandria.* 5. *Pentandria.* 6. *Hexandria.* 7. *Heptandria.* 8. *Polyandria.* 9. *Monadelphia.* 10. *Syngenesia.* 11. *Gynandria.*
22. Diœcia	1. *Monandria.* 2. *Diandria.* 3. *Triandria.* 4. *Tetrandria.* 5. *Pentandria.* 6. *Hexandria.* 7. *Octandria.* 8. *Enneandria.* 9. *Decandria.* 10. *Dodecandria.* 11. *Polyandria.* 12. *Monadelphia.* 13. *Syngenesia.* 14. *Gynandria.*
23. Polygamia	1. *Monœcia.* 2. *Diœcia.* 3. *Triœcia.*
24. Cryptogamia	1. *Filices.* 2. *Musci.* 3. *Algæ.* 4. *Fungi.*
25.	1. *Palmæ.*

EXPLANATION of PLATE 52.

Classes and Orders.

Fig. 1. Illustrates the class *Monandria,* and order *Monogynia,* (one stamen and one pistil) as in the *Canna Indica,* Indian flowering reed.

2. *Diandria Monogynia,* two stamens and one pistil, as in Veronica, or Speedwell.

3. *Triandria Digynia,* three stamens and two stigmata, as in the Grasses, &c.

4. *Tetrandria Monogynia,* four stamens and one pistil, as in many examples.

5. *Pentandria Monogynia,* five stamens and one style or pistil, as in the Hen-bane, &c.

6. *Hexandria Monogynia,* six stamens and one style, as in Tradescantia Virginia, Spider-wort, &c.

7. *Heptandria Monogynia,* seven stamens and one style.

8. *Octandria Monogynia,* eight stamens and one style, as in Erica, Heath, &c.

9. *Enneandria Monogynia,* nine stamens, &c.

10. *Decandria Pentagynia,* ten stamens and five styles, as in Sedum, &c.

11. *Dodecandria Monogynia,* twelve stamens and one pistil.

12. *Icosandria Polygynia,* twenty stamens arising from the substance of the calyx or corolla, with many stigmata, as in *Geum, Water Avens,* &c.

13. *Polyandria Monogynia,* many stamens with one pistil or style, as in *Cistus,* Poppy, &c.

14. *Didynamia,* two stamens longer than the other two, as in *Lamium,* Arch-angel, &c.

15. *Tetradynamia,* —— six stamens, four longer than the other two.

16. *Monadelphia Pentagynia,* many stamens united at the base, and forming a cylinder with five stigmata, as in *Hibiscus Syriacus,* in the Mallow, &c.

17. *Diadelphia,* —— the stamens in two parcels, as in the Pea, &c.

18. *Polyadelphia,* —— many sets of stamens in one flower.

19. *Syngenesia,* —— anthers united, as in *Aster, Violet,* &c.

20. *Gynandria,* —— stamens connected to the style, as in *Sisyrinchium,* &c.

21. *Monœcia,* —— male and female flowers separate, but on the same plant.

22. *Diœcia.* —— Plants of this class are either male or female, each distinct, and bearing from a separate root.

23. *Polygamia.* —— Plants of this class bear *Hermaphrodite,* together with distinct male and female flowers, or both.

24. *Cryptogamia.* —— Plants of this kind have a concealed fructification, as in the *Filices,* Ferns, &c.

Parts of the Flower.

Fig. 1. A flower with its corolla, pistillum, and stamina, as just now described; *a,* the petals of the corolla; *b,* the germen; *c,* the style; *d,* the stigma; *e,* the filaments; *f,* the antheræ. Fig. 2. The calyx, pistillum and stamina, separate from the corolla; *a,* the perianthium; *b,* the germen; *c,* the style; *d,* the stigma; *e,* the filaments; *f,* the antheræ bursting and discharging the pollen; *g,* an anthera before it has burst. Fig. 3. A flower whose corolla is monopetalous; *a,* the corolla; *b,* the perianthium. Fig. 4. A polypetalous corolla; *a,* the ungues; *b,* the laminæ. Fig. 5. A *Narcissus* issuing from its spatha: *a,* the flower, *b,* the spatha. Fig. 6. An amentum. Fig. 7. The fructification of a *Moss*; *a,* the calyptra. Fig. 8. A *Fungus*: *a,* the volva. Fig. 9. A *Grass*: *a,* the gluma; *b,* the arista. Fig. 10. A compound umbel: *a,* the universal umbel; *b,* the umbellulæ, or partial umbels; *c,* the universal involucrum; *d,* the partial involucra. Fig. 11. A bractæa accompanying the flowers of the *Tilia*: *a,* the bractæa. Fig. 12. *a,* the pollen seen with a microscope; *b,* an elastic vapour discharged from it.

Parts of the Fruit.

Fig. 1. A capsule: *a,* the valvules. Fig. 2. *a,* A receptacle of seeds. Fig. 3. A strobilus. Fig. 4. A winged seed: *a,* the seed; *b,* the wing. Fig. 5. A legumen: *a,* the upper suture, along which runs the receptacle of the seeds. Fig. 6. A siliqua: *a, b,* the two sutures to which the seeds are fastened alternately. Fig. 7. A seed crowned with a pappus: *a,* the seed; *b,* the stipes or thread which supports the pappus; *c,* a hairy pappus; *d,* a feathery pappus. Fig. 8. The seed of a *Bean* split in two: *a,* the cotyledons; *b,* the corculum; *c,* the rostellum; *d,* the plumula; *e,* the hilum. Fig. 9. A drupa: *a,* the nucleus, or stone; *b,* the pulp. Fig. 10. A pomum: *a,* the capsule; *b,* the pulp. Fig. 11. A berry: *a,* the seeds; *b,* the pulp. Fig. 12. A seed crowned with a calyculus: *a,* the seed; *b,* the calyculus.

Sect. II. *Explanation of the Orders.*

Class I. MONANDRIA. 2. DIANDRIA. 3. TRIANDRIA. 4. TETRANDRIA. 5. PENTANDRIA. 6. HEXANDRIA. 7. HEPTANDRIA. 8. OCTANDRIA. 9. ENNEANDRIA. 10. DECANDRIA.——These ten classes, which consist of hermaphrodite flowers, take their denominations from the number of stamina, or male parts of the flower. The word here compounded with the numerical terms, signifies *a husband*; so that the title *Monandria* expresses, that the flowers of this class have but one husband, that is, *one* stamen; *Diandria, two* stamina; *Triandria, three*; *Tetrandria, four*; *Pentandria, five*; *Hexandria, six*; *Heptandria, seven*; *Octandria, eight*; *Enneandria, nine*; and *Decandria, ten.* It must be observed however, that the flowers being hermaphrodite, as above mentioned, is in all these classes a necessary condition;

for, should the female part be wanting, the plant would belong to some other class, notwithstanding the number of stamina may be such as would otherwise refer it to one of these: and this caution we give once for all, to avoid repetitions, that when we use the term *Hermaphrodite*, we mean that it is a condition not to be dispensed with.

CLASS XI. DODECANDRIA.—This term in the *Greek* imports that the flowers have *twelve* husbands or stamina. However, the class is not confined to this number, but includes all such hermaphrodite flowers as are furnished with any number of stamina from *twelve* to *nineteen* inclusive; no flowers have been yet found to have eleven stamina, which is the reason no class has been allotted to that number.

CLASS XII. ICOSANDRIA.—This term imports, that the flowers have *twenty* husbands or stamina: but here again the title is to be understood with great latitude; for though the plants that belong to this class are rarely found with less than twenty stamina, yet they frequently have a greater number; and they are therefore not to be known with certainty from those of the next class, without having recourse to their classic character; which, not being expressed in the title, we forbear the explanation of here, as we shall give it in the section allotted for this class.

CLASS XIII. POLYANDRIA.—This term imports, that the flowers have *many* stamina.

CLASS XIV. DIDYNAMIA.—This term signifies the *power* or *superiority* of *two*, and is applied to this class, because its flowers have four stamina, of which there are two longer than the rest: this circumstance alone is sufficient to distinguish this class from the fourth, where the four stamina are equal; but the flowers of this class have also their particular character, besides what the title expresses, their corollæ being mostly *ringent*, as will be shewn in its place.

CLASS XV. TETRADYNAMIA.—This term expresses the power or superiority of *four*; and accordingly there are in the flowers of this class six stamina, four of which are longer than the rest; which circumstance distinguishes them from those of the sixth class, where the six stamina are equal: but these flowers have their particular character also, their corollæ being *cruciform*.

CLASS XVI. MONADELPHIA.—The word here, compounded with the numerical term, signifies a *brother*. This relation is employed to express the union of the filaments of the stamina, which in this class do not stand separate, but join at the base, and form one substance, out of which they proceed as from a common mother; and the title of the class expresses a *single* brotherhood, meaning that there is but *one* set of stamina so united, which distinguishes the class from the two following ones. The number of stamina in this class is not limited: the flowers have their particular character.

CLASS XVII. DIADELPHIA.——This term expresses a *double* brotherhood, or *two* sets of stamina, united in the manner explained in the preceding class. The number of the stamina is not limited: the flowers of this class have a very particular character, their corolla being *papilionaceous*, as will be shewn in its place.

CLASS XVIII. POLYADELPHIA.—This term expresses *many* brotherhoods, or sets of stamina; the flowers have no classic character, farther than is expressed in the title.

CLASS XIX. SYNGENESIA.—This class contains the compound flowers described in a former section. The title signifies *Congeneration*, alluding to the circumstance of the stamina; in which, though the filaments stand separate, yet the antheræ, which are the part more immediately subservient to generation, are united in a cylinder, and perform their office *together*. The classic character will be explained in its place.

CLASS XX. GYNANDRIA.—The term is compounded of two words, that signify *wife* and *husband*; and alludes to the singular circumstance of this class, in the flowers of which the stamina grow upon the pistillum; so that the male and female parts are united, and do not stand separate, as in other hermaphrodite flowers.

CLASS XXI. MONŒCIA.—The word here, compounded with the numerical term, signifies a *house* or *habitation*. To understand the application of this title, we must know, that the plants of this class are not *hermaphrodite* but *androgynous*, the flowers that have the stamina wanting the pistillum, and those that have the pistillum wanting the stamina. Now the term *Monœcia*, which signifies a *single* house, alludes to this circumstance; that in this class the male and female flowers are both found on the *same* plant, whereas in the next they have *distinct* habitations.

CLASS XXII. DIŒCIA.—This term, which signifies *two* houses, is applied to this class (the plants of which are *male* and *female*) to express the circumstance of the *male* flowers being on one plant, and the *female* on another; the contrary of which is the case of the androgynous class *Monœcia*, last explained.

CLASS XXIII. POLYGAMIA.—The term signifies *plurality* of *marriages*. This class produces, either upon the same or different plants, *hermaphrodite* flowers, and also flowers of *one* sex only, be it male or female; or flowers of *each* sex; and the latter receiving impregnation from, or giving it to the hermaphrodites, as their sex happens to be, the parts essential to generation in the hermaphrodite flowers do not confine themselves to the correspondiing parts within the same flower, but become of *promiscuous* use; which is the reason of giving this title to the class.

CLASS XXIV. CRYPTOGAMIA.—The term signifies *concealment* of *marriages*; this class consisting of such plants as either bear their flowers concealed within the fruit, or have them so small as to be imperceptible.

CLASS XXV. *Palmæ*, palms.

SECT. III. *Explanation of the Titles of the Orders.*

THE titles of the orders have been already given. It remains therefore to explain them.

CLASS I. to XIII. inclusive.—The orders of the first thirteen classes take their denominations from the number of the *Pistillum*, or female part of the plant, which is usually reckoned from the *base* of the *style*, if there be any; but if the style be wanting, the number is fixed from the *Stigmata*. The *Greek* word compounded with the numerical terms in the titles of these orders, signifies a *wife*: *Monogynia* implies *one wife*, or one style; *Digynia*, *two* styles; *Trigynia*, *three*; *Tetragynia*, *four*; *Pentagynia*, *five*; *Hexagynia*, *six*; *Decagynia*, *ten*; and *Polygynia*, *many*. These are the titles that occur in the orders of these thirteen classes; and this general explanation of them will be thought sufficient, as from the table it appears how they are employed in the classes.

CLASS XIV. DIDYNAMIA.—Of the three orders of this class the two first are founded on a distinction of the fruit. The title of the first order, *Gymnospermia*, is expressive of such plants as have *naked* seeds; and that of the second, *Angiospermia*, of such as have their seeds in a *vessel* or *pericarpium*. The third order, *Polypetala*, is expressive of such plants as have *many Petals*: This order seems to have been established in favour of one genus of plants only, the *Melianthus*, the flowers of which are *polypetalous*, though those of all the rest of this class are *monopetalous*.

CLASS XV. TETRADYNAMIA.—The two orders of this class are founded on a distinction in the *Pericarpium*. In the first order, *Siliculosa*, the *Pericarpium* is a *Silicula*, *little pod*; which

differs from the *Siliqua* or *pod* in being round, and having the apex of the diffepiment, which had been the ftyle, prominent beyond the valves, often fo far as to be equal in length to the Silicula. In the fecond order, *Siliquofa*, the pericarpium is a *Siliqua*, which is long and without any remarkable extenfion of the ftyle.

Class XVI. MONADELPHIA. XVII. DIADELPHIA. XVIII, POLYADELPHIA.—The orders of thefe three claffes are founded on the number of the ftamina in each brotherhood or diftinct fet of ftamina. The titles of the orders being the fame that are ufed for the titles of the early claffes of the fyftem, the explanation need not be repeated here.

Class XIX. SYNGENESIA.—To underftand the orders of this clafs, we muft explain what is meant by *Polygamy* in flowers. We have already treated of polygamous *plants*, and fhewn that the term *Polygamous*, as there applied, alluded to the intercommunication of the male or female flowers with the Hermaphrodite ones, either upon the fame or a diftinct plant: But in refpect to flowers, the term is applied to a fingle flower only; for the flowers of this clafs being compound, a polygamy arifes from the intercommunication of the feveral florets in one and the fame flower. Now the *Polygamy* of *flowers*, in this fenfe of the word, affords four cafes, which are the foundations of the four firft orders of this clafs. 1ft Order, *Polygamia æqualis*, *equal polygamy*, is when *all* the florets are *hermaphrodite*. 2d Order, *Polygamia fuperflua*, *fuperfluous polygamy*, when *fome* of the florets are *hermaphrodite*, and *others female* only; for in this cafe, as the fructification is perfected in the hermaphrodites, the addition of the females is a fuperfluity. 3d Order, *Polygamia fruftranea*, *fruftraneous* or *ineffectual polygamy*, when fome of the florets are *hermaphrodite*, and others *neuter*; for in this cafe the addition of the neuters is of no affiftance to the fructification. 4th Order, *Polygamia neceffaria*, *neceffary polygamy*, when fome of the florets are *male*, and the reft *female*; for in this cafe there being no hermaphrodites, the polygamy arifing from the compofition of the florets of different fexes is *neceffary* to perfect the fructification. 5th Order, *Polygamia segregata*. The title fignifies to be *feparted*, the plants of this order having partial cups growing out of the common calyx which furround and divide the flofculi or florets. 6th Order, *Monogamia*: the title fignifies a *fingle* marriage, and is oppofed to the *Polygamia* of the four other orders; for in this, though the antheræ are united, which is the effential character of the flowers of this clafs, the flower is *fimple*, and not compounded of *many* florets, as in the other orders.

Class XX. GYNANDRIA.—The orders of this clafs are founded on the number of ftamina. The titles have been already explained.

Class XXI. MONŒCIA. XXII. DIŒCIA.—Thefe two claffes, whofe flowers have no fixed character but that of not being hermaphrodite, take in the characters of almoft every other clafs; and the orders have accordingly been difpofed under the titles of thofe claffes, to which their refpective flowers would have belonged, if the ftamina and piftillum had been under the fame covers: as the explanation of all thefe titles has been given in the laft chapter in the explanation of the claffes, it need not be repeated here.

Class XXIII. POLYGAMIA.—In this clafs the titles of the two firft orders are the fame with the titles of the twenty-firft and twenty-fecond claffes, and are to be underftood in the fame manner; that is, 1. *Monœcia*, when the polygamy is on the *fame* plant; and, 2. *Diœcia*, when it is on *diftinct* plants. The order *Triœcia* has been eftablifhed in favour of a fingle genus, the *Ficus*; in which the polygamy is on *three* diftinct plants, one producing *male* flowers, another *female*, and a third *hermaphrodite*, or *androgynous*.

Class XXIV. CRYPTOGAMIA.—The orders of this clafs are, 1. *Filices*, Ferns. 2. *Mufci*, Moffes. 3. *Algæ*, Flags; and 4. *Fungi*, Mufhrooms. The explanation of the character of which will follow when we treat of the genera.

Sect. 4. *The Genera of the Plants arranged according to the Claffes and Orders.*

Of the 1ft Class, MONANDRIA.

This clafs confifts of fuch plants as bear *hermaphrodite* flowers, furnifhed with but *one* ftamen. The orders are *two*. viz.

Order I. MONOGYNIA, comprehending fuch plants as have but *one* ftyle. This order contains fourteen genera, diftinguifhed into, 1. Trilocular, fuch as have the pericarpium divided into three loculaments: of which there are eleven, viz. *Canna*, Indian flowering-reed, *Amomum*, Ginger, *Coftus*, *Alpinia*, *Maranta*, Indian arrow-root, *Curcuma*, Turmerick, *Kæmpferia*, *Thalia*, *Myrofma*, *Phyllachne*, and *Renealmia*. 2. Monofpermous, fuch as have a fingle feed, of which there are three, viz. *Boerhavia*, American hog-weed, *Salicornia*, jointed glafs-wort, and *Hippuris*.

Order II. DYGINIA, comprehending fuch plants as have two ftyles. This order contains five genera, viz. *Corifpermum*, Tick-feed, *Callitriche*, Star-headed water chick-weed, *Blitum*, Strawberry Spinach or Blite, *Cinna*, and *Mniarum*.

Of the 2d Class, DIANDRIA.

This clafs confifts of fuch plants as bear *hermaphrodite* flowers furnifhed with *two* ftamina. The orders are three, viz.

Order I. MONOGYNIA, comprehending fuch plants as have but *one* ftyle. This order contains thirty-one genera, diftinguifhed into, 1. Such as have *regular* corollæ, of which there are eleven, viz. *Nyctanthes*, Arabian Jafmin, *Jafminum*, Jafmin, *Liguftrum*, Privet, *Phillyrea*, Mock privet, *Olea*, Olive, *Chionanthus*, Snow-drop tree, or Fringe tree, *Syringa*, Lilach, *Dialium*, *Eranthemum*, *Circæa*, Enchanters Night-fhade, and *Wulfenia*. 2. Such as have irregular corollæ, and the fruit *angiofpermous* *, of which there are ten, viz. *Veronica*, Speedwell. *Pæderota*, *Jufticia*, Malabar Nut, *Dianthera*, *Gratiola*, Hedge Hyffop, *Schwenkia*, *Pinguicula*, Butter-wort, *Utricularia*, Water-milfoil, *Calceolaria*, and *Globba*. 3. Such as have irregular corolla, and the fruit *gymnofpermous* †; of which there are twelve, viz. *Verbena*, Vervain, *Lycopus*, Water horehound, *Amethyftea*, *Cunila*, *Ziziphora*, Syrian field-bafil. *Monarda*, Ofwego, Tea, *Rofmarinus*, Rofemary, *Salvia*, Sage, *Collinfonia*, *Morina*, *Anciftrum*, and *Thouinia*.

Order II. DYGINIA, comprehending fuch plants as have two ftyles. This order contains but one genus, viz. *Anthoxanthum*, Vernal grafs.

Order III. TRYGINIA. comprehending fuch plants as have three ftyles. There is but one genus of this order, viz. *Piper*, Pepper.

Of the 3d Class, TRIANDRIA.

This clafs confifts of fuch plants as bear hermaphrodite flowers, furnifhed with three ftamina. The orders are three, viz.

Order I. MONOGYNIA, comprehending fuch plants

* The feeds in a veffel. See the table explanatory of botanical terms at the end of the work. † The feeds naked.

as have but one ftyle. This order contains thirty-four genera, diftinguifhed into, 1. Thofe whofe flowers have no fpatha or amentum; of which there are fixteen, viz. *Valeriana*, Valerian, *Glax*, *Willichia*, *Tamarindus*, Tamarind tree, *Rumphia*, *Cneorum*, Widow Wail, *Camocladia*, *Melotheria*, Small creeping Cucumber, *Ortegia*, *Lœflingia*, *Polycnemum*, *Hippocratea*, *Rotala*, *Witfenia*, *Pommereulla*, and *Dilatris*. Such as have fpathaceous flowers, and a trilocular capfule; of which there are ten, viz. *Crocus*, Saffron, *Ixia*, *Gladiolus*, Corn Flag, *Antholyza*, *Iris*, Flower de Luce, *Moræa*, *Wachendorfia*, *Commelina*, *Callifia*, and *Xyris*. 3. Such as have an imbricated amentum, and are gymnofpermous *; of which there are eight, viz. *Schœnus*, Baftard Cyprefs, *Cyperus*, Englifh Galingale, *Scirpus*, Rufh-grafs, *Eriophorum*, *Lygeum*, Hooded Mat-weed, *Nardus*, *Kyllinga*, and *Fuirena*.

Order II. DIGYNIA, comprehending fuch plants as have two ftyles. This order contains thirty-one genera †, viz. *Bobartia*, *Cornucopia*, *Saccharum*, Sugar-cane, *Panicum*, Panic grafs, *Phleum*, Cat's-tail Grafs, *Alopecurus*, Fox-tail Grafs, *Milium*, Millet, *Agroftis*, Bent Grafs, *Aira*, Hair Grafs, *Melica*, *Poa*, *Briza*, Quaking Grafs, *Uniola*, Sea-fide Oats of Carolina, *Dactylis*, Cock's-foot Grafs, *Cynofurus*, Dog's-tail Grafs, *Feftuca*, Fefcue Grafs, *Bromus*, Brome Grafs, *Stipa*, Feather Grafs, *Avena*, Oats, *Lagurus*, Hare's-tail Grafs, *Arundo*, Reed, *Ariftida*, *Lolium*, Darnel or Rye Grafs, *Elymus*, *Secale*, Rye, *Hordeum*, Barley, *Triticum*, Wheat, *Phalaris*, Canary Grafs, *Pafpalum*, *Rottboella*, and *Anthiftiria*.

Order III. TRIGYNIA, comprehending fuch plants as have three ftyles. This order contains eleven genera, viz. *Eriocaulon*, *Montia*, Blinks, *Proferpinaca*, *Triplaris*, *Holofteum*, *Polycarpon*, *Mollugo*, *Minuartia*, *Queria*, *Lechea*, and *Koenigia*.

Of the 4th Class, TETRANDRIA.

This clafs confifts of fuch plants as bear *hermaphrodite* flowers, furnifhed with four ftamina. The flowers of this clafs may be known from thofe of the fourteenth by this diftinction, that the ftamina are of an equal length; whereas in thofe of the fourteenth, which have four ftamina likewife, there are two long and two fhort. The orders of this clafs are three, viz.

Order I. MONOGYNIA, comprehending fuch plants as have but *one* ftyle. This order contains feventy genera, diftinguifhed into, 1. Such as have *aggregate* flowers properly fo called, with the feeds fingle and naked; of which there are feven, viz. *Protea*, Silver Tree, *Cephalanthus*, Button Wood, *Globularia*, Blue Daify, *Dipfacus*, Teazel, *Knautia Scabiofa*, Scabious, and *Allionia*. 2. Such as have their flowers *monopetalous* on a double fruit, and the *ftyle* bifid, of which there are twenty ‡, viz. *Hedyotis*, *Spermacoce*, Button Weed, *Sherardia*, Little Field Madder, *Afperula*, Woodroof, *Diodia*, *Knoxia*, *Manettia*, *Houftonia*, *Galium*, Lady's Bed-ftraw, *Crucianella*, Petty Madder, *Rubia*, Madder, *Scabrita*, *Embothrium*, *Hydrophylax*, *Hartogia*, *Acæna*, *Banckfia*, *Orixa*, *Othera*, and *Skimmia*. 3. Such as have *monopetalous* flowers otherways circumftanced; of which there are twenty, viz. *Siphonanthus*, *Catefbæa*, Lily Thorn, *Ixora*, *Pavetta*, *Petefia*, *Mitchella*, *Callicarpa*, Johnfonia, *Aquartia*, *Polypremum*, Carolina, Flax, *Penæa*, *Blaeria*, *Buddleja*, *Exacum*, *Plantago*, Plantain, *Scoparia*, *Rhacoma*, *Centunculus*, *Sanguiforba*, Greater wild Burnet, *Ciffus*, and *Ægiphila*. 4. Such as are tetrapetalous and complete §: of which there are twelve, viz. *Epimedium*, Barren Wort, *Cornus*, Dogwood or Cornelian Cherry, *Fagara*, *Tomex*, *Amannia*, *Ptelea*, Shrub, Trefoil, *Ludwigia*, *Oldenlandia*, *Ifnardia*, *Santalum*, Saunders, *Trapa*, Water Caltrops, and *Samara*. 5. Such as are incomplete ||: of which there are eleven, viz. *Dorftenia*, Contrayerva, *Elæagnus*, Wild Olive, *Crameria*, *Rivina*, *Salvadora*, *Camphorofma*, *Alchemilla*, Ladies Mantle, *Struthiola*, *Cometes*, and *Sirium*.

Order II. DIGYNIA, comprehending fuch plants as have *two* ftyles. This order contains nine genera, viz. *Aphanes*, Parfley Piert, *Cruzita*, *Bufonia*, *Harmamelis*, Witch Mazel, *Cufcuta*, Dodda; *Hypecoum*, *Galopina*, *Gomozia*, and *Conocarpus*.

Order III. TETRAGYNIA, comprehending fuch plants as have *four* ftyles. This order contains feven genera, viz. *Ilex*, Holly, *Coldenia*, *Potamogiton*, Pond Weed, *Ruppia*, *Sagina*, Purl-wort, *Myginda*, and *Tillæa*.

Of the 5th Class, PENTANDRIA.

This clafs confifts of fuch plants as bear *hermaphrodite* flowers, furnifhed with *five* ftamina. The orders are fix, viz.

Order I. MONOGYNIA, comprehending fuch plants as have but *one* ftyle ¶. This order contains one hundred and fifty-five genera, diftinguifhed into, 1. *Monopetalous Tetrafpermous* **, of which there are fixteen ††, viz. *Heliotropium*, Turnfole, *Myofotis*, Moufe-ear Scorpion Grafs, *Lithofpermum*, Gromwell, *Anchufa*, Buglofs, *Cynogloffum*, Hound's-tongue, *Pulmonaria*, Lungwort, *Symphytum*, Comphrey, *Onofma*, *Cerinthe*, Honey-wort, *Borago*, Borrage, *Afperugo*, Wild buglofs or goofe grafs, *Lycopfis*, *Echium*, Viper's Buglofs, *Nolana*, *Turnefortia*, and *Mefferfchmidia*. 2. *Monopetalous* with the capfule within the flower; of which there are thirty-five, viz. *Diapenfia*, *Aretia*, *Androface*, *Primula*, Primrofe, *Cortufa*, Bear's-ear Sanicle, *Porana*, *Soldanella*, Soldanel, *Dodecatheon*, Meadia, *Cyclamen*, Sowbread, *Menyanthes*, Bog-bean, or Marfh Trefoil, *Hottonea*, Water Milfoil, or Water Violet, *Hydrophyllum*, Water-leaf, *Lyfimachia*, Loofeftrife, *Anagillis*, Pimpernel, *Theophrafta*, *Patagonula*, *Spigelia*, Worm-grafs, *Ophiorrhiza*, Serpent's Tongue, *Randia*, *Azalea*, American upright Honey-fuckle, *Plumbago*, Leadwort, *Phlox*, Lichnidea, or Baftard Lychnis, *Convolvulus*, Bindweed, *Ipomea*, Quamoclit, *Lifianthus*, *Broffæa*, *Allamanda*, *Polemonium*, Greek Valerian, *Nigrina*, *Retzia*, *Scheffieldia*, *Epacris*, *Doraena*, *Weigela*, *Tectona*, and *Ignatia*. 3. Monopetalous with the germen below the flower; of which there are thirty-one, viz. *Campanula*, Bell-flower, *Roella*, *Phyteuma*, Rampions, *Trachelium*, Umbelliferous Throat-wort, *Samolus*, Round-leaved Water Pimpernel, *Nauclea*, *Rondeletia*, *Macrocnemum*, *Bellenia*, *Portlandia*, *Cinchona*, *Pfychotria*, *Coffea*, Coffee-tree, *Chiococca*, *Ceropegia*, *Lonicera*, Honey-fuckle, *Triofteum*, Fever-root, or falfe Ipecacuana, *Morinda*, *Conocarpus*, Button-tree, *Hamellia*, *Erithalis*, *Menais*, *Genipa*, *Matthiola*, *Scævola*, *Muffænda*, *Virecta*, *Efcallonia*, *Caroxylon*, *Blaedendrum*, and

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* The feeds fingle and naked.

† All the plants of this order are graffes, the leaves of which are food for cattle, the fmall feeds for birds, and the larger grain for man.

‡ Thefe are the *Stellatæ*, Starry Plants, of *Ray*. They are held to be aftringent and diuretic.

§ Not wanting either calyx or corolla. || Calyx or corolla wanting.

¶ The berries of the monopetalous plants of this order are for the moft part poifonous. ** With four Seeds.

†† Thefe are the Afperifolia, rough-leaved plants of Ray's Hift. page 487. They are accounted glutinous and vulnerary.

Hovenia. 4. Such as have declining ſtamina; of which there are ſeven, viz. *Mirabilis*, Marvel of Peru; *Coris*, Heathlow Pine, *Verbaſcum*, Mullein, *Datura*, Thorn Apple, *Hyocyamus*, Henbane, *Nicotiana*. Tobacco, and *Atropa*, Deadly Nightſhade. 5. Monopetalous, with a berry above the receptacle; of which there are twenty-two, viz. *Phyſalis*, Alkakingi, or Winter Cherry, *Solanum*, Nightſhade, *Capſicum*, Guinea Pepper, *Strychnus*, *Jacquinia*, *Chironia*, *Brunsfelſia*, *Cordia*, Sibeſtan, *Pergularia*, *Ceſtrum*, Baſtard Jaſmin, *Ehretia*, *Varronia*, *Laugieria*, *Lycium*, Box-thorn, *Chryſophyllum*, Star-apple, *Sideroxylum*, Iron-wood, *Rhamnus*, Buckthorn, *Arduina*, Baſtard Lycium, *Elliſia*, *Phylica*, Baſtard Alaternus, *Bladbia*, and *Fragræa*. 6. Polypetalous, of which there are thirty-one, viz. *Ceanothus*, New Jerſey Tea, *Byttneria*, *Myrſine*, African Box-tree, *Celaſtrus*, Staff-tree, *Euonymus*, Spindle-tree, *Dioſma*, African Spirea, *Brunia*, *Itea*, *Galax*, *Cedrela*, *Mangifera*, Mango-tree, *Hirtella*, *Ribes*, Currant-tree, *Gronovia*, *Hedera*, Ivy, *Vitis*, Vine, *Lagœtia*, Baſtard Cumin, *Sauvageſia*, *Claytonia*, *Achyranthes*, *Roridula*, *Kuhnia*, *Plectronia*, *Cyrilla*, *Aquilicia*, *Heliconia*, *Cariſſa*, *Celoſia*, Cock's-comb, *Calodendrum*, *Ghenolea*, and *Corynocarpus*. 7. *Incomplete* flowers, of which there are three, viz. *Illecebrum*, Mountain-Knot-graſs, *Glaux*, Sea Milk-wort, or black Saltwort, and *Theſium*, Baſtard Toad-flax. 8. Such as have the lobes of the corollæ bent obliquely to the right: of which there are nine, viz. *Rauvolfia*, *Cerbera*, *Vinca*, Perriwinkle, *Gardenia*, Cape Jaſmin; *Nerium*, Oleander, or Roſe-bay, *Plumeria*, Red Jaſmin, *Echites*, *Cameraria*, and *Tabernamontana*.

ORDER II. DIGYNIA, comprehending ſuch plants as have two ſtyles. This order contains *ſeventy-five* genera, diſtinguiſhed into, 1. Such as have the *lobes* of the *corollæ* bent *obliquely* to the right; of which there are ſix, viz. *Periploca*, Virginian Silk, *Cynanchum*, *Apocynum*, Dog's-bane, *Aſclepiis*, Swallow-wort, *Linconia*, and *Stapelia*: 2. Monoſpermous *; of which there are ten, viz. *Herniaria*, Rupture-wort, *Chenopodium*, Gooſe-foot, or Wild Orache, *Beta*, Beet, *Salſola*, Glaſs-wort, *Anabaſis*, Berry-bearing Glaſs-wort, *Creſſa*, *Gomphrena*, Globe-amaranth, *Steris*, *Boſea*, Yerva-mora, or Golden-rod Tree, and *Ulmus*, Elm-tree. 3. Polyſpermous †; of which there are thirteen, viz. *Nama*, *Hydrolea*, *Heuchera*, *Swertia*, Marſh Gentian, *Schrebera*, *Velezia*, *Gentiana*, Gentian, or Fell-wort, *Bumalda*, *Coproſma*, *Cuſſonia*, *Melondinus*, *Ruſſelia*, and *Vahlia*. 4. Gymnodiſpermous ‡, with a ſimple umbel; of which there are three §, viz. *Phyllis*, Baſtard Hare's ear, *Eryngium*, Eryngo, or Sea Holly, and *Hydrocotyle*, Water Navel-wort. 5. Gymnodiſpermous with an univerſal and partial *involucrum*, of which there are twenty-ſeven, viz. *Sanicula*, Sanicle, *Aſtrantia*, Black Maſter wort, *Bupleurum*, Hare's-ear, *Echinophora*, Prickly Parſnip, *Tordylium*, Hart-wort of Crete, *Caucalis*, Baſtard Parſley, *Artedia*, *Daucus*, Carrot, *Ammi*, Biſhop's-wood, *Bunium*, Pig-nut, or Earth-nut, *Conium*, Hemlock, *Selinum*, Milk Parſley, *Athamanta*, Spignel, *Peucedanum*, Hog's Fennel, or Sulphur-wort, *Crithmum*, Samphire, *Haſſelquiſtia*, *Cachrys*, *Ferula*, Fennel-giant, *Laſerpitium*, Laſer-wort, *Heracleum*, Cow Parſnip, *Liguſticum*, Lavage, *Angelica*, *Sium*, Water Parſnip, *Siſon*, Baſtard Stone-Parſley, *Bubon*, Macedonian Parſley, *Cuminum*, Cumin, and *Oenanthe*, Water Dropwort. 6. Gymnodiſpermous with only one partial umbel; of which there are eight, viz. *Phellandrium*, *Cicuta*, Water Hemlock, *Æthuſa*, Leſſer Hemlock, or Fool's Parſley, *Coriandrum*, Coriander, *Scandix*, Shepherd's needle, or Venus's Comb, *Chærophyllum*, Wild Shervil, *Imperatoria*, Maſter-wort, and *Seſeli*, Hart-wort of Marſeilles. 7. Gymnodiſpermous without any involucrum, of which there are eight, viz. *Thapſia*, Deadly carrot, or Scorching Fennel, *Paſtinaca*, Parſnip, *Smyrnium*, Alexanders, *Anethum*, Dill, *Carum*, Carrui, or Carraway, *Pimpinella*, Burnet Saxifrage, *Apium*, Parſley, and *Ægopodium*, Herb Gerrard, Goutwort, or Wild Angelica.

ORDER III. TRIGYNIA, comprehending ſuch plants as have three ſtyles. This order contains ſeventeen genera, viz. *Rhus*, Sumach, *Viburnum*, Pliant Mealy-tree, or Wayfaring-tree, *Caſſine*, Hottentot cherry, *Sambucus*, Elder, *Spathelia*, *Staphylea*, Bladder-nut, *Tamarix*, Tamariſk, *Turnera*, *Telephium*, True Orpine, *Corrigiola*, *Pharnaceum*, *Alſine*, Chick-weed, *Drypis*, *Baſella*, Malabar Nightſhade, *Sarothra*, Baſtard Gentian, *Xylophylla*, and *Semecarpus*.

ORDER IV. TETRAGYNIA, comprehending ſuch plants as have four ſtyles. This order contains two genera, viz. *Parnaſſia*, Graſs of Parnaſſus, and *Evolvulus*.

ORDER V. PENTAGYNIA, comprehending ſuch plants as have ſtyles. This order contains ten genera, viz. *Aralia*, Berry-bearing Angelicon, *Mahernia*, *Statice*, Thrift, or Sea Pink, *Linum*, Flax, *Aldrovanda*, *Droſera*, Sun Dew, *Craſſula*, Leſſer Orpine, *Sibbaldia*, *Giſekia*, and *Commerſonia*.

ORDER VI. POLYGYNIA, comprehending ſuch plants as have many ſtyles. This order contains but one genus, viz. *Myoſurus*. Mouſe-tail.

Of the 6th CLASS, HEXANDRIA.

This claſs conſiſts of ſuch plants as bear *hermaphrodite* flowers, furniſhed with ſix ſtamina. The flowers of this claſs may be known from thoſe of the fifteenth by this diſtinction, that the ſtamina are of equal length; whereas in thoſe of the fifteenth, which have ſix ſtamina likewiſe, there are four long and two ſhort. The orders of this claſs are five, viz.

ORDER I. MONOGYNIA, comprehending ſuch plants as have but one ſtyle. This order contains ſixty-two genera, diſtinguiſhed into, 1. Such as have *trifid corollæ*, and a *calyx*, of which there are ſeven, viz. *Bromelia*, Ananas, or Pine-apple, *Tillandſia*, *Burmannia*, *Tradeſcantia*, Virginian Spider-wort, *Burſera*, *Licuala*, and *Lachenalia*. 2. Such as have *monophyllous* ſpatha, of which there are nine, viz. *Pontederea*, *Hæmanthus*, Blood-flower, *Galanthus*, Snow Drop, *Leucojum*, Greater Snow Drop, *Tulbagia*, *Narciſſus*, Daffodil, *Pancratium*, Sea Daffodil, *Duroia*, and *Nandina*. 3. Such as are *hexapetalous* and naked ‖; of which there are twenty-five, viz. *Crinum*, Aſphodel-lilly, *Amaryllis*, Lilly Daffodil, *Bulbocodium*, *Aphyllanthes*, *Allium*, Garlick, *Lilium*, Lilly, *Fritillaria*, Fritillary, *Uvularia*, *Glorioſa*, Superb Lilly, *Tulipa*, Tulip, *Erythronium*, Dog's-tooth Violet, *Albuca*, *Ornithogalum*, Star of Bethlem, *Scilla*, Squill, *Hypoxis*, *Cyanella*, *Aſphodelus*, Aſphodel, or King's Spear, *Anthericum*, Spider-wort, *Leontice*, Lion's Leaf, *Dracæna*, *Aſparagus*, Aſparagus, or Sperage, *Ehrharta*, *Maſſonia*, *Phormium*, and *Pollia*. 4. Monopetalous and naked, of which there are ten, viz. *Convallaria*, Lilly of the Valley, *Polyanthes*, Tuberoſe, *Hyacinthus*, Hyacinth, *Aletris*, Baſtard Aloe, *Yucca*, Adam's Needle, *Aloe*, *Agave*, Ameri-

* Single-ſeeded. † Many-ſeeded. ‡ Having two naked ſeeds.

§ Theſe plants, and thoſe of the two diſtinctions next following, which are *gymnodiſpermous* alſo, are the *umbellate* plants of *Tournefort's* ſeventh claſs. See his Inſtitution, *R. H.* In dry ſoils they are aromatic, warm, reſolvent, and carminative, but in moiſt places poiſonous. The virtue is in the roots and ſeeds.

‖ Without a calyx. See the Table at the end of this work, explanatory of the terms.

can Aloë, *Alstromeria*, *Capura*, and *Hemerocallis*, Day-lilly, or Lilly-asphodel. 5. Such as have a calyx, but the corollæ not trifid; of which there are thirteen, viz. *Acorus*, Sweet Rush, *Orontium*, Floating Arum, *Calamus*, *Juncus*, Rush, *Achras*, Sapota, *Richardia*, *Prinos*, Winter-berry, *Berberis*, Berberry, or Piperage Bush, *Loranthus*, *Frankenia*, *Hillia*, *Peplis*, Water Purslane, and *Canaria*.

Order II. DIGYNIA, comprehending such plants as have two styles. This order contains four genera, viz. *Atraphaxis*, *Oryza*, Rice, *Falkia*, and *Gahnia*.

Order III. TRIGYNIA, comprehending such plants as have three styles. This order contains ten genera, viz. *Flagellaria*, *Rumex*, Dock, *Scheuchzaria*, Lesser Flowering-rush, *Triglochin*, Arrow-headed Grass, *Melanthium*, Climbing African Asparagus, *Medeola*, *Trillium*, Herb True-love of Canada, *Colchicum*, Meadow Saffron, *Helonias*, and *Wurmbea*.

Order IV. TETRAGYNIA, comprehending such plants as have four styles. Of this order there is but one genus, viz. *Petiveria*, Guinea-hen Weed.

Order V. POLYGYNIA, comprehending such plants as have many styles. Of this order there is but one genus, viz. *Alisma*, Water Plantain.

Of the 7th Class, HEPTANDRIA.

This class consists of such plants as bear *hermaphrodite* flowers, furnished with seven stamina. The orders of this class are four, viz.

Order I. MONOGYNIA, comprehending such plants as have but one style. This order contains three genera, viz. *Trientalis*, Winter Green with Chick weed Flowers, *Disandra*, and *Æsculus* Horse-chesnut.

Order II. DIGYNIA, comprehending such plants as have two styles. This order contains but one genus, viz. *Limeum*.

Order III. TETRAGYNIA, comprehending such plants as have four styles. Of this order there are but two genera, viz. *Saururus*, Lizard's Tail, and *Aponogeton*.

Order IV. HEPTAGYNIA, containing such plants as have seven styles. Of this order there is but one genus, viz. *Septas*.

Of the 8th Class, OCTANDRIA.

This class consists of such plants as bear *hermaphrodite* flowers, furnished with eight stamina. The orders are four, viz.

Order I. MONOGYNIA, comprehending such plants as have but one style. Of this order there are thirty-one genera, viz. *Tropæolum*, Indian Cress, *Osbeckia*, *Rhexia*, *Oenothera*, Tree Primrose, *Gaura*, Virginian Loosestrife, *Epilobium*, Willow Herb, or French Willow, *Melococca*, *Grislea*, *Amyris*, *Allophylus*, *Combretum*, *Fuchsia*, *Ximenia*, *Mimusops*, *Jambolifera*, *Memecylon*, *Lawsonia*, *Vaccinium*, Whortle-berry, *Erica*, Heath, *Daphne*, Mezereon, or Spurge-laurel, *Dirca*, Leather-wood, *Gnidia*, *Stellera*, German Groundsel, *Passerina*, Sparrow-wort, *Lachnæa*, *Anthichorus*, *Chlora*, *Dodonæa*, *Ophira*, *Guarea*, and *Beckea*.

Order II. DIGYNIA, comprehending such plants as have two styles. This order contains five genera, viz. *Galenia*, *Weinmannia*, *Moehringia*, Mountain Chick-weed, *Schmidelia*, and *Codia*.

Order III. TRIGYNIA, comprehending such plants as have three styles. This order contains five genera, viz. *Polygonum*, Knot-grass, *Coccoloba*, *Paullinia*, *Cardiospermum*, Heart Pea, and *Sapindus*, Soap berry.

Order IV. TETRAGYNIA, comprehending such plants as have four styles. This order contains four genera, viz. *Paris*, Herb True-love, or Oneberry, *Adoxa*, Tuberous Moschatel, or Hollow Root, *Elatine*, Water-wort, and *Haloragis*.

Of the 9th Class, ENNEANDRIA.

This class consists of such plants as bear *hermaphrodite* flowers, furnished with nine stamina. The orders are three, viz.

Order I. MONOGYNIA, comprehending such plants as have but one style. This order contains four genera, viz. *Laurus*, bay, *Tinus*, *Anacardium*, Cashew-nut, and *Cassyta*.

Order II. TETRAGYNIA, comprehending such plants as have three styles. This order contains but one genus, viz. *Rheum*, Rhubarb.

Order III. HEXAGYNIA, comprehending such plants as have six styles. Of this order there is but one genus, viz. *Butomus*, Flowering Rush, or Water Gladiolus.

Of the 10th Class, DECANDRIA.

This class consists of such plants as bear *hermaphrodite* flowers, furnished with ten stamina. The orders are five, viz.

Order I. MONOGYNIA, comprehending such plants as have but one style. This order contains fifty-six genera, distinguished into, 1. Such as have declined stamina, of which there are fifteen, viz. *Sophora*, *Anagyris*, Stinking Bean Trefoil, *Cercis*, Judas Tree, *Bauhinia*, Mountain Ebony, *Parkinsonia*, *Hymenæa*, Locust-tree, or Courbaril, *Cassia*, Wild Senna, *Poinciana*, Barbadoes Flower-fence, *Cæsalpinia*, Brasiletto, *Guilandina*, Bardue, or Nichar-tree, *Guaiacum*, Lignum Vitæ, *Cynometra*, *Anacardium*, Cashew-nut, *Swietenia*, Mahogany Tree, and *Dictamnus*. 2. Such as have erect stamina, of which there are forty-one, viz. *Ruta*, Rue, *Toluifera*, Balsam of Tolu Tree, *Hæmatoxylum*, Log-wood, *Adenanthera*, Bastard flower-fence, *Melia*, Bread-tree, *Trichilia*, *Zygophillum*, Bean-caper, *Quassia*, *Fagonia* *Tribulus*, Caltrops, *Thryallis*, *Murraya*, *Monotropa*, *Jussieua*, *Limonia*, *Melastoma*, American Gooseberry, *Kalmia*, Dwarf American Laurel, *Ledum*, Marsh Cistus, or Wild Rosemary, *Quisqualis*, *Dais*, *Bergera*, *Bucida*, *Copaifera*, *Samyda*, *Rhododendron*, Dwarf Rose-bay, *Andromeda*, Marsh Cistus, *Epigæa*, Trailing Arbutus, *Gualtheria*, *Arbutus*, Strawberry-tree, *Clethra*, *Pyrola*, Winter-green, *Prosopis*, *Histeria*, *Chalcas*, *Codon*, *Styrax*, Storax-tree, *Turræa*, *Dionæa*, Venus's Fly-trap, *Ekebergia*, *Inocarpus*, and *Myroxylon*.

Order II. DIGYNIA, comprehending such plants as have two styles. Of this order there are twelve genera, viz. *Royena*, African Bladder-nut, *Hydrangea*, *Cunonia*, *Chrysosplenium*, Golden Saxifrage, *Saxifraga*, Saxifrage, *Tiarella*, *Mitella*, Bastard American Sanicle, *Scleranthus*, German Knot-Grass, or Knawel, *Trianthema*, *Gypsophila*, *Saponaria*, and *Dianthus*.

Order III. TRIGYNIA, comprehending such plants as have three styles. Of this order there are twelve genera, viz. *Cucubalus*, Berry-bearing Chick-weed, *Silene*, Viscous Campion, *Stellaria*, Great Chick-weed, *Arenaria*, Sea Chick-weed, *Cherleria*, *Garidella*, Fennel Flower of Crete, *Malpighia*, Barbadoes Cherry, *Banisteria*, *Triopteris*, *Erythroxilon*, *Hiræa*, and *Deutzia*.

Order IV. PENTAGYNIA, comprehending such plants as have five styles. Of this order there are fourteen genera, viz. *Averrhoa*, *Spondias*, Brasilian Plumb, *Cotyledon*, Navelwort, *Sedum*, Lesser Housleek, *Penthorum*, *Oxalis*, Wood Sorrel, *Suriana*, *Lychnis*, Campion, *Agrostema*, Campion, or wild Lichnis, *Cerastium*, Mouse-ear, Chick-weed, *Spergula*, Spurray, *Grielum*, *Forskohlea*, and *Bergia*.

Order V. DECAGYNIA, comprehending such plants as

have ten ſtyles. This order contains two genera, viz. *Neurada*, and *Phytolacca*, American Night-ſhade.

Of the 11*th* CLASS, DODECANDRIA.

This claſs, notwithſtanding its title, which is expreſſive of twelve ſtamina, conſiſts of ſuch plants as bear *hermaphrodite* flowers, furniſhed with any number of ſtamina from twelve to nineteen incluſive *. The orders are five, viz.

ORDER I. MONOGYNIA, comprehending ſuch plants as have but one ſtyle. This order contains twenty-five genera, viz. *Aſarum*, Aſarabacca, *Gethyllis*, *Bocconia*, *Rizophora*, Candle of the Indians, *Blakea*, *Garcinia*, *Winterana*, *Crateva*, Garlick Pear, *Triumfetta*, *Baſſia*, *Peganum*, Wild Syrian Rue, *Haleſia*, *Nitraria*, *Portulaca*, Purſlane, *Hudſonia*, *Lythrum*, Willow Herb, *Ginora*, *Decumaria*, *Beſaria*, *Vatica*, *Apactis*, *Canella*, *Dodecas*, *Eurya*, and *Ariſtotelia*.

ORDER II. DIGYNIA, comprehending ſuch plants as have two ſtyles. Of this order there are two genera, viz. *Heliocarpus*, and *Agrimonia*, Agrimony.

ORDER III. TRIGYNIA, comprehending ſuch plants as have three ſtyles. This order contains five genera, viz. *Reſeda*, Baſtard Rocket, *Euphorbia*, Burning Thorny Plant, or Spurge, *Pallaſia*, *Tacca*, and *Viſnea*.

ORDER IV. PENTAGYNIA, comprehending ſuch plants as have five ſtyles. This order contains but one genus, viz. *Glinus*.

ORDER V. DODECAGYNIA, comprehending ſuch plants as have twelve ſtyles. This order contains but one genus, viz. *Sempervivum*, Houſleek.

Of the 12*th* CLASS, ICOSANDRIA †.

This claſs conſiſts of ſuch plants as bear *hermaphrodite* flowers, of the following characters, viz. 1. A calyx monophyllous, and concave. 2. The corolla faſtened by its claws to the inner ſide of the calyx. 3. The ſtamina twenty or more. As the number of ſtamina in this claſs, notwithſtanding its title, is not limited, an attention muſt be had to the two firſt characters, to diſtinguiſh the flowers from thoſe of the next claſs, with which they might otherwiſe be confounded. The orders are five, viz.

ORDER I. MONOGYNIA, comprehending ſuch plants as have but one ſtyle. This order contains eleven genera, viz. *Cactus*, Melon Thiſtle, *Eugenia*, *Philadelphus*, Mock Orange, *Pſidium*, Guayava, or Bay Plumb, *Myrtus*, Myrtle, *Punica*, Pomegranate, *Amygdalus*, Almond, *Prunus*, Plumb Tree, *Plinia*, *Chryſobalanus*, Cocoa Plumb, and *Sonneratia*.

ORDER II. DIGYNIA, comprehending ſuch plants as have two ſtyles. Of this order there is but one genus, viz. *Cratægus*, Wild Service.

ORDER III. TRIGYNIA, comprehending ſuch plants as have three ſtyles. This order contains two genera, viz. *Sorbus*, Service Tree, and *Seſuvium*.

ORDER IV. PENTAGYNIA, comprehending ſuch plants as have five ſtyles. This order contains ſix genera, viz. *Meſpilus*, Medlar; *Pyrus*, Pear; *Tetragonia*; *Meſembryanthemum*, Fig Marygold, *Aizoon*, and *Spiræa*.

ORDER V. POLYGYNIA, comprehending ſuch plants as have many ſtyles. This order contains nine genera, viz. *Roſa*, Roſe, *Rubus*, Raſpberry, *Fragaria*, Strawberry, *Potentilla*, Cinque-foil, *Tormentilla*, Tormentil, *Geum*, Avens, or Herb Bennet, *Dryas*, *Comarum*, Marſh Cinque-foil, and *Calycanthus*, Virginian All-ſpice.

Of the 13*th* CLASS, POLYANDRIA ‡.

This claſs conſiſts of ſuch plants as bear *hermaphrodite* flowers, furniſhed with many ſtamina. The diſtinction between this claſs and the twelfth may be known by having recourſe to the characters of the twelfth claſs in the preceding chapter. The orders are ſeven, viz.

ORDER I. MONOGYNIA, comprehending ſuch plants as have but one ſtyle. This order contains forty two genera, diſtinguiſhed into, 1. Such as have ſcarce any ſtyle, of which there are thirteen, viz. *Marcgravia*, *Rhcedia*, *Capparis*, Caper Buſh §, *Actæa*, Herb Chriſtopher, *Sanguinaria*, Puccoon, *Podophyllum*, Duck's-foot, or May-apple, *Chelidonium*, Celandine, *Papaver*, Poppy, *Argemone*, Prickly Poppy, *Muntingia*, *Cambogia*, *Sarracena*, Side ſaddle flower, and *Nymphæa*, Water Lily. 2. Such as have a ſtyle of ſome length, of which there are twenty-nine, viz. *Bixa*, Anótta, *Sloanea*, Aperba of the Braſilians, *Mammea*, Mammee, *Ochna*, *Calophyllum*, *Grias*, *Tilia*, Lime Tree, *Laetia*, *Elæocarpus*, *Lecythis*, *Vateria*, *Lagerſtroemia*, *Thea*, Tea Tree, *Caryophyllus*, Clove Tree, *Mentzellia*, *Delima*, *Ciſtus*, Rock Roſe, *Prockia*, *Corchorus*, Jew's Mallow, *Seguieria*, *Looſa*, *Trewia*, *Trilix*, *Alſtonia*, *Cleyera*, *Myriſtica*, *Sparrmania*, *Ternſtromia*, and *Vallea*.

ORDER II. DIGYNIA, comprehending ſuch plants as have two ſtyles. This order contains four genera, viz. *Pæonia*, Pæony, *Calligonum*, *Curatella*, and *Fothergilla*.

ORDER III. TRIGYNIA, comprehending ſuch plants as have three ſtyles. This order contains two genera, viz. *Delphinium*, Lark-ſpur, and *Aconitum*, Wolf's-bane.

ORDER IV. TETRAGYNIA, comprehending ſuch plants as have four ſtyles. This order contains three genera, viz. *Tetracera*, *Caryocar*, and *Cimicifuga*.

ORDER V. PENTAGYNIA, comprehending ſuch plants as have five ſtyles. This order contains four genera, viz. *Aquilegia*, Columbine, *Nigella*, Fennel Flower, or Devil in a buſh, *Reaumuria*, and *Brathys*.

ORDER VI. HEXAGYNIA, comprehending ſuch plants as have ſix ſtyles. This order contains but one genus, viz. *Stratiotes*, Water Soldier.

ORDER VII. POLYGYNIA, comprehending ſuch plants as have many ſtyles. This order contains twenty-one genera, viz. *Dellenia*, *Liriodendron*, Tulip-tree, *Magnolia*, Laurel-leaved Tulip-tree, *Michelia*, *Uvaria*, *Annona*, Cuſtard Apple, *Anemone*, Wind-flower, *Atragene*, *Clematis*, Virgin's Bower, *Thalictrum*, Meadow Rue, *Adonis*, Bird's-eye, *Illicium*, *Ranunculus*, Crow-foot, *Trollius*, Globe Ranunculus, *Iſopyrum*, *Helleborus*, Black Hellebore, *Caltha*, Marſh Marygold, *Hydraſtis*, Yellow Root, *Houttuynia*, *Unona*, and *Wintera*.

Of the 14*th* CLASS, DIDYNAMIA.

This claſs conſiſts of ſuch plants as bear *hermaphrodite* flowers, furniſhed with four ſtamina; two of which are longer than the reſt. This circumſtance would ſuffice to diſtinguiſh it from the fourth claſs, in which the four ſtamina are equal; however, as the flowers of this claſs have a particular ſtructure, there are general characters which will nearly ſerve for the whole claſs; and theſe we will give at length.

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* *Tormentilla* is an exception, belonging to the next claſs, though it has but ſixteen ſtamina. The characters of the fructification in the next claſs over-rule the number of the male parts expreſſed in its title.

† This claſs furniſhes the fruits moſt in eſteem.

‡ The fruits of this claſs are often poiſonous; which makes it neceſſary to diſtinguiſh them from thoſe of the laſt, which abounds with eatable fruits.

§ *Capparis* has ſome length of ſtyle.

Characters of the Class DIDYNAMIA.

CALYX.—A perianthium, monophyllous, erect, tubulate, quinquefid, with segments for the most part unequal, and persisting.

COROLLA—Monopetalous and erect, the base of which contains the honey, and does the office of a nectarium. The upper lip strait: the lower spreading and trifid. The middle lacinia the broadest.

STAMINA—Four filaments, subulate, inserted in the tube of the corolla, and inclined towards the back thereof. The two inner and nearest the shortest. All of them parallel, and rarely exceeding the length of the corolla. The antheræ lodged under the upper lip of the corolla in pairs; in each of which respectively the two antheræ approach each other.

PISTILLUM—The germen commonly above the receptacle. The style single, filiform, bent in the same form as the filaments, usually placed within them, a little exceeding them in length, and slightly curved towards the summit. The stigma for the most part emarginate.

PERICARPIUM—Either wanting (see the first order), or, if present, usually bilocular (see the second order.)

SEEDS—If no pericarpium, four, lodged within the hollow of the calyx, as in a capsule; but if there be a pericarpium, more numerous, and fastened to a receptacle placed in the middle of the pericarpium.

The flowers of this class are for the most part almost upright, but inclining a little at an acute angle from the stem, that the corolla may more easily cover the antheræ, and that the pollen may fall on the stigma, and not be soaked with the rain. The essential character is in the four stamina; of which the two nearest are shorter, and all four close to each other, and transmitted with the single style of the pistillum through a corolla that is unequal.

The orders of this class are two, viz.

ORDER I. GYMNOSPERMIA*, comprehending such plants as have naked seeds. This order has these farther characters, viz. the seeds four (excepting *Phryma*, which is *monospermous*); and the stigma *bipartite*, and *acute*, with the lower lacinia *reflexed*. It contains thirty-four genera, distinguished into, 1. Such as have the calyx quinquefid, and nearly equal, of which there are twenty, viz. *Ajuga*, Bugle, *Teucrium*, Germander, *Satureja*, Savory, *Thymbra*, Mountain Hyssop, *Hyssopus*, Hyssop, *Nepeta*, Catmint, or Nep, *Lavandula*, Lavender, *Betonica*, Betony, *Sideritis*, Iron-wort, *Mentha*, Mint, *Glechoma*, Ground-ivy, or Gill, *Perilla*, *Lamium*, Dead Nettle, or Archangel, *Galeopsis*, Hedge Nettle, *Stachys*, Base Horehound, *Ballota*, Black Horehound, *Marrubium*, Horehound, *Leonurus*, Lion's-tail, *Phlomis*, Jerusalem Sage, and *Moluccella*, Molucca Baum. 2. Such as have the calyx *bilabiate*, *(divided into two lips)*; of which there are fourteen, viz. *Clinopodium*, Field Basil, *Origanum*, Wild Marjoram, *Thymus*, Thyme, *Melissa*, Baum, *Dracocephalon*, Dragon's Head, *Horminum*, Pyrenæan Clary, *Melittis*, Baum-leaved Archangel, or Bastard Baum, *Ocymum*, Basil, *Trichostema*, *Scutellaria*, Scull-cap, *Prunella*, Self-heal, *Cleonia*, *Prasium*, Shrubby Hedge-nettle, and *Phryma*.

ORDER II. ANGIOSPERMIA †, comprehending such plants as have the seeds in a *pericarpium*, which circumstance is constant, and distinguishes this order from the last in every form. To this character may be added that of a stigma, commonly *obtuse*. This order contains sixty-nine genera, distinguished into, 1. Such as have a *simple* stigma, and *personate* corollæ; of which there are thirteen, viz. *Bartsia*, *Rhinanthus*, Elephant's Head, *Euphrasia*, Eye-bright, *Melampyrum*, Cow-wheat, *Lathræa*, *Schwalbea*, *Tozzia*, *Pedicularis*, Rattle Coxcomb, or Louse-wort, *Gerardia*, *Chelone*, *Gesneria*, *Antirrhinum*, Snap Dragon, or Calves' Snout, and *Cymbaria*. 2. A *simple* stigma and *spreading* corollæ, of which there are thirty, viz. *Graniolaria*, *Martynia*, *Torenia*, *Scrophularia*, Figwort, *Celsia*, *Digitalis*, Fox-glove, *Bignonia*, Trumpet Flower, *Citharexylum*, Fiddle-wood, *Halleria*, African Fly-honey-suckle, *Crescentia*, Calabash Tree, *Gmelina*, *Petrea*, *Lantana*, American Viburnum, *Bontia*, *Lasfelia*, *Capraria*, *Selago*, *Hebenstretia*, *Erinus*, *Buchnera*, *Browallia*, *Linnæa*, *Sibthorpia*, *Limosella*, Least Water Plantain, *Hemimeris-Dombeya*, *Castilleja*, *Millingtonia*, *Thunbergia*, and *Amasonia*. 3. With a double stigma; of which there are twenty-five, viz. *Stemodia*, *Obolaria*, *Orobanche*, Brown Rape, *Dodartia*, *Lippia*, *Sesamum*, Oily Purging-grain, *Mimulus*, Monkey Flower, *Ruellia*, *Barleria*, *Duranta*, *Ovieda*, *Volkameria*, *Clerodendron*, *Vitex*, Agnus Castus, or Chaste Tree, *Bontia*, *Columnea*, *Acanthus*, Bear's Breech, *Pedalium*, *Avicennia*, *Vandelia*, *Manulea*, *Besleria*, *Lindernia*, *Premna*, and *Hyobanche*. 4. Such as have many petals, of which there is but one genus, viz. *Melianthus*, Honey Flower.

Of the 15th CLASS, TETRADYNAMIA ‡.

This class consists of such plants as bear *hermaphrodite* flowers, furnished with six stamina, two of which are shorter than the rest, by which last circumstance it may be distinguished from the sixth class, whose flowers have six equal stamina. The flowers of this class are of a particular structure, answering to the characters following.

Characters of the Class TETRADYNAMIA.

CALYX—A perianthium tetraphyllous and oblong; the leaves of which are ovato-oblong, concave, obtuse, conniving, gibbous downwards at the base, the opposite ones equal and deciduous. The calyx in these flowers is a nectarium; which is the reason of the base being gibbous.

COROLLA—Called cruciform. Four equal petals. The claws plano-subulate, erect, and somewhat longer than the calyx. The limb plane. The laminæ widening outwards, obtuse, the sides hardly touching one another. The insertion of the petals is in the same circle with the stamina.

STAMINA—The filaments six, and subulate; of which two that are opposite are of the length of the calyx; the other four somewhat longer, but not so long as the corolla. The antheræ oblong, acuminate, thicker at the base, erect, and with their tops leaning outwards. There is a nectariferous glandule, which in the different genera has various appearances; it is seated close to the stamina, and particularly to the two shorter ones, to whose base it is fastened; and these have a light curvature to prevent their pressing upon it, whereby those filaments become shorter than the rest.

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* The plants of this order are scented, and are accounted cephalic and resolvent. The virtue is in the leaves. They are the *Labian* (lipped plants) of Tournefort, and *Verticillati* (plants that flower at the joints) of Ray's Hist. Plant. 508.

† These are the *Personati*, *personate flowers* of Tournefort.

‡ These are the *Cruciformes* (cross-shaped flowers) of Tournefort, and the *Siliculosæ*, and the *Siliquosæ* (plants that have pods) of Ray's Hist. Plant. 777. This class is truly natural, and has been assumed as such by all Systematists, though individuals have often added one or more genera to it, contrary to nature. Linnæus thinks he has given no wrong one, unless it be *Cleome*. The distinction into *Siliculosæ*, and *Siliquosæ*, is admitted by all. The plants are held to be antiscorbutic and diuretic. The taste in most is watery, mixed with a sharpness. They commonly lose their quality when dried. The essential character of the several genera in this class depends commonly on the situation of the nectariferous glandule.

PISTILLUM—The germen above the receptacle increasing daily in height. The style either of the length of the longer stamina, or wanting. The stigma obtuse.

PERICARPIUM—A siliqua of two valves, often bilocular, opening from the base to the top. The dissepiment projecting at the top beyond the valves, the prominent part thereof having before served as a style.

SEEDS—Roundish, inclining downwards, alternately plunged lengthwise into the dissepiment. The receptacle linear, surrounding the dissepiment, and immersed in the sutures of the pericarpium. The orders are two, viz.

ORDER I. SILICULOSA, comprehending those plants whose pericarpium is a silicula. This order contains fourteen genera, viz. *Myagrum*, Gold of Pleasure, *Vella*, Spanish Cress, *Anastatica*, Rose of Jericho, *Subularia*, Rough-leaved Alysson, *Draba*, Whitlow Grass, *Lepidium*, Dittander, or Pepper-wort, *Thlaspi*, Mithridate Mustard, or Treacle Mustard, *Cochlearia*, Scurvy-grass, or Spoon-wort, *Iberis*, Candy-tuft, or Sciatic Cress, *Alyssum*, Mad-wort, *Peltaria*, *Clypeola*, Treacle Mustard, *Biscutella*, Buckler Mustard, and *Lunaria*, Moon-wort, Sattin Flower, or Honesty.

ORDER II. SILIQUOSA, comprehending those plants whose pericarpium is a siliqua*. This order contains eighteen genera, viz. *Ricotia*, *Dentaria*, Tooth-wort, *Cardamine*, Lady's Smock, *Sisymbrium*, Sisymbrium, *Erysimum*, Hedge Mustard, *Cheiranthus*, Stock July-flower, *Heliophola*, *Hesperis*, Dames Violet, Rocket or Queen's July-flower, *Arabis* Bastard Tower Mustard, *Turritis*, Tower Mustard, *Brassica*, Cabbage, *Sinapis*, Mustard, *Raphanus*, Raddish, *Bunias*, *Isatis*, Woad, *Crambe*, Sea-cabbage, *Cleome*, Bastard Mustard, and *Chamira*.

Of the 16th CLASS, MONADELPHIA†.

This class consists of such plants as bear *hermaphrodite* flowers, furnished with one set of united stamina. This class consists of eight orders. The characters of the flowers are as follow.

Characters of the Class MONADELPHIA.

CALYX—A perianthium always present, persisting, and in most genera double.

COROLLA—Pentapetalous, the petals heart-shaped; the sides of which lap each one over the next, contrary to the motion of the sun.

STAMINA—The filaments united below, but distinct upwards if there be more than one ‡. The exterior ones shorter than the interior. The antheræ incumbent.

PISTILLUM—The receptacle of the fructification prominent in the centre of the flower. The germen erect, surrounding the top of the receptacle in a jointed ring. The styles are all united below in one substance with the receptacle, but divided above into as many threads as there are germina. The stigma spreading and thin.

PERICARPIUM—A capsule divided into as many loculaments as there are pistilla. Its figure various in the different genera.

SEEDS—Kidney-shaped.

The corolla in this class has been called *monopetalous*; but as the petals are all distinct at the base, it is to be styled more properly *pentapetalous*, notwithstanding the petals cohere by the union of the stamina. The orders are eight, viz.

ORDER I. TRIANDRIA, comprehending such plants as have three stamina. This order contains three genera, viz. *Aphyteja*, *Galaxia*, and *Hydnora*.

ORDER II. PENTANDRIA, comprehending such plants as have five stamina. This order contains five genera, viz. *Waltheria*, *Lerchea*, *Hermannia*, *Melochia*, and *Symphoria*.

ORDER III. OCTANDRIA, comprehending such plants as have eight stamina. Of this order there is but one genus, viz. *Aitonia*.

ORDER IV. ENNEANDRIA, comprehending such plants as have nine stamina. Of this order there is but one genus, viz. *Dryandra*.

ORDER V. DECANDRIA, comprehending such plants as have ten stamina. This order contains three genera, viz, *Conarus*, *Geranium* §, and *Hugonia*.

ORDER VI. ENDECANDRIA, comprehending such plants as have eleven stamina. Of this order there is only one genus, viz. *Brownea*.

ORDER VII. DODECANDRIA, comprehending such plants as have twelve stamina. Of this order there is only one genus, viz. *Pentapetes*.

ORDER VIII. POLYANDRIA, comprehending such plants as have many stamina. This order contains twenty-one genera, viz. *Bombyx*, Silk Cotton-tree, *Sida*, Indian Mallow, *Adansonia*, Æthiopian Sower Gourd, *Althæa*, Marsh Mallow, *Alcea*, Holly-hock, or Rose Mallow, *Malva*, Mallow, *Lavatera*, *Malope*, Bastard Mallow, *Urena*, Indian Mallow, *Gossypium*, Cotton, *Hibiscus*, Althea Frutex, or Syrian Mallow, *Stewartia*, *Camellia*, *Morisonia*, *Mesua*, Indian Rose-chesnut, *Malachra*, *Gordonia*, *Gustavea*, *Corolinea*, *Barringtonia*, and *Solandra*.

Of the 17th CLASS, DIADELPHIA.

This class consists of such plants as bear *hermaphrodite* flowers, furnished with two sets of united stamina. The characters of the fructification are as follow.

Characters of the Class DIADELPHIA.

CALYX—A perianthium monophyllous, campanulate, and withering. The base gibbous, the lower part thereof fastened to the peduncle, the upper obtuse and melliferous. The brim quinquedentate, acute, erect, oblique, unequal. The lowest odd denticle longer than the rest; the upper pair shorter and farther asunder. The bottom of the cavity moist with a melleous liquor, including the receptacle.

COROLLA—Termed papilionaceous, unequal; the petals expressed by distinct names, viz.

Vexillum, the *standard*; a petal covering the rest, incumbent, greater, plano-horizontal, inserted by its claw in the upper margin of the receptacle, approaching to a circular figure when it leaves the calyx, and nearly entire; along it, and especially towards its extremity, runs a line, or ridge, that rises up, as if the lower part of the petal had been com-

* See the Table of botanical terms at the end of this treatise.

† In this class the calyx is of great moment for distinguishing the genera, and fixes the limits with certainty. They were formerly distinguished by the fruit; which not being found sufficient, recourse was had to the leaves of the plant. The plants of this class are esteemed to be emollient, and mucilaginous.

‡ The *Melochia* has five antheræ, but it does not appear that there are any distinct filaments. Its character may be seen in the Genera Plantarum.

§ The species of this genus vary singularly in the number of stamina and other circumstances, viz. from 1 to 22, they have seven fertile stamina, the leaves alternate and many flowers on a peduncle; from 23 to 35, they have seven fertile stamina, and the leaves growing opposite; from 36 to 45, five fertile stamina, the calyx five leaves, and the fruit declined; from 46 to 58, ten fertile stamina, and two flowers on a peduncle; from 59 to 68, ten fertile stamina, two flowers on a peduncle, and the plants annual; from 69 to 82, ten fertile stamina, and one flower on a peduncle.

preſſed; the part of the petal next to the baſe, approaching to a ſemicylindric figure, embraces the parts that lie under it. The diſk of the petal is depreſſed on each ſide, but the ſides of it neareſt the margin are reflexed upwards. Where the halved tube ends, and the halved limb begins to unfold itſelf, are two concave impreſſions prominent underneath, and compreſſing the wings, that lie under them.

Alæ, the *wings*; two equal petals, one at each ſide of the flower, placed under the vexillum; incumbent with their margins parallel, roundiſh, or oblong, broader upwards, the upper margin ſtraighter, the lower ſpreading more into a roundneſs; the baſe of each wing bifid, the lower diviſion ſtretching out into a claw, inſerted in the ſide of the receptacle, and about the length of the calyx; the upper ſhorter and inflexed.

Carina, the *keel*; the loweſt petal, often bipartite, placed under the vexillum and between the alæ; boat-ſhaped, concave, compreſſed on the ſides, ſet like a veſſel afloat, mutilate at the baſe, the lower part of which runs into a claw of the length of the calyx, and inſerted in the receptacle, but the upper and ſide laciniæ are interwoven with that part of the alæ that is of the ſame ſhape. The form of the ſides of the carina is much like that of the alæ; and ſo alſo is their ſituation, except that they are lower, and ſtand within them. The line that forms the *Carina*, or *Keel*, in this petal, runs ſtraight as far as the middle, and then riſes gradually in the ſegment of a circle, but the marginal line runs ſtraight to the extremity, where meeting the carinal, they terminate obtuſely.

Stamina—called *Diadelphia*. The filaments two, of different forms, viz. a lower one that involves the piſtillum, and an upper one incumbent on it. The former of theſe, from the middle downwards, is cylindraceous, membranaceous, and ſplit lengthwiſe on its upper ſide; but the upper half terminates in nine ſubulate * parts, that are of the ſame length with, and follow the flexure of the carina of the corolla, and of which the intermediate or lower radii † are longer by alternate pairs. The upper filament is ſubulato-ſetoſe ‡, covering the ſplitting of the former cylindraceous filament, incumbent on it, anſwering to it in ſituation, ſimple and gradually ſhorter; its baſe is detached from the reſt, and prepares an outlet for the honey on each ſide. The antheræ reckoned all together are ten, one on the upper filament, and nine on the lower, each of the radii being furniſhed with a ſingle one: they are ſmall, all of one ſize, and terminate the radii.

Pistillum—Single, growing out of the receptacle, within the calyx. The germen oblong, roundiſh, lightly compreſſed, ſtraight, of the length of the cylinder of the lower filament which involves it. The ſtyle ſubulate, filiform, aſcending, having the ſame length and poſition as the radii of the filament among which it is placed, and withering. The ſtigma downy, of the length of the ſtyle from the part turned upwards, and placed immediately under the antheræ.

Pericarpium—A legumen, oblong, compreſſed, obtuſe, bivalved, with a longitudinal ſuture both above and below; each ſuture ſtraight, though the upper one falls near the baſe, and the lower one riſes near the top. The legumen opens at the upper ſuture.

Seeds—A few, roundiſh, ſmooth, fleſhy, pendulous, marked with an embryo that is a little prominent towards the point of inſertion. When the ova are hatched, the cotyledons preſerve the form of the halved ſeed.

Receptacle—The proper receptacles of the ſeeds are very ſmall, very ſhort, thinner towards the baſe, obtuſe at the diſk that faſtens them, oblong, inſerted longitudinally in the upper ſuture of the legumen only, but placed alternate; ſo that when the valvulæ have been parted, the ſeeds adhere alternately to each of the valves.

The ordinary ſituation of the flowers is obliquely pendulous; that is, at an acute angle from the perpendicular. The orders are four, viz.

Order I. PENTANDRIA, comprehending ſuch plants as have five ſtamina. Of this order there is only one genus, viz. *Monnieria*.

Order II. HEXANDRIA, comprehending ſuch plants as have ſix ſtamina. This order contains two genera, viz. *Fumaria*, Fumitory, and *Saraca*.

Order III. OCTANDRIA, comprehending ſuch plants as have eight ſtamina. This order contains three genera, viz. *Polygala*, Milkwort, *Securidaca*, and *Dalbergia*.

Order IV. DECANDRIA, comprehending ſuch plants as have ten ſtamina. This order contains fifty genera, diſtinguiſhed into, 1. Such as have monadelphous § filaments: of which there are ſeventeen, viz. *Niſſolia*, *Erythrina*, Coral Tree, *Piſcidia*, *Borbonia*, *Spartium*, Broom, *Geniſta*, Single-ſeeded Broom, *Aſpalathus*, African Broom, *Amorpha*, Baſtard Indigo, *Crotolaria*, *Ononis*, Root Harrow, *Anthyllis*, Kidney Vetch, or Lady's Finger, *Ebenus*, Ebony of Crete, *Abrus*, *Pterocarpus*, *Ulex*, Furze, Whins, or Gorſs, *Arachis*, Ground Nut, and *Lupinus*, Lupine. 2. Such as have *diadelphous* || filaments and a downy ſtigma; of which there are ten, viz. *Phaſeolus*, Kidney Bean, *Dolichus*, *Glycine*, Carolina Kidney Bean Tree, *Clitoria*, *Piſum*, Pea, *Orobus*, Bitter Vetch, *Lathyrus*, Chichling Vetch, *Vicia*, Vetch, *Cicer*, Chich Peas, and *Ervum*, Bitter Vetch. 3. Such as have diadelphous filaments, bilabiate calyces, and the ſtigma not downy, of which there are ſix, viz. *Cytiſus*, Baſe Tree, Trefoil, *Geoffroya*; *Robinia*, Falſe Acacia, *Colutea*, Bladder Senna, *Glycirrhiza*, Liquorice, and *Coronilla*, Jointed-pointed Colutea. 4. Such as have diadelphous filaments, ſtigmata that are not downy, and calyces not bilabiate; of which there are ſeventeen, viz. *Ornithopus*, Bird's foot, *Hippocrepis*, Horſe-ſhoe Vetch, *Scorpiurus*, Caterpillars, *Hedyſarum*, French Honey-ſuckle, *Æſchynomene*, Baſtard Senſitive Plant, *Indegofera*, Indigo, *Galega*, Goat's Rue, *Phaca*, Baſtard Milk Vetch, *Aſtragalus*, Liquorice Vetch, or Milk Vetch, *Biſſerrula*, *Pſoralea*, *Trifolium*, Trefoil, *Lotus*, Bird's Foot Trefoil, *Liparia*, *Trigonella*, Fenugreek, *Medicago*, Sail and Moon Trefoil, and *Mullera*.

Of the 18*th* Class, POLYADELPHIA.

This claſs conſiſts of ſuch plants as bear *hermaphrodite* flowers, furniſhed with many ſets of united ſtamina: the flowers have no particular character farther than is expreſſed in the title. The orders are four, viz.

Order I. PENTANDRIA, comprehending ſuch plants as have five ſtamina in each ſet. Of this order there are two genera, viz. *Theobroma*, Chocolate Nut, and *Abroma*.

Order II. DODECANDRIA, comprehending ſuch plants as have twelve ſtamina in each ſet. Of this order there is but one genus, viz. *Monſonia*.

Order III. ICOSANDRIA, comprehending ſuch plants as have twenty ſtamina in each ſet. Of this order there is but one genus, viz. *Citrus*, Citron.

Order IV. POLYANDRIA, comprehending ſuch plants as have many ſtamina in each ſet. This order contains eight genera, viz. *Hypericum*, St. John's Wort, *Aſcyrum*, St. Peter's Wort, *Hopea*, *Symplocus*, *Melaleuca*, *Durio*, *Munchhauſia*, and *Glabraria*.

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* Awl-ſhaped. † Rays, meaning the diviſions of the filaments. ‡ Awl-ſhaped, and like a briſtle. § One ſet, or brotherhood. || Two ſets, or brotherhoods.

Of the 19th Class, SYNGENESIA *.

This clafs confifts of fuch plants as bear *compound* flowers. We have already paved the way for underftanding this clafs, by the explanation of the titles of the clafs and its orders. What is farther neceffary here, is to give the characters of the flowers. Compound flowers admit of a double defcription, viz. 1. of the whole flower in its aggregate ftate, which is termed the *Flofculofe Flower*; and 2. of the *Flofculi, Florets*, of which it is compofed. We fhall begin with the firft, which concerns only the calyx and receptacle, thofe being the only parts that are in common.

Characters of the Flofculofe Flower.

Calyx—The common calyx is a perianthium, which contains the florets and the receptacle. It is either *fimple, augmented*, or *imbricated*. It contracts when the flowers are fallen, but expands and turns back when the feeds are ripe.

Receptacle—The common receptacle of the fructification receives many feffile florets on its difk, which is either *concave, plain, convex, pyramidal*, or *globofe*. The furface of the difk is either naked, without any other inequality than that of being lightly dotted; *villofe*, covered with upright hairs; or *paleaceous*, covered with *paleæ, chaffs*, or *ftraws*, that are linear, fubulate, compreffed and erect, and ferve to part the florets.

Characters of the Florets.

Calyx—A fmall perianthium, often quinquepartite, feated on the germen, perfifting, and becoming the crown of the feed.

Corolla—Monopetalous, with a long and very narrow tube. It is feated on the germen, and is either *tubulate*, with the limb campanulate and quinquefid, and the laciniæ fpreading and turning back; *ligulate*, with the limb linear, plane, turned outwards, and the top whole; *tridentate*, or *quinquedentate*; or wanting, having no limb, and often no tube.

Stamina—The filaments five, capillary, very fhort, inferted in the neck of the corollulæ. The antheræ five, linear, erect; and by the union of their fides forming a cylinder, that is tubulate, quinquedentate, and of the length of the limb.

Pistillum—The germen oblong, placed under the receptacle of the flower; the ftyle filiform, erect, of the length of the ftamina, and perforating the cylinder of the antheræ; the ftigma bipartite, the laciniæ revolute and fpreading afunder.

Pericarpium—No true one, though in fome there is a coriaceous cruft.

Seed—A fingle one, oblong, often tetragonous, but commonly narrower at the bafe. It is either crowned, or with the crown wanting. The crown is of two kinds, either a pappus, or a perianthium: if a pappus, it is either feffile, or placed on a ftipes; and confifts of many radii, that are placed in a round, and are either fimple, radiate, or ramofe: when the crown is a perianthium, it is fuch as is defcribed above under that head.

The effence of a *flofculofe* flower confifts in having the antheræ united in a cylinder, and a fingle feed below the receptacle of the floret. The orders of this clafs are fix, viz.

Order I. POLYGAMIA ÆQUALIS, comprehending fuch plants as have compound flowers, of which the florets are all *hermaphrodite*. This order contains forty-two genera, diftinguifhed into, 1. Such as have *ligulate* compound flowers, of which there are nineteen, viz. *Geropogon, Tragopogon*, Goat's Beard, *Scorzonera*, Viper Grafs, *Picris, Sonchus*, Sowthiftle, *Lactuca*, Lettuce, *Chondrilla*, Gum Succory, *Prenanthes*, Wild Lettuce, *Leontodon*, Dandelion, *Hieracium*, Hawkweed, *Crepis*, Baftard Hawkweed, *Andriala*, Downy Sowthiftle, *Hyoferis, Seriola, Hypochæris, Lapfana*, Nipple wort, *Catananche*, Candy Lion's Foot, *Cichorium*, Succory or Endive, and *Scolymus*, Golden Thiftle. 2. Such as have *tubulofe* compound flowers; of which there are twenty-three, viz. *Arctium*, Burdock, *Serratula*, Saw wort, *Carduus*, Thiftle, *Cnicus*, Bleffed Thiftle, *Onopordon*, Woolly Thiftle, *Cynara*, Artichoke, *Carlina*, Carline Thiftle, *Carthamus*, Baftard Saffron, *Bidens*, Water Hemp Agrimony, *Cacalia*, Alpine Colt's Foot, *Atractylis*, Diftaff Thiftle, *Eupatorium*, Hemp Agrimony, *Ageratum*, Baftard Hemp Agrimony, *Ethulia, Stachelina, Chryfocoma*, Goldy Locks, *Calea, Tarchonanthus*, African Fleabane, *Pteronia, Athanafia, Spilanthus, Santolina*, Lavender Cotton, and *Barnadefia*.

Order II. POLYGAMIA SUPERFLUA, comprehending fuch plants as have the florets of the difk *hermaphrodite*, and thofe of the radius female. This order contains thirty eight genera, diftinguifhed into, 1. *Tubulofe*; of which there are eight, viz. *Tanacetum*, Tanfey, *Artemifia*, Mugwort, *Gnaphalium*, Cudweed, *Xeranthemum*, Auftrian Sneezewort, or Eterna, Flower, *Carpefium, Baccharis*, Plowman's Spikenard, *Cotula*, and *Conyza*, Fleabane. 2. *Radiate*; of which there are thirty, viz. *Erigeron, Tuffilago*, Coltsfoot, *Senecio*, Groundfel, *After*, Star-wort, *Solidago*, Golden Rod, *Inula*, Elecampane, *Cineraria*, Sky Flower, *Arnica, Doronicum*, Leopard's Bane, *Perdicium, Helenium*, Baftard Sun Flower, *Bellis, Leyfera, Tagetes*, African Marygold, *Pectis, Chryfanthemum*, Corn Marygold, *Matricaria*, Feverfew, *Anacyclus, Anthemis*, Chamomile, *Achillea*, Millfoil, *Tridax*, Trailing Starwort of Vera Cruz, *Zinnia, Verbefina, Sigefbeckia, Buphthalmum*, Ox Eye, *Eclipta, Bellium, Amellus, Unxia*, and *Mutifia*.

Order III. POLYGAMIA FRUSTRANEA, comprehending fuch plants as have the florets of the difk *hermaphrodite*, and thofe of the radius neuter. This order contains nine genera, all *radiate*, viz. *Helianthus*, Sun Flower, *Rudbeckia*, Dwarf Sun Flower, *Coreopfis*, Tick-feeded Sun Flower, *Gorteria, Ofmites, Zoegea, Centaurea*, Centaury, *Sclerocarpus*, and *Didelta*.

Order IV. POLYGAMIA NECESSARIA, comprehending fuch plants as have flowers of the *difk* male, and thofe of the *radius* female. This order contains fourteen genera, moft of which are *radiate*, viz. *Milleria, Silphium*, Baftard Chryfanthemum, *Chryfogonum, Melampodium, Calendula*, Marygold, *Arctotis, Ofteofpermum*, Hard feeded Chryfanthemum, *Othonna*, African Ragwort, *Polymnia, Eriocephalus, Filago*, Cotton-weed, *Micropus*, Baftard Cudweed, *Baltimora*, and *Hippia*.

Order V. POLYGAMIA SEGREGATA. This order comprehends fuch plants as have *many* partial cups contained in the common calyx, which feparate and furround the flofcula. This order contains feven genera, diftinguifhed into, 1. Such as have four flofculi in each partial calyx; of which there are two genera, viz. *Elephantopus*, and *Oedera*. 2. Such as have *many* flofculi in each partial calyx; of which there is only one genus, viz. *Sphæranthus*. 3. Such as have one flofculus in each partial calyx; of which there are three genera, viz. *Echinops, Gundelia*, and *Stoebe*. 4. Such as have three flofculi in each partial cup, of which there is only one genus, viz. *Jungia*.

Order VI. MONOGAMIA, comprehending fuch plants as have *fimple* flowers. This order contains feven genera, viz. *Strumfia, Seriphium, Corymbium, Jafione*, Sheep Scalions, *Lobelia*, Cardinal Flower, *Viola*, Violet, and *Impatiens*, Balfam, or Female Balfamine.

* This clafs of compound flowers is a natural one, if we except the laft order; which, upon the fyftematic principles affumed, could not be refufed an admiffion into it. Its plants are commonly bitter and ftomachic.

Of the 20th CLASS, GYNANDRIA *.

This clafs confifts of fuch plants as have the *ftamina* growing either upon the *ftyle* itfelf, or upon a receptacle that ftretches out into the form of a ftyle, and fupports both the ftamina and the piftillum. The orders are nine, which we fhall fhortly particularize; but it is firft neceffary to fpeak of the order *Diandria.* The flowers of this order have a moft fingular ftructure, anfwering to the following defcription.

Characters of the Order DIANDRIA, *of the Clafs* GYNANDRIA.

The *germen* is always contort; the *petals* are five; of which the two inner ones ufually approach and form a galea; the lower lip of which becomes a nectarium, and ferves alfo for a piftillum and fixth petal. The ftyle grows to the inner margin of the nectarium, in fuch a manner as to be with its ftigma fcarce either of them diftinguifhable. The filaments are always two, fupporting as many antheræ, which are narrower downwards, naked, or without tunic, and divifible, like the pulp of a citrus. Thefe laft are covered by little cells, that are open underneath, and grow to the inner margin itfelf of the nectarium. The fruit is a capfule, that is unilocular, trivalved, and fplits in the angles under the carinate ribs. The feeds are fcobiform, numerous, affixed to a linear receptacle in each valvule. The orders of this clafs are as follow:

ORDER I. DIANDRIA †, comprehending fuch plants as have two ftamina. This order contains eleven genera, viz. *Orchis, Satyrium,* Lizard Flower, *Ophrys,* Twyblade, *Serapias,* Helleborine, *Limodorum, Arethufa, Cypripedium,* Ladies' Slipper, *Epidendrum,* Vanilla or Vanelloe, *Gunnera, Forftera,* and *Difa.*

ORDER II. TRIANDRIA, comprehending fuch plants as have three ftamina. This order contains four genera, viz. *Sifyrinchium,* Bermudiana, *Ferraria, Stilago,* and *Salacia.*

ORDER III. TETRANDRIA, comprehending fuch plants as have four ftamina. Of this order there is but one genus, viz. *Nepenthes.*

ORDER IV. PENTANDRIA, comprehending fuch plants as have five ftamina. This order contains three genera, viz. *Paffiflora,* Paffion Flower, *Gluta,* and *Ayenia.*

ORDER V. HEXANDRIA, comprehending fuch plants as have fix ftamina. This order contains two genera, viz. *Ariftolochia,* Birthwort, and *Piftia.*

ORDER VI. OCTANDRIA, comprehending fuch plants as have eight ftamina. Of this order there is only one genus, viz. *Scopolia.*

ORDER VII. DECANDRIA, comprehending fuch plants as have ten ftamina. Of this order there are but two genera, viz. *Helicteres,* Skrew Tree, and *Kleinhovia.*

ORDER VIII. DODECANDRIA, comprehending fuch plants as have twelve ftamina. This order contains but one genus, viz. *Cytinus.*

ORDER IX. POLYANDRIA, comprehending fuch plants as have many ftamina. This order contains eight genera, viz. *Grewia, Xylopia, Arum,* Wake Robin, or Cuckoo Pint, *Dracontium,* Dragons, *Calla,* African Arum, *Pothos, Ambrofinia,* and *Zoftera,* Grafs Wrack.

Of the 21ft CLASS, MONOECIA.

This clafs confifts of fuch plants as have no hermaphrodite flowers, but bear both male and female flowers on the fame plant ‡. The orders of this clafs are eleven, viz.

ORDER I. MONANDRIA, comprehending fuch plants as have their male flowers furnifhed with one ftamen. This order contains ten genera, viz. *Zanichellia,* Triple-headed Pond Weed, *Ceratocarpus, Cynomorium, Elaterium, Chara, Ægopricon, Artocarpus, Nipa, Cafuarina,* and *Phyllachne.*

ORDER II. DIANDRIA, comprehending fuch plants as have their male flowers furnifhed with two ftamina. This order contains two genera, viz. *Lemna,* Duck Meat, and *Anguria.*

ORDER III. TRIANDRIA, comprehending fuch plants as have their male flowers furnifhed with three ftamina. This order contains twelve genera, viz. *Omphalea, Typha,* Cat's Tail, or Reed Mace, *Sparganium,* Burr Reed, *Zea,* Indian or Turkey Wheat, *Coix,* Job's Tears, *Tripfacum, Olyra, Carex, Axyris, Tragia, Hernandia,* Jack in a Box, and *Phyllanthus,* Sea-fide Laurel.

ORDER IV. TETRANDRIA, comprehending fuch plants as have their male flowers furnifhed with four ftamina. This order contains nine genera, viz. *Centella, Betula,* Birch, *Buxus,* Box Tree, *Urtica,* Nettle, *Morus,* Mulberry Tree, *Cicca, Serpicula, Littorella,* and *Aucuba.*

ORDER V. PENTANDRIA, comprehending fuch plants as have the male flowers furnifhed with five ftamina. This order contains eight genera, viz. *Xanthium,* Leffer Burdock, *Ambrofia, Parthenium,* Baftard Feverfew, *Iva,* Jefuits' Bark Tree, *Leea, Amaranthus,* Amaranth or Flower Gentle, *Nephelium,* and *Clibadium.*

ORDER VI. HEXANDRIA, comprehending fuch plants as have their male flowers furnifhed with fix ftamina. Of this order there are two genera, viz. *Zizania,* and *Pharus.*

ORDER VII. HEPTANDRIA, comprehending fuch plants as have their male flowers furnifhed with feven ftamina. Of this order there is but one genus, viz. *Guettarda.*

ORDER VIII. POLYANDRIA, comprehending fuch plants as have their male flowers furnifhed with many ftamina. This order contains thirteen genera, viz. *Ceratophillum, Myriophillum,* Water Millfoil, *Sagittaria,* Arrowhead, *Begonia, Theligonum,* Dogs Cabbage, *Poterium,* Burnet, *Quercus,* Oak, *Juglans,* Walnut, *Fagus,* Beech, *Carpinus,* Hornbeam, *Corylus,* Hazel or Nut tree, *Platanus,* Plane-tree, and *Liquidambar,* Sweet Gum.

ORDER IX. MONADELPHIA, comprehending fuch plants as have their male flowers furnifhed with one fet of united ftamina. This order contains fifteen genera, viz. *Hura,* Sand Box tree, *Pinus,* Pine-tree, *Cupreffus,* Cyprus, *Thuja,* Arbor Vitæ, *Acalypha, Delechampia, Plukenetia, Cupania, Croton,* Tallow-tree, or Baftard Licinus, *Ricinus,* Palma Chrifti, *Jatropha,* Caffava, *Sterculia, Hippomane,* Manchineal, *Stillingia,* and *Gnetum.*

ORDER X. SYNGENESIA, comprehending fuch plants as have their male flowers furnifhed with ftamina, of which the antheræ are united. This order contains fix genera, viz. *Tricofanthes,* Serpent Cucumber, *Momordica,* Male Balfam Apple, *Cucumis, Cucurbita,* Gourd, *Sicyos,* Single-feeded Cucumber, and *Bryonia,* Bryony.

ORDER XI. GYNANDRIA, comprehending fuch plants as have their male flowers furnifhed with ftamina that grow out of a kind of ftyle, or imperfect *piftillum,* the perfect one being in the female flower. This order contains two genera, viz. *Andrachne,* Baftard Orpine, and *Agyneia.*

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* All the flowers of this clafs have a monftrous appearance, owing to the uncommon fituation of the parts of fructification.

† This order is a natural one, the genera differing only in refpect of the nectarium. This part Linnæus confiders as a mark of diftinction for thefe genera, far preferable to the root, though not received as fuch by former botanifts.

‡ Thefe are the androgynous plants.

Of the 22nd Class, DIŒCIA.

This clafs confifts of fuch plants as have no hermaphrodite flowers, but bear male and female flowers on diftinct plants. The orders of this clafs are fifteen, viz.

Order I. MONANDRIA, comprehending fuch plants as have their male flowers furnifhed with one ftamen. This order contains only two genera, viz. *Najas*, and *Pandanus*.

Order II. DIANDRIA, comprehending fuch plants as have their male flowers furnifhed with two ftamina. This order contains three genera, viz. *Vallifneria, Salix*, Willow, and *Cecropia*.

Order III. TRIANDRIA, comprehending fuch plants as have their male flowers furnifhed with three ftamina. This order contains fix genera, viz. *Empetrum*, Black-berried Heath, or Crow-berries, *Ofyris*, Poet's Caffia, *Caturus*, *Excœcaria*, *Reftio*, and *Maba*.

Order IV. TETRANDRIA, comprehending fuch plants as have their male flowers furnifhed with four ftamina. This order contains feven genera, viz. *Vifcum*, Miffletoe, *Hippophæ*, Sea Buckthorn, *Myrica*, Candleberry Myrtlegale, or Sweet Willow, *Trophis*, *Batis*, *Montinia*, and *Brucea*.

Order V. PENTANDRIA, comprehending fuch plants as have their male flowers furnifhed with five ftamina. This order contains twelve genera, viz. *Piftacia*, Piftacia Nut, *Zanthoxylum*, Tooth-ach Tree, *Aftronium*, *Irefine*, *Antidefma*, *Spinacia*, Spinage, *Acnida*, *Cannabis*, Hemp, *Humulus*, Hop, *Zanonia*, *Fevillea*, and *Canarium*.

Order VI. HEXANDRIA, comprehending fuch plants as have their male flowers furnifhed with fix ftamina. This order contains four genera, viz. *Tamus*, Black Bryony, *Smilax*, Rough Bindweed, *Rajania*, and *Diofcorea*.

Order VII. OCTANDRIA, comprehending fuch plants as have their male flowers furnifhed with eight ftamina. This order contains three genera, viz. *Populus*, Poplar, *Rhodiola*, Rofe Root, and *Magaritaria*.

Order VIII. ENNEANDRIA, comprehending fuch plants as have their male flowers furnifhed with nine ftamina. This order contains two genera, viz. *Mercurialis*, Mercury, and *Hydrocharis*, Frog's Bit.

Order IX. DECANDRIA, comprehending fuch plants as have their male flowers furnifhed with ten ftamina. This order contains four genera, viz. *Carica*, Papaw, *Kiggelaria*, *Coriaria*, Myrtle-leaved Sumach, and *Schinus*, Indian Maftick.

Order X. DODECANDRIA, comprehending fuch plants as have their male flowers furnifhed with twelve ftamina. This order contains three genera, viz. *Menifpermum*, Moon Seed, *Datifca*, Baftard Hemp, and *Euclea*.

Order XI. ICOSANDRIA, comprehending fuch plants as have their male flowers furnifhed with many ftamina inferted into the calyx. Of this order there is but one genus, viz. *Flacourtia*.

Order XII. POLYANDRIA, comprehending fuch plants as have their male flowers furnifhed with many ftamina. Of this order there are two genera, viz. *Cliffortia*, and *Hedycaria*.

Order XIII. MONADELPHIA, comprehending fuch plants as have their male flowers furnifhed with one fet of united ftamina. This order contains fix genera, viz. *Taxus*, Yew Tree, *Juniperus*, Juniper, *Ephedra*, Shrubby Horfe-tail, *Ciffampelos*, *Napæa*, and *Adelia*.

Order XIV. SYNGENESIA, comprehending fuch plants as have their male flowers furnifhed with ftamina, of which the antheræ are united. Of this order there is but one genus, viz. *Rufcus*, Knee Holly, or Butcher's Broom.

Order XV. GYNANDRIA, comprehending fuch plants as have their male flowers furnifhed with ftamina that grow out of a kind of ftyle, or imperfect piftillum, the perfect one being in the female flower. Of this order there is but one genus, viz. *Clutia*.

Of the 23rd Class, POLYGAMIA.

This clafs confifts of fuch plants as bear hermaphrodite flowers, and alfo either male or female flowers, or both. The orders of this clafs are three, viz.

Order I. MONŒCIA, comprehending fuch plants as have the polygamy on the fame plant. This order contains twenty-four genera, diftinguifhed into, 1. Such as are polygamous by male hermaphrodites, and female hermaphrodites; of which there is but one genus, viz. *Mufa*, Plantain Tree. 2. By hermaphrodites and males; of which there are twenty-two, viz. *Ophioxylon*, *Celtis*, Nettle Tree, *Veratrum*, White Hellebore, *Fufanus*, *Andropogon*, *Holcus*, Indian Millet, *Apluda*, *Ifchæmum*, *Cenchrus*, *Ægilops*, *Valantia*, Crofs-wort, *Parietaria*, Pellitory, *Atriplex*, Orach, *Brabeium*, African Almond, *Acer*, Maple, *Gouania*, *Solandra*, *Terminalia*, *Clufia*, Balfam Tree, *Hermas*, *Spinifex*, and *Manifurus*. 3. By hermaphrodites and females; of which there is one genus, viz. *Mimofa*, Senfitive Plant.

Order II. DIŒCIA, comprehending fuch plants as have the polygamy on two diftinct plants. This order contains ten genera, diftinguifhed into, 1. Such as are polygamous by hermaphrodites and females; of which there are two, viz. *Fraxinus*, Afh, and *Gleditfia* *, Three-thorned Acachia. 2. By hermaphrodites and males; of which there are three, viz. *Diofpyrus*, Indian Date Plumb, *Nyffa*, Dupelo Tree, and *Pifonia*, Fringrigo. 3. By androgynous and males; of which there are five, viz. *Anthofpermum*, Amber Tree, *Arctopus*, *Panax*, Ginfeng, *Chryfitrix*, and *Stilbe*.

Order III. TRIŒCIA, comprehending fuch plants as have the polygamy on three diftinct plants. This order contains two genera, viz. *Ficus*, Fig, and *Ceratonia*, Carob Tree, or St. John's Bread.

Of the 24th Class, CRYPTOGAMIA †.

This clafs confifts of fuch plants as conceal their fructification, having their flowers either within the fruit, or fo fmall as not to be perceptible to the naked eye. The fructification of thefe is alfo of an uncommon ftructure. The orders are four, viz.

Order I. FILICES, *Ferns*, comprehending fuch plants as are dorfiferous ‡, What is known of the fructification of thefe plants, amounts only to the few characters following.

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* In gleditfia the hermaphrodites and males are on the fame plant, and the females on a diftinct one.

† The plants of this clafs are often of a dangerous quality.

‡ Bearing the fruit on the back of the leaf. Thefe have been called alfo epiphyllofpermous, a Greek compound, expreffive of the fame circumftance; capillary, as being efteemed good for the hair; and acaules, without ftems; for in thefe plants, what rifes out of the ground is plainly a leaf only; one of the characters of a ftem or trunk is to be alike on every fide; but in the ftalks of ferns, there is manifeftly a front and back, the former being flat and channelled, and the latter convex; which fhews them to be leaves.

Characters of the FILICES.

CALYX—A squama growing out of the leaf, opening on one of its sides; and under which there are peduneulate globules; each globule is girt with an elastic ring, which breaks elastically, and sheds a dust, which are the seeds.

This order contains eighteen genera; which, not admitting of any certain distinction from their fructification, have been ranged by Linnæus according to their situation under their covers, and are as follows, viz. *Cycas*, Sego Palm, *Zamia*, *Equisetum*, Horse Tail, *Onoclea*, Sensible Polypody, *Ophioglossum*, Adder's Tongue, *Osmunda*, Osmund Royal, or Flowering Fern, *Acrostichum*, Forked Fern, *Pteris*, Braks, or Female Fern, *Blechnum*, *Hemionitis*, Mule's Fern, *Lonchitis*, Rough Spleenwort, *Asplenium*, Spleenwort, or Miltwaste, *Polypodium*, Polypody, *Adianthum*, Maiden Hair, *Trichomanes*, *Marsilea*, *Pilularia*, Pepper Grass, and *Isoetes*.

ORDER II. MUSCI, Mosses. The character of the plants comprehended under this title are, antheræ without filaments; the female flowers distinct, and without any pistillum; and the seeds, consisting only of a naked corculum, without cotyledon or tunic. The genera of this order have been distinguished by Linnæus, according to the following circumstance, viz. the antheræ, with or without a calyptra (or veil), placed on the same plant as the female floret, or on a distinct one; and the female aggregate, or single. The order contains eleven genera, viz. *Lycopodium*, Wolf's Claw Moss, *Porella*, *Sphagnum*, Bog Moss, *Phascum*, *Splachnum*, *Polytrichum*, Golden Maiden Hair, *Mnium*, *Bryum*, *Hypnum*, *Fontinalis*, Water Moss, and *Buxbaumia*.

ORDER III. ALGÆ, Flags. The plants comprehended under this order have their root, stem, and leaf all in one. The characters of the fructification of this order are not yet known, excepting the few descriptions given by Michelius. The genera are twelve, viz. *Jungermannia*, *Targionia*, *Marchantia*, *Blasia*, *Riccia*, Marsh Liverwort, *Anthoceros*, *Lichen*, Liverwort, *Tremella*, *Fucus*, Wrack, or Sea Weed, *Ulva*, Laver, *Conferva*, and *Byssus*.

ORDER IV. FUNGI, Mushrooms. The genera of this order are given by Linnæus after the method of Dillenius. The fructification being imperfectly known, no character can be assigned for this order, farther than the title, which is familiar to every one. The genera are ten, viz. *Agaricus*, Agaric, *Boletus*, *Hydnum*, *Phallus*, Stinkhorns, *Clathrus*, *Helvella*, *Peziza*, Cup Mushroom, *Clavaria*, *Lycoperdon*, and *Mucor*.

Twenty-fifth CLASS, PALMÆ, comprehending such plants as have a spadax and spatha. This order contains nine genera, viz. *Chamærops*, Dwarf Palm, or Palmetto, *Borassus*, *Corypha*, *Cocos*, Cocoa Nut, *Phœnix*, Common Palm, or Date Palm Tree, *Elais*, *Areca*, Arica Nut, *Elate*, and *Caryota*.

From this Dissertation on the *Sexual System* of Botany, it will be easily seen in what manner it is applied, in order to discover the genus and species of any unknown plant. When a plant is gathered in flower, the number of the stamina will refer to the CLASS, and the pistils to the ORDER, except in the twelve last classes, which are distinguished by other marks. When the order is found, the GENUS is next to be discovered, which is done by observing the *calyx*, the *corolla*, the *pericarpium*, and the *seeds*, as well as the form and situation of the *stamina* and *pistils*. The SPECIES are distinguished by some specific difference of the root, the trunk, the branches, or the leaves, and they are called by some trivial name, expressive of the specific difference, or some other circumstance; thus we find the *yellow* gentian, the *lesser* centaury, the *rough-leaved*, and the *smooth-leaved* witch elms, &c.

6

EXPLANATION of PLATE 53.

Roots.

Fig. 1. A Squamose Bulb. 2. A Solid Bulb. 3. Transverse Section of a Tunicate Bulb. 4. A Pendulous Tuberose Root of the Filipendula. 5. A Ramose Root. 6. A Fusiform Root. 7. A Repent Root.

Trunks.

Fig. 1. A Squamose Culm. 2. A Repent Stem. 3. A Frons. 4. A Voluble Stem. 5. An Articulate Culm. 6. A Scapus. 7. A Dichotomous Stem. 8. A Brachiate Stem.

Fulcra.

Fig. 1. *a*, A Cirrhus. *b*, Stipulæ. *c*, Concave Glandules. Fig. 2. *a*, Pedicellate Glandules. Fig. 3. *a*, Bracteæ differing from the Leaves. *b*, The Leaves. Fig. 4. *a*, Simple Spines. *b*, A Triple Spine. Fig. 5. *a*, Simple Aculei. *b*, Triple Aculei, or Forks. Fig. 6. *a*, Opposite Leaves. *b*, The Axillæ.

EXPLANATION of PLATES 54 and 55.

Simple Leaves.

Fig. 1. Orbiculate. 2. Subrotund. 3. Ovate. 4. Oval. 5. Oblong. 6. Lanceolate. 7. Linear. 8. Subulate. 9. Reniform. 10. Cordate. 11. Lunulate. 12. Triangular. 13. Saggittate. 14. Cordato-sagittate. 15. Hastate. 16. Fissa. 17. Trilobe. 18. Præmorse. 19. Lobate. 20. Quinquangular. 21. Erose. 22. Palmate. 23. Pinnatifid. 24. Laciniate. 25. Sinuate. 26. Dentato-sinuate. 27. Retrorsum-sinuate. 28. Partite. 29. Repand. 30. Dentate. 31. Serrate. 32. Duplicato-serrate. 33. Duplicato-crenate. 34. Cartilagineous. 35. Acutely-crenate. 36. Obtusely-crenate. 37. Plicate. 38. Crenate. 39. Crisp. 40. Obtuse. 41. Acute. 42. Acuminate. 43. Obtuse with an acumen. 44. Acutely-emarginate. 45. Cuneiform-emarginate. 46. Retuse. 47. Pilose. 48. Tomentose. 49. Hispid. 50. Ciliate. 51. Rugose. 52. Venose. 53. Nervose. 54. Papillose. 55. Linguiform. 56. Acinaciform. 57. Dolabriform. 58. Deltoid. 59. Triquetrous. 60. Canaliculate. 61. Sulcate. 62. Teretes. 63. Parabolic. 64. Spatulate.

Compound Leaves.

Fig. 1. Binate. 2. Ternate, with the folioles sessile. 3. Ternate, with the folioles petiolate. 4. Digitate. 5. Pedate. 6. Pinnate with an odd one. 7. Pinnate abrupt. 8. Pinnate alternately. 9. Pinnate interruptedly. 10. Pinnate cirrhose. 11. Pinnate conjugate. 12. Pinnate decursively. 13. Pinnate articulately. 14. Lyrate, (this belongs to the Simple Leaves.) 15. Biternate. 16. Bipinnate. 17. Triternate. 18. Tripinnate abrupt. 19. Tripinnate with an odd one.

Determinate Leaves.

Fig. 1. *a*, Inflex. *b*, Erect. *c*, Patent. *d*, Horizontal. *e*, Reclined. *f*, Revolute. Fig. 2. *a*, Seminal. *b*, Cauline. *c*, Rameous. *d*, Floral. Fig. 3. *a*, Peltate. *b*, Petiolate. *c*, Sessile. *d*, Decurrent. *e*, Amplexicaul. *f*, Perfoliate. *g*, Connate. *h*, Vaginant. Fig. 4. *a*, Articulate. *b*, Stellate. *c*, Quartern. *d*, Opposite. *e*, Alternate. *f*, Acerose. *g*, Imbricate. *h*, Fasciculate.

Foliation.

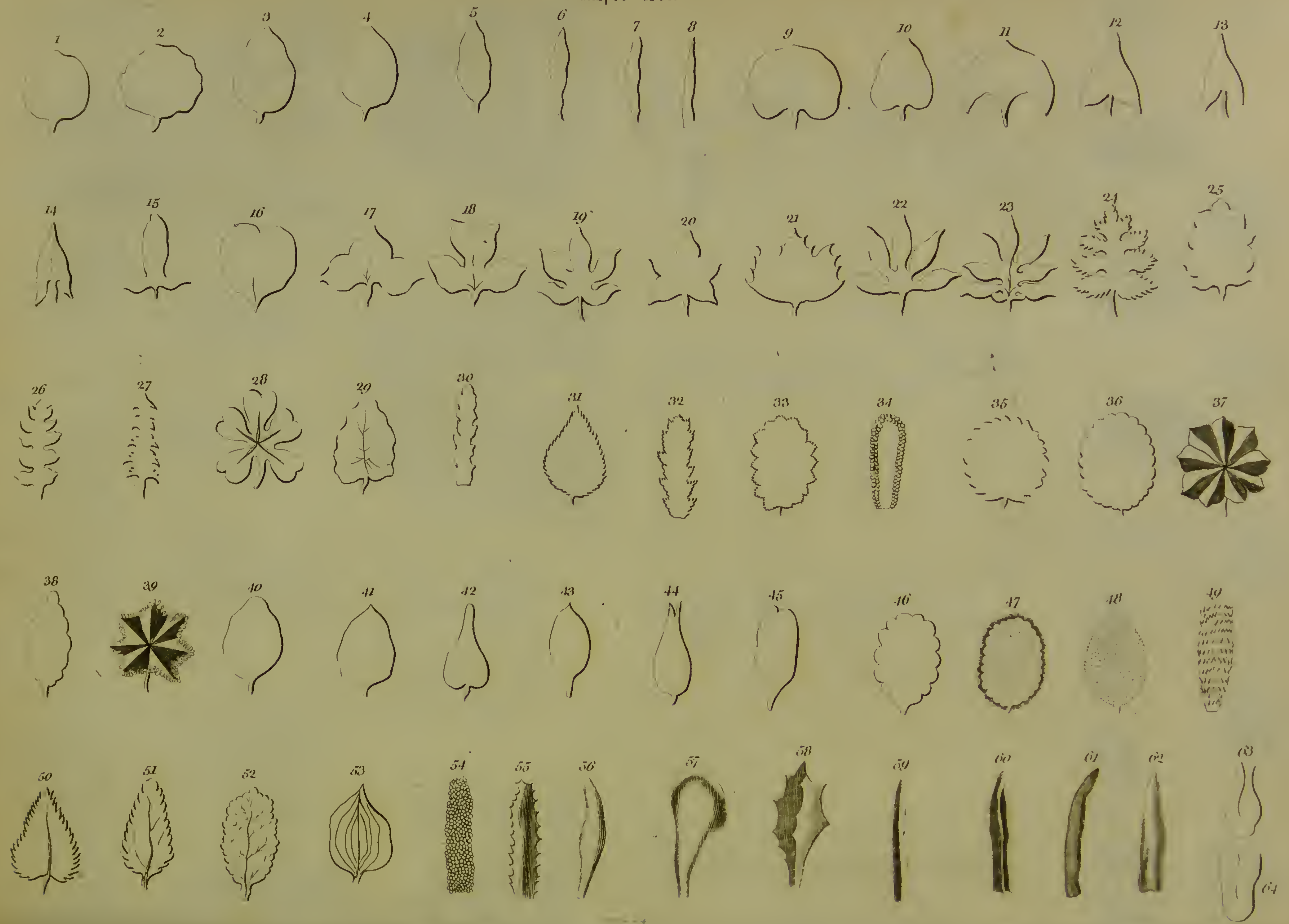
Fig. 1. Convolute. 2. Involute. 3. Revolute. 4. Conduplicate. 5. Equitant. 6. Imbricate. 7. Obvolute. 8. Plicate. 9. Convoluta (more than one leaf convolute). 10. Involute opposite. 11. Involute alternate. 12. Revolute opposite.

BOTANY.

Pl. 53

BOTANY.

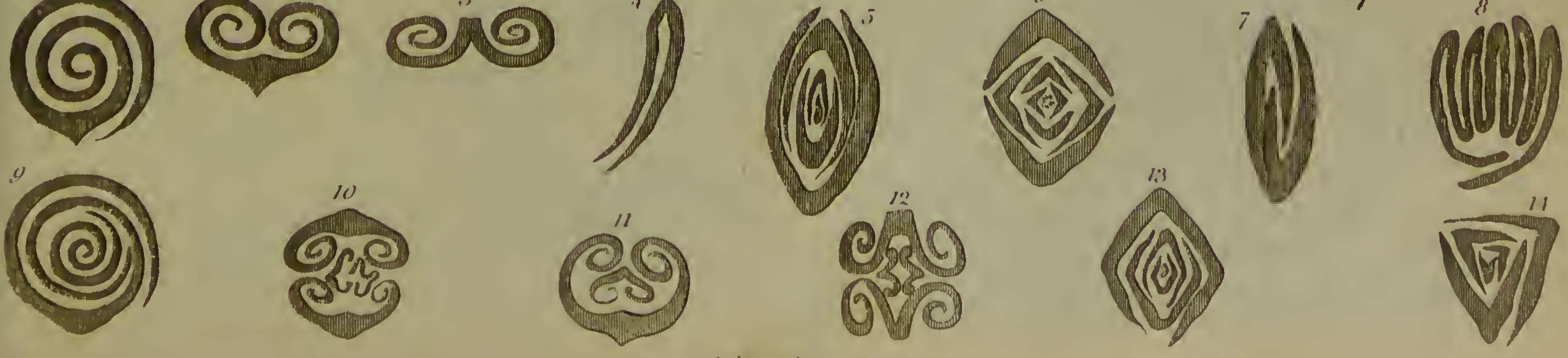
Simple Leaves.



Compound Leaves.

Determinate Leaves.

Foliation.



Barlow sculp.

Miscellaneous.

Parker sculp.

13. Equitant ancipit (with two prominent angles). 14. Equitant triquetrous (forming a triangle).

EXPLANATION of PLATE 56.

Miſcellaneous.

Fig. 1. A Corymbus. 2. An Arillus exemplified in the Fruit of the Euonymus: *a*, the Valvules of the Capſule; *b*, a Seed; *c*, the Arillus opened to diſcover the Seed. 3. A Verticillus. 4. *a*, The Horned Nectaria in *Aconitum*; *b*, two Peduncles or Styles that ſupport them. 5. A paleaceous Receptacle of a compound Flower ſhewn in *Rudbeckia*; *a*, the Paleæ that part the Florets of the Diſk; *b*, the tubuloſe Florets of the Diſk; *c*, the ligulate Corollulæ of the Radius; *d*, a ligulate Corollula fallen off. 6. *a*, A Spatha; *b*, a Spadix. 7. A Racemus. 8. A tubuloſe Floret of a compound Flower. 9. A monopetalous hypocrateriform Corolla: *a*, the Tube; *b*, the Limb. 10. A Nectarium that crowns the Corolla ſhewn in the Cup of a *Narciſſus*; *a*, the Cup or Nectarium. 11. A Spike. 12. A calycine Nectarium ſhewn in the Flower of a *Tropæolum*; *a*, the Nectarium. 13. A Nectarium of ſingular conſtruction ſhewn in a Flower of the *Parnaſſia*; *a*, five heart-ſhaped Nectaria terminated by Styles or Threads, each of which is crowned with a little Ball. 14. A Cyma of the *Lauruſtinus*. 15. A Panicle.

Note. For the terms uſed in theſe explanations, ſee the Gloſſary. The plants added in the plate, are explained under the heads to which they belong.

PART III.

OF THE NATURAL METHOD OF CLASSIFICATION.

NOTWITHSTANDING the evident ſuperiority of the ſexual ſyſtem over all others, Linnæus and moſt other modern botaniſts are of opinion, that there is a *natural method*, or nature's ſyſtem, which we ſhould diligently endeavour to find out. That this ſyſtem, ſay they, is no chimera, as ſome imagine, will appear particularly from hence, that all plants, of what order ſoever, ſhow an affinity to ſome others; and thus, as formerly obſerved, not only the virtues of a great number of ſpecies may be aſcertained, but we may know with certainty how to find a proper ſuccedaneum for plants which cannot eaſily be had.—Linnæus divides vegetables into fifty-eight natural methods, which are numbered in the following way:

1ſt, Palmæ. Theſe are perennial, and moſtly of the ſhrub and tree kind. The ſtem is in height from 2 to 100 feet and upwards; and the roots form a maſs of fibres which are commonly ſimple and without any ramifications. This order includes the following genera: Areca, *the Fauſel-nut*; Boraſſus, *Malabar-palm*, called *Ampana* and *Carim-pana*; Caryota, *Palm with doubly winged leaves*, called *Schunda-pana*; Chamærops, *Leſſer* or *Dwarf palm, palmetto, thatch*; Cocos, *Cocoa-nut tree*; Corypha, *Mountain-palm with largeſt leaves*, called *Codda-pana*; Cycas, *Todda-pana*; Elais; Elate, *wild Malabar-palm*, called *Katou-Indel*; Phœnix, *Date-tree*; Zamia; Hydrocharis, *Frog's-bit*; Stratiotes, *Water-ſoldier*; Valliſneria.

2d, Piperitæ. Theſe plants are moſtly herbaceous and perennial. They conſiſt of pepper, and a few genera which agree with it in habit, ſtructure, and ſenſible qualities, particularly the latter. The genera contained in this order are, Ambroſinia; Arum, *Cuckow-pint*, or *Wake-robin*; Calla, *African Arum*; Dracontium, *Dragons*; Pothos; Zoſtera, *Graſs-wrack*; Acorus, *Sweet-ruſh*, or *Calamus Aromaticus*; Orontium, *Floating Arum*; Piper, *Pepper*; Saururus, *Lizard's-tail.*

3d, Calamariæ, from *calamus* a reed. In this claſs the baſe of the leaf, which embraces the ſtalk like a glove, has no longitudinal aperture. The ſtalk is generally triangular, and without knots. The flowers have no petals. By theſe three particulars this order is eaſily diſtinguiſhed from the family of the graſſes, to which it is nearly allied. The genera contained in this natural order are, Cyperus, *Cypreſs Graſs*; Eriophorum; Schœnus; Scirpus, *Ruſh Graſs*; Carex; Sparganium, *Burr-reed*; Typha, *Cat's-tail*, or *Reed-mace.*

4th, Gramina. This natural order conſiſts of the numerous and natural family of the graſſes, viz. Agroſtis; Aira; Alopecurus, *Fox-tail Graſs*; Anthoxanthum, *Vernal Graſs*; Ariſtida; Arundo, *Reed*; Avena, *Oats*; Bobartia; Briza; Bromus; Cinna; Cornucopiæ, *Horn-of-plenty Graſs*; Cynoſurus; Dactylis; Elymus; Feſtuca, *Feſcue-graſs*; Hordeum, *Barley*; Lagurus, *Hair's-tail Graſs*; Lolium, *Darnel*; Lygeum, *Hooded Matweed*; Melica; Milium, *Millet*; Nardus; Oryza, *Rice*; Panicum, *Panic-graſs*; Paſpalum; Phalaris, *Canary-graſs*; Phleum; Poa; Saccharum, *Sugar-cane*; Secale, *Rye*; Stipa, *Winged Spike-graſs*; Triticum, *Wheat*; Uniola, *Sea-ſide Oats of Carolina*; Coix, *Job's-tears*; Olyra; Pharus; Tripſacum; Zea, *Indian Turkey Wheat*, or *Indian Corn*; Zizania; Ægilops, *Wild Feſcue-graſs*; Andropogon; Apluda; Cenchrus; Holcus, *Indian Millet*; Iſchæmum.

5th, Tripetaloideæ, from *tres* three, and *petalum* a petal. Theſe plants have no very ſtriking characters, and are nearly allied to the graſſes. All the genera of this order, however, are not tripetaloid. The genera are, Aliſma, *Water-plantain*; Aphyllanthes; Butomus, *Flowering-ruſh*, or *Water-gladiolus*; Calamus; Flagellaria; Juncus, *Ruſh*; Sagittaria, *Arrow-head*; Scheuchzeria, *Leſſer Flowering-ruſh*; and Triglochin, *Arrow-headed Graſs.*

6th, Ensatæ, from *enſis*, a ſword; the leaves of plants of this order being ſword-ſhaped. The genera are, Antholyza; Calliſia; Commelina; Crocus, *Saffron*; Eriocaulon; Ferraria; Gladiolus, *Corn-flag*; Iris, *Iris*, or *Flower-de-luce*; Ixia; Moræa; Pontederia; Siſyrinchium; Tradeſcantia, *Virginian Spider-wort*, or *Flower of a Day*; Wachendorffia; Xyris.

7th, Orchideæ. The roots of many of theſe plants are compoſed of one or more fleſhy tubercles or knobs, attached to the lower part of the ſtem, and ſending forth fibres from the top. Thoſe of orchis bear an obvious reſemblance to the ſcrotum in animals; from which circumſtance the genus has derived its name. The genera are, Arethuſa; Cypripedium, *Ladies'-ſlipper*; Epidendrum, *Vanilla*, or *Vanelloe*; Limodorum; Ophrys, *Bee-flower, Bird's-neſt, Twy-blade*; Orchis; Satyrium; Serapias, *Helleborine, or Baſtard-hellebore.*

8th, Scitamineæ, from *ſcitamentum*, a dainty. This claſs conſiſts of beautiful exotic plants, all natives of very warm countries. Some of them furniſh exquiſite fruits; but though the plants riſe very high, they are perennial only by their roots. Thoſe which have only one filament, have in all their parts an aromatic odour, and an acrid or poignant taſte; qualities, however, poſſeſſed in a much greater degree by the roots, which are hot and reſinous. The genera are, Alpinia; Amomum, *Ginger*; Canna, *Indian Flowering-reed*; Coſtus; Curcuma, *Turmerick*; Kæmpferia; Maranta, *Indian Arrow-root*; Muſa, *Banana, Plantain-tree*; Thalia.

9th, Spathaceæ, ſo called becauſe their flowers are protruded from a *ſpatha* or ſheath. They are nearly allied in habit and ſtructure to the liliaceous plants, from which they are chiefly diſtinguiſhed by the ſpatha out of which their flowers are protruded. The genera contained in this order, are, Allium, *Garlick, Onion, &c.* Amaryllis, *Lily-daffodil*; Bul-

bocodium; Colchicum, *Meadow Saffron*; Crinum, *Asphodel-lily*; Galanthus, *Snow-drop*; Gethyllis; Hæmanthus, *Blood-flower*; Leucoium, *Greater Snow-drop*; Narcissus, *Daffodil*; Pancratium, *Sea-daffodil*.

10*th*, CORONARIÆ. These plants are herbaceous, perennial, and from one inch to 15 feet high. The genera included in this natural order are, Albuca, *Bastard Star of Bethlehem*; Cyanella; Fritillaria, *Fritillary*, and *Crown Imperial*; Helonias; Hyacinthus, *Hyacinth*; Hypoxis; Lilium, *Lily*; Melanthium, *Star-flower*; Ornithogalum, *Star of Bethlehem*; Scilla, *Squill*; Tulipa, *Tulip*; Agave, *American Aloe*; Aletris; Aloe, *Aloe*; Anthericum, *Spider-wort*; Asphodelus, *Asphodel*, or *King's-spear*; Bromelia, *Ananas*, or *Pine-apple*; Burmannia; Hemerocallis, *Day Lily*, or *Lily Asphodel*; Polianthes, *Tuberose*; Tillandsia; Veratrum, *White Hellebore*; Yucca, *Adam's Needle*. With respect to the powers of the plants of this order, it may be affirmed in general, that such as have little taste or smell, as the roots of tulip, and star of Bethlehem, are perfectly innocent; whilst those which have a heavy nauseous smell, as squill, hyacinth, crown imperial, and spider-wort, are at least suspicious, and frequently prove noxious.

11*th*, SARMENTOSÆ, from *sarmentum*, a long shoot. This order consists of plants which have climbing stems and branches, like the vine. These plants are far from being a true natural assemblage; in fact they scarce agree in a single circumstance, except that expressed in the title, which is far from being peculiar to this order. The genera are these, Alstromœria; Aristolochia, *Birthwort*; Asarum, *Asarabacca*; Asparagus, *Sparrowgrass*; Centella; Cissampelos; Convallaria, *Lily of the valley*; Cytinus; Dioscorea; Erythronium, *Dog's-tooth Violet*; Gloriosa, *Superb Lily*; Medeola, *Climbing African Asparagus*; Menispermum, *Moon-seed*; Paris, *True-love*, or *One-berry*; Rajania; Ruscus, *Butcher's-broom*, or *Knee-holly*; Smilax, *Rough Bind-weed*; Tamus, *Black Bryony*; Trillium, *Three-leaved Night-shade*, or *Herb True-love of Canada*; Uvularia.

12*th*, HOLERACEÆ, from *holus*, pot-herbs. This order consists of plants which are used for the table, and enter into the œconomy of domestic affairs: it contains trees, shrubs, perennial and annual herbs. The genera contained in this order are, Anabasis, *Berry-bearing Glass-wort*; Anacardium, *Acajou*, or *Cashew-nut*; Atraphaxis; Basella, *Malabar Night-shade*; Beta, *Beet*; Blitum, *Blite*, or *Strawberry Spinach*; Bucida; Calligonum; Callitriche; Camphorosma; Chenopodium, *Goose-foot*, or *Wild Orach*; Coccoloba; Corispermum, *Tickseed*; Heisteria; Herniaria, *Rupture-wort*; Illecebrum, *Mountain Knot-grass*, *Whitlow grass*; Laurus, *Bay*, *Cinnamon*, *Camphire*, *Sassafras*, and *Benjamin-tree*; Mimusops; Petiveria, *Guinea-hen Weed*; Polycnemum; Polygonum, *Knot-grass*, *Bistort*; Rheum, *Rhubarb*; Rhizophora, *Mangrove*, *Kandel of the Indians*; Rivina; Rumex, *Dock*; Salicornia, *Jointed Glass-wort*, or *Salt-wort*; Salsola, *Glass-wort*; Tinus; Winterania; Atriplex, *Orach*; Axyris; Begonia; Ceratocarpus; Nyssa, *the Tupelo-tree*; Spinacia, *Spinach*.

13*th*, SUCCULENTÆ, from *succus*, juice. This order consists of flat, fleshy, and juicy plants, most of them ever-greens. They are astringent, refreshing, and very wholesome. The genera are, Aizoon; Cactus, *Melon-thistle*, *Torch-thistle*, *Indian-fig*; Galenia; Mesembryanthemum, *Fig-marigold*; Neurada; Reaumuria; Tamarix, *Tamarisk*; Tetragonia; Cotyledon, *Navel-wort*; Crassula, *Lesser Orpine*; Penthorum; Rhodiola, *Rose-root*; Sedum, *Lesser House-leek*, *Stone-crop*; Sempervivum, *House-leek*; Septas; Suriana; Tillea, *Small annual House-leek*; Claytonia; Nama; Portulaca, *Purslane*; Sesuvium; Trianthema, *Horse-purslane*; Adoxa, *Tuberous Moschatel*, or *Hollow-root*; Chrysosplenium, *Golden Saxifrage*; Hydrangea; Mitella, *Basta d American Sanicle*; Saxifraga, *Saxifrage*; Tiarella.

14*th*, GRUINALES, from *grus*, a crane. These consist of *geranium*, vulgarly called *crane's-bill*, and a few other genera which Linnæus considers as allied to it in their habit and external structure. This order furnishes both herbaceous and woody plants; and the genera included in it are, Aldrovanda; Averrhoa; Drosera, *Sundew*; Fagonia; Geranium, *Crane's-bill*; Guaicum, *Lignum Vitæ*, or *Pockwood*; Linum, *Flax*; Oxalis, *Wood-sorrel*; Quassia; Tribulus, *Caltrops*; Zygophyllum, *Bean Caper*.

15*th*, INUNDATÆ. The plants of this order are aquatic, of low stature, herbaceous, and mostly perennial. The roots are fibrous. The stem is generally wanting. In its place are an assemblage of leaves, which wrapping or enfolding each other mutually form a sheath; and from the middle of this sheath is produced the foot-stalk of the flower. The leaves are sometimes alternate, sometimes placed in whorls round the stem. The genera are, Ceratophyllum; Elatine; Hippuris; Myriophyllum, *Water Milfoil*; Potamogeton, *Pondweed*; Proserpinaca; Ruppia; Zannichellia, *Triple-headed Pondweed*.

16*th*, CALYCIFLORÆ, from *calyx* the flower-cup, and *flos* the flower; consisting of such plants as have the stamina (the flower) inserted into the calyx. All the plants of this order are of the shrub and tree kind. In this order are only four genera, viz. Elæagnus, *Oleaster*, or *Wild-olive*; Hippophaë, *Bastard-Rhamnus*, or *Sea Buck-thorn*; Osyris, *Poet's-Cassia*; Trophis. The last genus is only to be found in the improved editions of Linnæus.

17*th*, CALYCANTHEMÆ, from *calyx* the flower-cup, and ἀνθος the *flower*; consisting of plants, which, among other characters, have the corolla and stamina inserted in the calyx. This order furnishes trees, shrubs, and annual, biennial, and perennial herbs; but the herbaceous annuals are by much the most numerous. The genera are, Epilobium, *Willow-Herb*, or *French Willow*; Gaura, *Yellow Virginian Loose-strife*; Isnardia; Jussiæa; Ludvigia; Melastoma, *American Gooseberry-tree*; Mentzelia; Oenothera, *Tree Primrose*; Ammannia; Frankenia; Glaux, *Sea Chick-weed*, or *Milk-wort*, and *Black Salt-wort*; Grislea; Lythrum, *Willow-herb*, or *Purple Loose-strife*; Osbeckia; Peplis, *Water Purslane*; Rhexia.

18*th*, BICORNES, from *bis* twice, and *cornu*, a horn; plants whose antheræ have the appearance of two horns. The plants of this order are all of the shrub and tree kind. The genera contained in this natural order are, Blæria; Azalea; *American upright Honey-suckle*; Myrsine, *African Box*; Erica, *Heath*; Vaccinium, *Whortle*, or *Bilberries*; Andromeda; Arbutus, *Strawberry-tree*; Clethra; Epigea, *Trailing Arbutus*; Gaultheria; Kalmia, *Dwarf Laurel of America*; Ledum, *Marsh Cistus*, or *Wild Rosemary*; Pyrola, *Winter-Green*; Rhododendrum, *Dwarf Rose-bay*; Rhodora; Royena, *African Bladder-nut*; Garcinia, *Mangostan*; Halesia; Styrax, *Storax-tree*; Citrus, *Citron*, *Orange*, *Lemon*; Diospyros, *Indian Date Plum*.

The appearance of horned *antheræ*, which has given name to this order, is not very conspicuous, unless in the following genera: Whortle-berries, Heath, Strawberry-tree, Dwarf Rose-bay, and Trailing Arbutus.

19*th*, HESPERIDEÆ, from the *Hesperides*, whose orchards are said to have produced golden apples. The plants of this order are of the shrub and tree kind, and mostly evergreen. It includes the following genera: Caryophyllus, *Clove-tree*; Eugenia; Myrtus, *Myrtle*, and *All-spice* or *Pimento*: Philadelphus; *Mock Orange*, or *Syringa*; Psidium, *Guayava* or *Bay-plum*.

20*th*, ROTACEÆ, from *rota* a wheel, consists of plants with one wheel-shaped petal without a tube. These resemble in quality those of the order of *Preciæ*, to which they are in all respects very nearly allied; but very few of them can be said in strict propriety to possess the character specified in the title. The genera are, Anagallis, *Pimpernel*; Centunculus; Chironia;

Exacum; Gentiana, *Gentian*, or *Fell-wort*; Lyfimachia, *Loofe-ftrife*; Phlox, *Lychnidea*, or *Baftard Lychnis*; Sarothra, *Baftard Gentian*; Swertia; Trientalis, *Winter Green, with Chick-weed Flowers*; Afcyrum, *St. Peter's Wort*; Ciftus, *Rock-rofe*; Hypericum, *St. John's Wort*.

21*ft*, PRECIÆ, from *precius*, early. Thefe confift of primrofe, an early flowering plant, and fome others which agree with it in habit and ftructure, though not always in the character or circumftance expreffed in the title. Thefe plants, which poffefs no ftriking uniform characters, are, in general, innocent in their quality; yet the root of fow-bread is dangerous, if taken internally. The genera are, Androface; Aretia; Cortufa, *Bear's-ear Sanicle*; Cyclamen, *Sow-bread*; Diapenfia; Dodecatheon, *Meadia*; Primula, *Primrofe*, *Auricula*; Soldanella, *Soldanel*; Limofella, *Leaft Water Plantain*; Hottonia, *Water Milfoil*, or *Water-violet*; Menyanthes, *Bog-bean*, or *Marfh-trefoil*; Samolus, *Round-leaved Water Pimpernel*.

22*d*, CARYOPHYLLEÆ. All the plants of this order are herbaceous, and moftly annual. They are innocent in their quality, abound in a watery fort of phlegm, and have bitter feed. The genera are, Agroftemma, *Campion*, or *wild Lychnis*; Cucubalus, *Berry-bearing Chick-weed*; Dianthus, *Clove-July-flower*, or *Carnation-pink*; Drypis; Gypfophila; Lychnis, *Campion*; Saponaria, *Soap-wort*; Silene, *Vifcous Campion*; Velezia; Alfine, *Chick-weed*; Arenaria; Bufonia; Ceraftium, *Moufe-ear Chick-weed*; Cherleria; Glinus; Holofteum; Lœflingia; Mœhringia, *Mountain Chick-weed*; Polycarpon; Sagina; Spergula, *Spurrey*; Stellaria, *Great Chick-weed*; Minuartia; Mollugo; Ortegia; Pharnaceum; Queria.

To this order have been annexed, fomewhat improperly indeed, two other genera, which cannot be arranged under any of the foregoing fections. Thefe are, Polypremum, *Carolina Flax*; Seleranthus, *German Knot-grafs*, or *Knawel*. The former has a calyx of four pieces, and one wheel-fhaped petal; the latter a hollow calyx of one piece, and no petals.

23*d*, TRIHILATÆ, from *tres* three, and *hilum* an external mark on the feed; confifting of plants with three feeds, which are marked diftinctly with an external cicatrix or fcar, where they were faftened within to the fruit. The genera are, Melia, *Bead-tree*; Trichilia; Acer, *Maple*; Æfculus, *Horfe-chefnut*; Banifteria; Malpighia, *Barbadoes-cherry*; Triopteris; Cardiofpermum, *Heart-feed*, or *Heart-pea*; Paullinia; Sapindus, *Soap-berry*; Staphylæa, *Bladder-nut*; and Tropæolum, *Indian Crefs*.

24*th*, CORYDALES, from κορυς a helmet, confifts of plants which have irregular flowers, fomewhat refembling a helmet or hood. Thefe plants are moftly herbaceous and perennial. The genera are, Epimedium, *Barren-wort*; Hypecoum; Leontice, *Lion's-leaf*; Melianthus, *Honey-flower*; Pinguicula, *Butter-wort*, or *Yorkfhire Sanicle*; Utricularia, *Water-milfoil*; Fumaria, *Fumatory*; Impatiens, *Balfam*, or *Female Balfamine*; Monnieria.

25*th*, PUTAMINEÆ, from *putamen* a fhell, confift of a few genera of plants allied in habit, whofe flefhy feed-veffel or fruit is frequently covered with a hard woody fhell. Moft of thefe plants are acrid and penetrating; and yield, by burning, a great quantity of fixed alkali. The names of the genera contained in this order are, Capparis, *Caper-bufh*; Cleome, *Baftard Muftard*; Cratæva, *Garlick-pear*; Crefcentia, *Calabafh-tree*; Marcgravia; Morifonia.

26*th*, MULTISILIQUÆ, from *multus* many, and *filiqua* a pod, confift of plants which have more feed-veffels than one. From the etymology of the term, one would naturally imagine that the feed-veffels in queftion were of that kind called by Linnæus *filiqua*, or pod: but the fact is, that not a fingle plant of this order bears pods; the greater part having many dry capfules, and the remainder being furnifhed properly with no feed-veffel, but bearing numerous diftinct feeds. This order includes the following genera, viz. Aconitum, *Monk's-hood*, *Wolf's-bane*; Aquilegia, *Columbine*; Delphinium, *Lark-fpur*; Pæonia, *Peony*; Dictamnus, *Fraxinella*, *White Dittany*; Peganum, *Wild Syrian Rue*; Ruta, *Rue*; Adonis, *Adonis*, or *Bird's Eye*; Caltha, *Marfh Marigold*; Garidella, *Fennel-flower of Crete*; Helleborus, *Hellebore*; Ifopyrum; Myofurus, *Moufe-tail*; Nigella, *Fennel-flower*, or *Devil in a Bufh*; Ranunculus, *Crowfoot*; Trollius, *Globe-ranunculus*, or *Locker Gowlans*; Actæa, *Herb-chriftopher*, or *Bane Berries*; Anemone, *Wind Flower*, *Anemonie*; Atragene; Clematis, *Virgin's Bower*; Thalictrum, *Meadow-rue*.

27*th*, RHŒADEÆ, confifting of poppy, and a few genera which refemble it in habit and ftructure. Thefe plants, upon being cut, emit plentifully a juice, which is white in poppy, and yellow in the others. With refpect to their virtues, the juice is narcotic, their feeds lefs fo, their roots aperient. Applied externally, they are flightly corrofive. The genera are, Argemone, *Prickly Poppy*; Bocconia; Chelidonium, *Celandine*; Papaver, *Poppy*; Poaophyllum, *Duck's-foot*, or *May Apple*; Sanguinaria, *Puccoon*.

28*th*, LURIDÆ, confift of plants whofe appearance feems to indicate fomething baleful and noxious in their natural quality. Moft of thefe plants are herbaceous and perennial. The genera are, Atropa, *Deadly Night-fhade*; Browallia; Capficum, *Guinea Pepper*; Catefbæa, *Lily-thorn*; Celfia; Ceftrum, *Baftard Jafmine*; Datura, *Thorn-apple*; Digitalis, *Fox-glove*; Ellifia; Hyofcyamus, *Henbane*; Lycium, *Box-thorn*; Nicotiana, *Tobacco*; Pedalium; Phyfalis, *Alkekengi* or *Winter-cherry*; Sefamum, *Oily Purging-grain*; Solanum, *Night-fhade*, *Potatoe*, &c. Strychnus; Verbafcum, *Mullein*.

29*th*, CAMPANACEÆ, from *campana* a bell; plants with bell-fhaped flowers. The plants of this order are herbaceous and perennial, viz. Campanula, *Bell-flower*; Convolvulus, *Bindweed*; Evolvulus; Ipomœa, *Quamoclit*, or *Scarlet Convolvulus*; Phyteuma, *Rampions*; Polemonium, *Greek Valerian*, or *Jacob's Ladder*; Roella; Trachelium, *Blue umbelliferous Throat-wort*; Jafione, *Rampions with fcabious heads*, or *Sheep fcabious*; Lobelia, *Cardinal Flower*; Viola, *Violet*, or *Heart's-eafe*.

30*th*, CONTORTÆ, from *con* together, and *torqueo* to twift, confift of plants which have a fingle petal that is twifted or bent towards one fide. This order furnifhes trees, fhrubs, and fat fucculent plants, fome of which retain their leaves during the winter. The herbaceous vegetables in this order are generally perennial. The genera are, Cerbera; Echites; Gardenia; Genipa; Microcnemum; Nerium, *Oleander*, or *Rofe Bay*; Periploca, *Virginian Silk*; Rauwolfia; Tabernæmontana; Vinca, *Periwinkle*; Apocynum, *Dog's-bane*; Afclepias, Swallow-wort; Cameraria; Ceropegia; Cynanchum; Plumeria, *Red Jafmine*; Stapelia.

The plants of this order, abounding in a milky juice, are moft of them deemed poifonous; repeated obfervations having eftablifhed this aphorifm, That milky plants, except thofe of the plain compound flowers, are generally of a baneful nature.

31*ft*, VEPRECULÆ, from *vepres* a briar or bramble, confift of plants refembling the daphne, dirca, gnidia, &c. but which, however, do not conftitute a true natural affemblage. The genera belonging to this order are, Dais; Daphne, *Mezereon*, or *Spurge-laurel*; Dirca, *Leather-wood*; Gnidia; Lachnæa; Pafferina, *Sparrow-wort*: Quifqualis; Stellera, *German Groundfel*, or *Tragus's Sparrow-wort*; Thefium.

32*d*, PAPILIONACEÆ, plants that have papilionaceous flowers, *i. e.* fomewhat refembling a butterfly in fhape; of which number are all the leguminous plants. The plants of this order are of very different duration; fome of them being herbaceous, and thofe either annual or perennial; others woody vegetables of the fhrub and tree kind, a few of which rife to

the height of 70 feet and upwards. The genera are these, Anagyris, *Stinking Bean Trefoil*; Sophora; Abrus, *Wild Liquorice*; Amorpha, *Bastard Indigo*; Anthyllis, *Kidney-vetch*, or *Ladies-finger*; Arachis, *Earth* or *Ground Nut*; Aspalathus, *African Broom*; Borbonia; Crotalaria, *Rattle-wort*; Ebenus, *Ebony of Crete*; Erythrina, *Coral Tree*; Genista, *Single-seeded broom*; Lupinus, *Lupine*; Nissolia; Ononis, *Anonis*, or *Rest-harrow*; Piscidia, *Dog-wood tree*; Pterocarpus; Spartium, *Broom*; Ulex, *Furze*, *Whins*; Aeschynomene, *Bastard Sensitive plant*; Astragalus, *Liquorice-vetch*, or *Milk-vetch*, *Goat's-thorn*; Biserrula; Cicer, *Chich-pease*; Clitoria; Colutea, *Bladder-sena*; Coronilla, *Jointed, podded Colutea*; Cytisus, *Laburnum*, *Base Tree-trefoil*; Dolichos; Ervum, *Lentils*; Galega, *Goat's-rue*; Geoffræa; Glycine, *Carolina Kidney-bean tree*; Glycyrrhiza, *Liquorice*; Hedysarum, *French Honey-suckle*; Hippocrepis, *Horse-shoe Vetch*; Indigofera, *Indigo*; Lathyrus, *Chichling-vetch*, *Everlasting-pea*; Lotus, *Bird's-foot trefoil*; Medicago, *Snail and Moon trefoil, Lucerne*; Ornithopus, *Bird's-foot*; Orobus, *Bitter Vetch*; Phaca, *Bastard Milk-vetch*; Phaseolus, *Kidney-bean*, or *French-bean*; Pisum, *Pea*; Psoralea; Robinia, *False Acacia*; Scorpiurus, *Caterpillar*; Trifolium, *Trefoil*; Trigonella, *Fenugreek*; and Vicia, *Vetch*, *Bean*.

33d, Lomentaceæ, from *lomentum*, a colour used by painters. Many of these plants furnish beautiful tinctures, and some of them are much used in dyeing. They very much resemble the last order. The genera are, Adenanthera, *Bastard Flower-fence*; Bauhinia, *Mountain-ebony*; Cæsalpina, *Brasiletto*; Cassia, *Wild Sena*; Ceratonia, *Carob-tree*, or *St. John's Bread*; Cercis, *Judas-tree*; Gleditsia, *Honey-locust*, or *triple-thorned Acacia*; Guilandina, *Bonduc*, or *Nickar-tree*; Hæmatoxylon, *Logwood*; Hymenæa, *Locust-tree*, or *Courbaril*; Mimosa, *Sensitive plant*, *Acacia*, &c. Parkinsonia; Poinciana, *Barbadoes Flower-fence*, or *Spanish Carnation*; and Polygala, *Milk-wort*.

34th, Cucurbitaceæ, from *cucurbita* a gourd, consist of plants which resemble the gourd in external figure, habit, virtues, and sensible qualities. The plants of this order, which generally climb, and have long diffused branches, are mostly herbaceous and perennial. The genera are, Gronovia; Melothria, *Small creeping Cucumber*; Passiflora, *Passion-flower*; Anguria *Jacquin*; Bryonia, *Bryony*; Cucumis, *Cucumber*, *Melon*; Cucurbita, *Gourd*, *Pumpion*; Elaterium *Jacquin*; Fevillea; Momordica, *Male Balsam-apple*; Sicyos, *Single-seeded Cucumber*; and Trichosanthes, *Serpent Cucumber*.

35th, Senticosæ, from *sentis* a briar or bramble, consist of the rose, bramble, and other plants which resemble them in port and external structure. The genera are, Agrimonia, *Agrimony*; Alchimilla; *Ladies-mantle*; Aphanes, *Percepier*; Comarum, *Marsh Cinquefoil*; Dryas; Fragaria, *Strawberry*; Geum, *Avens, or Herb-bennet*; Potentilla, *Cinquefoil*; Rosa, *Rose*; Rubus, *Raspberry*, *Bramble*; Sibbaldia; and Tormentilla, *Tormentil*.

These plants are very nearly allied in form, habit, and structure, to those of the natural order *Pomaceæ*.

36th, Pomaceæ, from *pomum* an apple, consist of those which have a pulpy esculent fruit, of the apple, berry, or cherry kind. The plants of this order, which furnish many of our most esteemed fruits, are mostly of the shrub and tree kind. The genera are named thus: Cratægus, *Wild Service Thorn*; Mespilus, *Medlar*; Pyrus, *Apple*, *Pear*; Ribes, *Currant-tree*; Sorbus, *Service-tree*; Spiræa, *Spiræa Frutex*, *Spiked Willow*, *Drop-wort*; Punica, *Pomegranate*; Amygdalus, *Almond-tree*, *Peach*; Chrysobalanus, *Cocoa-plum*; and Prunus, *Plum*, *Apricot*, *Cherry*.

37th, Columniferæ, from *columna* a pillar, and *fero* to bear, consist of plants whose stamina and pistil have the appearance of a column pillar in the centre of the flower. This order furnishes a choice collection of herbs both annual and perennial, shrubs, and trees. These are very different in size and height, from the creeping mallows, and low shrubby tea-tree, to the fleshy limes, and the more lofty silk-cotton-trees, which by some modern writers are affirmed to be so large as not to be fathomed by 16 men, and so tall that an arrow cannot reach their top. The genera are the following: Bixa, *Arnotta*, or *Anotta*; by the French, *Roucou*: Corchorus, *Jew's-Mallow*; Heliocarpus, *Tree Montia*; Kiggelaria; Microcos; Muntingia; Thea, *Tea-tree*; Tilia, *Lime*, or *Linden-tree*; Turnera; Triumfetta; Ayenia; Grevia; Helicteres, *Screw-tree*; Kleinhovia; Adansonia, *Æthiopian Sourgourd*, or *African Calabash-tree*; Alcea, *Holly-hock*, or *Rose-mallow*; Althæa, *Marsh-mallow*; Bombax, *Silk-cotton-tree*; Camellia; Gossypium, *Cotton*; Hermannia; Hibiscus, *Althæa Frutex*, or *Syrian Mallow*; Lavatera, *Sea Tree-mallow*; Malope, *Bastard Mallow*; Malva, *Mallow*; Melochia; Napæa; Pentapetes; Sida, *Indian Mallow*; Stewartia; Theobroma, *Chocolate-nut, or Bastard Cedar of Jamaica*; Urena; Waltheria.

38th, Tricoccæ, from τρεις *three*, and κοκκος a *grain*; consisting of plants with a single three-cornered capsule, having three cells or internal divisions, each containing a single seed. The single seed-vessel of these plants is of a singular form, and resembles three capsules, which adhere to one common foot-stalk as a centre, but are divided externally into three pretty deep partitions. The genera are, Acalypha; Adelia; Andrachne, *Bastard-orpine*; Buxus, *Box*; Cambogia; Carica, *Papaw*; Cliffortia; Clutia; Cneorum, *Widow-wail*; Croton, *Bastard Ricinus*; Cupania; Dalechampia; Euphorbia, *Burning-thorny-plant*, *Spurge*; Excœcaria; Guettarda; Hernandia, *Jack-in-a-box*; Hippomane, *Manchineel-tree*; Hura, *Sand-box-tree*; Jatropha, *Cassava*, *Manihot*; Mercurialis, *Mercury*; Phyllanthus, *Sea-side Laurel*; Plukenetia; Ricinus, *Palma-christi*; Solandra; Sterculia; Tragia; Triallis.

This family is not completely natural: yet the title is a striking one; and though the plants which possess it are not connected by such numerous relations as to form a true natural assemblage, yet they are by that circumstance distinguished from all other plants with great facility. All the genera of this order have not the striking character just mentioned.

39th, Siliquosæ, from *siliqua* a pod, consist of plants which have a pod for their seed-vessel. This order chiefly furnishes biennial and perennial herbs of an irregular figure. The genera are these, Arabis, *Bastard Tower Mustard*; Brassica, *Cabbage*, *Turnep*, *Rape*; Bunias; Cardamine, *Ladies-smock*; Cheiranthus, *Stock*, *Wall-flower*; Crambe, *Sea Cabbage*; Dentaria, *Tooth-wort*; *Erysimum*, Hedge-mustard; Heliophila; Hesperis, *Rocket*, *Queen's July-flower*, or *Dame's Violet*; Isatis, *Woad*; Raphanus, *Radish*; Ricotia; Sinapis, *Mustard*; Sisymbrium, *Water-cresses*; Turritis, *Tower-mustard*; Alyssum, *Mad-wort*; Anastatica, *Rose of Jericho*; Biscutella, *Buckler-mustard*; Clypeola, *Treacle-mustard*; Cochlearia, *Scurvy-grass*, or *Spoon-wort*; Draba; Iberis, *Candy-tuft*, or *Sciatica-cress*; Lepidium, *Dittander* or *Pepper-wort*; Lunaria, *Sattin-flower*, *Honesty*, or *Moon-wort*; Myagrum, *Gold of Pleasure*; Peltaria; Subularia, *Rough-leaved Alysson*; Thlaspi, *Mithridate-mustard*, *Shepherd's-purse*; Vella, *Spanish-cress*.

40th, Personatæ, from *persona*, a masque, consist of plants whose flowers are furnished with an irregular, gaping, or grinning petal, in figure somewhat resembling the snout of an animal. This order furnishes both herbaceous and woody vegetables of the shrub and tree kind. The genera are, Collinsonia; Dianthera; Gratiola, *Hedge-hyssop*; Justicia; Scoparia; Verbena, *Vervain*; Veronica, *Speedwell*; Acanthus, *Bear's-breech*; Antirrhinum, *Calves-snout*, *Toad's-flax*, *Snap-dragon*; Avicennia; Barleria; Bartsia; Besleria; Bignonia, *Trumpet-flower*; Bontia; Buchnera; Capraria, *Sweet-weed*; Chelone; Ci-

tharexylon, *Fiddle-wood*; Clerodendrum; Columnea; Cornutia; Craniolaria; Cymbaria; Dodartia; Duranta; Erinus; Euphraſia, *Eye-bright*; Gerardia; Geſneria; Gmelina; Halleria *African Fly*, or *Honey-ſuckle*; Lantana, *American Viburnum*; Lathræa; Manulea; Martynia; Melampyrum, *Cow-wheat*; Mimulus; Obolaria; Orobanche, *Broom-rape*; Ovieda; Pedicularis, *Rattle Coxcomb*, or *Louſe-wort*; Petrea; Phryma; Rhinanthus, *Elephant's-head*; Ruellia; Schwalbea; Scrophularia, *Fig-wort*; Stemodia; Torenia; Tozzia; Vandellia; Vitex, *Agnus Caſtus*, or *Chaſte-tree*; Volkameria.

41*ſt*, Asperifoliæ, rough-leafed plants, viz. Anchuſa, *Bugloſs*; Aſperugo, *Small wild Bugloſs*, or *Great Gooſe Graſs*; Borrago, *Borrage*; Cynogloſſum, *Hound's Tongue*, *Venus's Navel-wort*, or *Lawn*; Echium, *Viper's Bugloſs*; Heliotropium, *Turnſole*; Lithoſpermum, *Gromwell*, or *Graymill*; Lycopſis; Myoſotis, *Mouſe-ear Scorpion-graſs*; Onoſma; Pulmonaria, *Lungwort*, or *Sage of Jeruſalem*; Symphytum, *Comfrey*; Cerinthe, *Honey-wort*; Nolana; Cordia, *Sebeſten*; Varronia; Tournefortia; Ehretia; Patagonula. The greater part of theſe are herbaceous and perennial.

42*d*, Verticillatæ, conſiſt of herbaceous vegetables, having four naked ſeeds, and the flowers placed in whorls round the ſtalk. The genera are, Ajuga, *Bugle*; Amethyſtea; Ballotta, *Black Hore-hound*; Betonica, *Betony*; Cleonia; Clenopodium, *Field-baſil*; Cunila; Dracocephalum, *Dragon's-head*; Galeopſis, *Hedge-nettle*; Glechoma, *Ground-ivy*; Horminum, *Pyrenæan Clary*; Hyſſopus, *Hyſſop*; Lamium, *Dead-nettle*; Lavandula, *Lavender*; Leonurus, *Lion's-tail*; Lycopus, *Water Hore-hound*; Marrubium, *Hore-hound*; Meliſſa, *Baulm*; Melittis, *Baſtard Baulm*; Mentha, *Mint*; Moluccella, *Molucca Baulm*; Monarda; Nepeta, *Cat-mint*, or *Nep*; Ocymum, *Baſil*; Origanum, *Marjoram*; Orvala; Phlomis, *Sage-tree*, or *Jeruſalem-ſage*; Praſium, *Shrubby Hedge-nettle*; Prunella, *Self-heal*; Roſmarinus, *Roſemary*; Salvia, *Sage*; Satureia, *Savory*; Scutellaria, *Skull-cap*; Sideritis, *Iron-wort*; Stachys, *Baſe Hore-hound*; Teucrium, *Germander*; Thymbra, *Mountain-hyſſop*; Thymus, *Thyme*; Trichoſtema; and Ziziphora, *Syrian Field baſil*. The plants of this order are fragrant, warm, and penetrating, and their chief virtue reſides in the leaves.

43*d*, Dumosæ, from *dumus* a buſh, conſiſt of a number of ſhrubby plants, which are thick ſet with irregular branches, and buſhy. The plants of this order are all of the ſhrub and tree kind, thick and buſhy, riſing from 6 to 40 feet high. The genera are, Achras, *Sapota*; Caſſine, *Caſſioberry-buſh*, and *South-Sea* or *Paraguay Tea*; Ceanothus, *New-Jerſey Tea*; Celaſtrus, *Staff-tree*; Chryſophyllum, *Star-apple*, and *Damſon-tree*; Fagara; Ilex, *Holly*; Phylica, *Baſtard Alaternus*; Prinos, *Winter-berry*; Rhamnus, *Buckthorn*, *Alaternus*, *Jujube-tree*; Rhus, *Sumach*, *Poiſon-tree*; Schinus, *Indian Maſtick*; Sideroxylon, *Iron-wood*; Callicarpa, *Johnſonia*; Euonymus, *Spindle-tree*; Sambucus, *Elder*; Tomex; Viburnum, *Pliant Mealy-tree*, or *Way-faring Tree*, *Lauruſtinus* and *Gulder-roſe*. The berries, bark, and flowers of many of theſe plants are purgative.

44*th*, Sepiariæ, from *ſepes* a hedge; conſiſt of a beautiful collection of woody plants, ſome of which, from their ſize, elegance, and other circumſtances, are very proper to adorn hedges. The genera are, Chionanthus, *Snow-drop Tree*, or *Fringe-tree*; Fraxinus, *Aſh-tree*; Jaſminum, *Jeſſamy*; Liguſtrum, *Privet*; Nyctanthes, *Arabian Jaſmine*; Olea, *Olive*; Phillyrea, *Mock Privet*; Syringa, *Lilac*.

This order furniſhes woody plants both of the ſhrub and tree kind, moſt of which do not drop their leaves till nearly the time when the new leaves begin to appear.

45*th*, Umbellatæ, from *umbella* an umbel, conſiſt of plants whoſe flowers grow in umbels, with five petals that are often unequal, and two naked ſeeds that are joined at top and ſeparated below. Theſe plants are herbaceous, and chiefly perennial. The genera are, Ægopodium, *Herb-gerard*, *Gout-wort*, or *Wild Angelica*; Æthuſa, *Leſſer Hemlock*, or *Fool's Parſley*; Ammi, *Biſhop's-weed*; Anethum, *Dill*, *Fennel*; Angelica; Apium, *Parſley*: Arctopus; Artedia; Aſtrantia, *Black Maſter-wort*; Athamanta, *Spignel*; Bubon, *Macedonian Parſley*; Bunium, *Pig-nut*, or *Earth-nut*; Bupleurum, *Hare's Ear*; Cachrys; Carum, *Cari*, or *Caraway*; Caucalis, *Baſtard Parſley*; Chærophyllum, *Chervil*; Cicuta, *Water-hemlock*; Conium, *Hemlock*; Coriandrum, *Coriander*; Crithmum, *Samphire*; Cuminum, *Cumin*; Daucus, *Carrot*; Echinophora, *Prickly-Parſnep*; Eryngium, *Eryngo*; Ferula, *Fennel-giant*; Haſſelquiſtia; Heracleum, *Cow-parſnep*; Hydrocotyle, *Water Navel-wort*; Imperatoria, *Maſter-wort*; Laſerpitium, *Laſerwort*; Liguſticum, *Lovage*; Oenanthe, *Water Drop-wort*; Paſtinaca, *Parſnep*; Peucedanum; *Hog's-fennel*, or *Sulphur-wort*; Phellandrium; Pimpinella, *Burnet-ſaxifrage*; Sanicula, *Sanicle*; Scandix. *Shepherd's-needle*, or *Venus's Comb*; Selinum, *Milk-parſley*; Seſeli, *Hart-wort of Marſeilles*; Sium, *Water-parſnep*; Siſon, *Baſtard-ſtone-parſley*; Smyrnium, *Alexanders*; Thapſia, *Deadly-carrot*, or *Scorching-fennel*; Tordylium, *Hart-wort of Crete*.

46*th*, Hederaceæ, from *hedera* ivy; conſiſts of ivy and a few other genera that ſeem nearly allied to it. This order furniſhes both herbaceous and ſhrubby plants; and its genera are, Aralia, *Berry-bearing Angelica*; Ciſſus, *Wild Grape*; Hedera, *Ivy*; Panax, *Ginſeng*; Vitis, *Vine*; Zanthoxylum, *Tooth-ach-tree*.

47*th*, Stellatæ, from *ſtella* a ſtar; conſiſts of plants with two naked ſeeds, and leaves diſpoſed round the ſtem in form of a ſtar. The genera are, Anthoſpermum, *Amber-tree*; Aſperula, *Woodroof*; Crucianella, *Petty Madder*; Diodia; Galium, *Ladies Bedſtraw*, or *Cheeſe-rennet*: Hedyotis; Knoxia; Lippia; Phyllis, *Baſtard Hare's-ear*; Richardia; Rubia, *Madder*; Sherardia, *Little Field-madder*; Spermacoce, *Button-weed*; Valantia, *Croſs-wort*; Houſtonia; Oldenlandia; Ophiorrhiza; Spigelia, *Worm-graſs*; Coffea, *Coffee-tree*; Cornus, *Dogwood*, or *Cornelian Cherry*; Ixora; Pavetta; *and* Pſychotria. This order contains herbs, ſhrubs, and trees.

48*th*, Aggregatæ, from *aggregare*, to aſſemble or collect, comprehends thoſe plants which have aggregate flowers, conſiſting of a number of florets or ſmall flowers, each of which have a proper and common calyx. The genera are, Statica; Hartogia; Brunia; Protea; Globularia; Leucadendron; Hebenſtretia; Selego; Cephalanthus; Dipſacus; Scabioſa; Knautia; Allionia; Valeriana; Morina; Boerhavia; Circæa; Lonicera; Chiococca; Trioſteum; Mitchella; Linnæa; Morinda; Conocarpus; Loranthus; Viſcum.

49*th*, Compositæ, conſiſts of plants with compound flowers. In this order Linnæus has conſtructed his firſt or primary diviſions from the different ſexes of the florets, which he terms *polygamy*; the ſubaltern diviſions are conſtructed from the figure of the petals, the diſpoſition of the flowers, the pappus or crown of the ſeed, the common receptacle, and other circumſtances which characterize the ſubaltern diviſions in other authors. The genera are, Gundelia; Echinops; Sphæranthus; Arctium; Serratula; Carduus; Onopordum; Cynara; Carlina; Gorteria; Atractylis; Carthamus; Centaurea; Elephantopus; Scolymus; Cichorium; Catananche: Lapſana; Hypochœris; Seriola; Hyoſeris; Andryala: Crepis; Hieracium; Leontodon; Prenanthes; Chondrilla; Lactuca; Sonchus; Picris; Scorzonera; Tragopogon; Geropogon; Gnaphalium; Xeranthemum; Stæhelina: Tanacetum: Matricaria; Carpeſium; Chryſanthemum; Pteronia; Baccharis; Oſmites; Conyza; Inula; Erigeron: Cineraria; Tuſſilago; Doronicum: Arnica; Senecio; Solidago: Chryſocoma; Aſter; Leyſera; Santolina; Anthemis; Anacyclus; Cotula; Athanaſia: Achillea; Cacalia; Perdicium: Bellis: Ageratum; Eupatorium; Ethulia; Kuhnia: Corymbium; Helenium; Othonna; Ca-

lendula; Arctotis; Osteospermum; Bidens; Verbesina; Sigesbeckia; Coreopsis; Silphium; Tetragonotheca; Polymnia; Helianthus; Rudbeckia; Milleria; Buphthalmum; Chrysogonum; Melampodium; Tridax; Pectis; Tagetes; Zinnia; Calea; Amellus; Stoebe; Tarchonanthus; Artemisia; Seriphium; Eriocephalus; Filago; Micropus; Iva; Parthenium; Ambrosia; Xanthium; Strumpsia.

50*th*, AMENTACEÆ, from *amentum* a catkin; plants bearing catkins; as Salix; Populus; Platanus; Sloanea; Fagus; Juglans; Quercus; Corylus; Carpinus; Betula; Myrica; Pistacia; Cynomorium.

51*st*, CONIFERÆ, from *conus* a cone, and *fero* to bear, consists of plants, whose female flowers, placed at a distance from the male, either on the same or distinct roots, are formed into a cone. In this character, the only one expressed in the title, the plants in question seem to be nearly allied to the family of mosses: from which, however, they are easily distinguished by their habit, as well as by the structure of the small flowers, in which the stamina are united below into a cylinder, and distinct at top. The plants of this order are mostly of the shrub and tree kind, and retain their leaves all the year. The form of these plants is generally conic, and extremely beautiful, from the disposition of the branches, which cover the stems even to the roots, extending themselves horizontally and circularly like so many rays. The height of some genera of this order does not exceed half a foot, that of others approaches to a hundred. The genera are, Cupressus, *Cypress*; Ephedra, *Shrubby Horse-tail*; Equisetus, *Horse-tail*; Juniperus, *Juniper*; Pinus, *Fir, Pine, Cedar, Larch*; Taxus, *Yew-tree*; Thuja, *Arbor Vitæ*.

52*d*, COADUNATÆ, from *coadunare*, to join or gather together; so termed from the general appearance of the seed-vessels, which are numerous, and being slightly attached below, form all together a single fruit in the shape of a sphere or cone; the parts of which, however, are easily separated from one another. This order, which consists of exotic plants, furnishes a beautiful and choice collection of shrubs and trees, both evergreen and deciduous. The genera are, Annona, *the Custard Apple*; Liriodendron, *the Tulip Tree*; Magnolia, *Laurel-leaved Tulip Tree*; Michelia; Uvaria; Xylopia. The plants of this order have a strong, agreeable, and aromatic smell: the fruits and seeds have a pungent taste like pepper: the bark and wood are bitter.

53*d*, SCABRIDÆ, from *scaber*, rough, rugged, or bristly, consists of plants with rough leaves. There seems to be some impropriety in characterizing these plants by a name expressive of the roughness of their leaves, as that circumstance had previously furnished the classic character of the *Asperifoliæ*. The degree of roughness, however, is much greater in the plants which make the subject of the present article. The plants of this order are in general of an astringent nature; their taste is bitter and styptic. The genera are, Acnida; Bosea, *Yervamora*, or *Golden Rod Tree*; Cannabis, *Hemp*; Cecropia; Celtis, *Nettle-tree*; Dorstenia, *Contrayerva*; Ficus, *Fig*; Humulus, *Hop*; Morus, *Mulberry-tree*; Parietaria, *Pellitory*; Theligonum, *Dog's-cabbage*; Ulmus, *Elm-tree*; Urtica, *Nettle*.

54*th*, MISCELLANEÆ, miscellaneous plants. This order consists of such genera as are not connected together by very numerous relations. They are, Datisca, *Bastard-hemp*; Reseda, *Bastard-rocket*, *Dyer's-weed*; Poterium, *Garden-burnet*; Sanguisorba, *Greater Wild-burnet*; Lemna, *Duck-meat*; Pistia, *Kodda-pail*; Coriaria, *Myrtle-leaved Sumach*; Empetrum, *Black-berried Heath*, or *Crow-berries*; Achyranthes, *Caddlari*; Amaranthus, *Amaranth*, or *Flower-gentle*; Celosia, *Cock's-comb*; Gomphrena, *Globe-amaranth*; Iresine; Phytolacca, *American Night-shade*; Nymphæa, *Water-lily*; Sarracenia, *Side-saddle Flower*; Cedrela; Swietenia, *Mahogany*; Corrigiola; Limeum; Telephium, *True Orpine*.

55*th*, FILICES, ferns; consists of plants which bear their flower and fruit on the back of the leaf or stalk. These plants, in figure, approach the more perfect vegetables; being furnished, like them, with roots and leaves. The genera are, Acrostichum; Adianthum, *Maiden-hair*; Asplenium, *Spleen-wort*, or *Milt-waste*; Blechnum; Hemionitis, *Mules-fern*; Isoetes; Lonchitis, *Rough Spleen-wort*; Polypodium, *Polypody*; Pteris, *Brakes*, or *Female Fern*; Trichomanes; Marsilea; Onoclea; Ophioglossum, *Adder's-tongue*; Osmunda, *Osmund-royal*, or *Flowering Fern*; Pilularia, *Pepper-grass*. Most of the ferns have a heavy disagreeable smell.

56*th*, MUSCI, *mosses*. These plants resemble the pines, firs, and other evergreens of that class, in the form and disposition of their leaves, and manner of growth of the female flowers, which are generally formed into a cone. They frequently creep, and extend themselves like a carpet upon the ground, trees, and stones, being generally collected into bunches and tufts: the smallest are only one third of an inch in height, and the largest do not exceed five or six. The genera are these: Bryum; Buxbaumia; Fontinalis, *Water-moss*; Hypnum; Lycopodium; Mnium; Phascum; Polytrichum, *Golden Maiden-hair*; Porella; Sphagnum; Splachnum.

The mosses in general are almost tasteless, have few juices, and being once dried do not readily imbibe moisture from the air. Those which grow in water, being thrown into the fire, grow red, and are reduced to ashes without receiving or communicating any flame. They are all of wonderful efficacy in preserving dry such bodies as are susceptible of moisture; and in retaining, for a long time, the humidity of young plants without exposing them to putrefaction. For this reason, such plants as are to be sent to any considerable distance, are generally wrapped up in them.

57*th*, ALGÆ, *flags*. This order consists of plants whose root, leaf, and stem, are all one. Under this description are comprehended all the sea-weeds, and some other aquatic plants: The genera have not been accurately enumerated.

58*th*, FUNGI, *mushrooms*. These plants are rarely branched, sometimes creeping, but most commonly erect. Such as are furnished with branches have them of a light spongy substance like cork. Mushrooms differ from the fuci, in that those which, like the fuci, have their seeds contained in capsules, are not branched, as that numerous class of sea weeds are. The greatest part of mushrooms have no root; some, instead of roots, have a number of fibres, which, by their inosculations, frequently form a net with unequal meshes, some of which produce plants similar to their parent vegetable. The stamina in these plants are still undetermined. The genera of this order are Agaricus, *Agaric*; Boletus; Byssus; Clathrus; Clavaria; Elvela; Hydnum; Lycoperdon; Mucor; Peziza, *Cup-mushroom*; Phallus, *Stinkhorns*. As a vegetable food, they are at best suspicious; and some of them are certainly poisonous.

Under the name *Dubii ordinis* Linnæus classes all the other genera which cannot be reduced to any of the abovementioned orders, and which are near 120 in number, as may be seen by referring to his *Fragmenta Methodi Naturalis*. In his *Philosophia Botanica* he has made a general division of Vegetables according to their natural order, into the seven families or tribes following, viz.

1. FUNGI, Mushrooms.
2. ALGÆ, Flags; whose root, leaf, and stem are all one.
3. MUSCI, Mosses; whose antheræ have no filaments, and are placed at a distance from the female flower, and whose seeds also want their proper tunic and cotyledons.
4. FILICES, Ferns; whose fructification is on the back of the frondes.

5. Gramina, Graffes; which have fimple leaves, a jointed culm or ftem, a glumofe calyx, and a fingle feed.

6. Palmæ, palms; which have fimple ftems that are frondofe at the fummit, and have their fructification on a fpadix iffuing from a fpatha.

7. Plants, which include all that do not enter into any of the other divifions. Thefe are,

Herbaceous, when they die down to the root every year; for in the perennial kinds, the buds are all produced on the root below the furface of the ground.

Shrubs, when their ftems come up without buds. And *Trees*, when their ftems come up with buds.

Having thus enumerated the different orders, &c. into which Linnæus has divided the vegetable kingdom, we here annex a Gloffary, which will enable the reader of any botanical work to inform himfelf of the meaning of any technical term he may happen to meet with.

GLOSSARY of BOTANICAL TERMS.

A

Abbreviatum *perianthium*, fhortened, when the cup is fhorter than the tube of the flower.

Abortiens *flos*, barren flowers, fuch as produce no fruit.

Abruptum *folium pinnatum*, winged leaves, ending without either foliole or cirrhus.

Acaulis, without ftalk or ftem.

Acerofum *folium*, chaffy leaves, when they are linear and abiding, as in pinus, abies, and juniperus.

Acicularis, needle-fhaped, as in fcirpus acicularis.

Acinaciforme, falchion or fcimitar-fhaped, as in mefembryanthemum acinaciforme.

Acini, the fmall berries which compofe the fruit of a mulberry or bramble.

Acotyledones, plants, whofe feeds have no cotyledons or feminal leaves.

Aculei, prickles, fixed in the rind or furface of the bark.

Aculeatus *caulis*, a ftalk or ftem furnifhed with prickles.

Acuminatum *folium*, a leaf ending in a point.

Acutum *folium*, leaves terminating in an acute angle.

Adnatum *folium*, the difk of the leaf preffing clofe to the ftem of the plant.

Adpreffa *folia*, the difk of the leaf preffed towards the ftem.

Adfcendens *caulis*, a ftalk or branch inclining upwards.

Adverfum *folium*, when the fides of the leaf are turned towards the fouth.

Aggregatus *flos*, an affemblage of flowers coming in clufters.

Aggregatus, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Ala, a wing, the fide petals of a papilionaceous bloffom, or a membrane added to a feed, ftalk, &c.

Alatus *petiolus*, when the foot-ftalk of a leaf is winged with membranes.

Alburnum, the white fubftance that lies between the inner bark and the wood of trees.

Algæ, flags, one of the feven families of plants.

Alterni rami *folia*, when they come out fingly, and follow in gradual order.

Amentaceæ, an order of plants in the Fragmenta methodi naturalis of Linnæus, bearing catkins.

Amentum, a catkin.

Amplexicaule *folium*, embracing the ftalk when the bafe of the leaf embraces the ftem fideways.

Anceps *caulis*, double-edged, when a ftalk is compreffed, and forms two oppofite acute angles.

Androgyna, plants bearing male and female flowers on the fame root.

Angulatus *caulis*, angulated ftalk.

Anguftifolia, narrow-leaved.

Angiofpermia, the fecond order in the clafs didynamia of Linnæus; containing plants whofe feeds are covered with a capfule.

Annua *radix*, an annual root; that which lives but one year.

Anthera, the fummit of the ftamen bearing the pollen: it is a principal part of the male organ of generation.

Apertura, an aperture, opening in fome fpecies of anthera.

Apetalus *flos*, having no petals or corolla.

Apex, the top or fummit.

Aphyllus *caulis*, deftitute of leaves.

Apophyfis, an excrefcence from the receptacle of the mufci.

Appendiculatus *petiolus*, a little appendage hanging from the extremity of the foot-ftalk.

Approximata *folia*, leaves growing near each other.

Arbor, a tree.

Arbuftiva, a copfe of fhrubs or trees, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Arcuatum *legumen*, arched, a pod that is curved or bent.

Arillus, the proper exterior coat of a feed that falls off fpontaneoufly.

Arifta, the beard of corn or graffes.

Arma, arms, weapons, one of the feven kinds of fulcra of plants.

Articulatus *caulis*, culmus, having knots or joints.

Articulus *culmi*, the ftraight part of the ftalk between the two joints.

Afperifolia, rough-leaved plants, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Affurgentia *folia*, firft bent down, but rifing erect towards the apex.

Attenuatus *pedunculus*, when the foot-ftalk grows fmaller towards the flower.

Auctus *calyx*, augmented, having a feries of diftinct leaves, fhorter than its own, that furround its bafe.

Avenia *folia*, leaves which have no vifible veins.

Auriculatum *folium*, an ear-fhaped leaf, when the leaf towards the bafe has a lob on each fide.

Axillaria *folia*, growing out of the angles formed by the branches and the ftem.

B

Bacca, a berry; or a pulpy pericarpium without valves, in which the feeds are naked.

Barba, a beard, a fpecies of pubefcence, fometimes on the leaves of plants, as on the mefembryanthemum barbatum.

Barbatum *folium*, when a bunch of ftrong hairs terminate the leaves.

Bicornes, plants, whofe antheræ have the appearance of two horns. Likewife an order of plants in the Fragmenta methodi naturalis of Linnæus.

Biennis *radix*, a root which continues to vegetate two years.

Bifaria *folia*, a leaf pointing two ways.

Biferæ *plantæ*, flowering twice a year.

Bifidum *folium*, divided or cloven into two parts.

Biflorus *pedunculus*, bearing two flowers on a foot-ftalk.

Bigeminum *folium*, a forked foot-ftalk, with two little leaves on the apex of each divifion.

Bijugum *folium*, a winged leaf bearing two pair of foliola.

Bilabiata *corolla*, a corolla with two lips.

Bilobum *folium*, a leaf confifting of two lobes.

Binata *folia*, a digitate leaf, confifting of two foliola.

Bipartitum *folium*, a leaf divided into two fegments.

Bipinnatum *folium*, double winged, when the folioles of a pinnate leaf are pinnate.

Biternatum *folium*, where there are three folioles on a petiole, and each foliole is ternate; as in epimedium.

Bivalve *pericarpium*, confifting of two valves, as in the filiqua and legumen.

Brachiatus *caulis*, branching in pairs; each pair ftanding at right angles with thofe above and below.

Brachium, the arm, tenth degree in the Linnæan fcale for meafuring plants, being twenty-four Parifian inches.

Bractæa, a floral leaf; thefe are generally of a different fhape and colour from the other leaves of the plant, and are always feated near the fructification.

Bracteatus, having a bractea growing out of it.

Bulbiferus *caulis*, a ftalk bearing bulbs, as in a fpecies called lilium bulbiferum.

Bulbofa *radix*, a bulbous root, and is either fquamofa, fcaly, as in lilium; tunicata, coated, as in cepæ; duplicate, double, as in fritillaria; or folida, as in tulip.

Bullatum *folium*, when the furface of the leaf rifes above the veins, fo as to appear like blifters.

C

Caducus *calyx*, to fall off; a term fignifying the fhorteft time of duration, falling off at the firft opening of the flower.

Calamariæ, a reed, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Calcariatum *nectarium*, a kind of nectarium refembling a fpur, as in the delphinium.

Caliculatus *calyx*, a little calyx added to a larger one, as in the coreopfis, leontice, &c.

Calycanthemi, a calyx, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Calyptra, a veil, in moffes, where it is placed over the antheræ.

Calyx, a flower-cup, of which there are the following kinds, viz. perianthium, involucrum, amentum, fpatha, gluma, calyptra, and volva.

Campanacei, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Campanulata *corolla*, bell-fhaped flowers.

Canaliculatum *folium*, leaves having a deep channel running from the bafe to the apex.

Candelares, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Capillaceum *folium*, capillary, exemplified in the ranunculus aquatilis.

Capillaris *pappus*, hairy down, as in hieracium and fonchus.

Capillus, hair, the firft degree of the Linnæan fcale for meafuring plants, the diameter of a hair, and the twelfth part of a line.

Capitati *flores*, flowers collected into heads, as in mentha aquatica and thymus ferpyllum.

Capitulum, a little head, a fpecies of inflorefcentia, in which the flowers are connected into clofe heads on the tops of the peduncles, as in gomphrena.

Capreolus, a tendril. See Cirrhus.

Capfula, a capfule, a hollow pericarpium, which cleaves or parts in fome determinate manner, and confifts of valvula diffepimentum, columnella, and loculamentum.

Carina, the keel of a boat or fhip, the lower petal of the papilionaceous corolla.

Carinatum *folium*, when the back of a leaf refembles the keel of a fhip.

Cariophyllæus *flos*, clove-tree, or flowers growing in the manner of carnations.

Carnofum *folium*, a flefhy leaf, as in fedum dafyphillum.

Cartilagineum *folium*, a leaf whofe brim is furnifhed with a margin of different fubftance from the difk.

Caryophylli, carnations or pinks, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Catenulata *fcabrities*, a fpecies of glandular roughnefs, hardly vifible to the naked eye, refembling little chains on the furface of fome plants.

Caudex, the ftem of a tree.

Caulefcens, having a ftalk or ftem.

Caulina *folia*, leaves growing immediately on the ftem.

Caulis, a ftem, a fpecies of truncus.

Cernuus, nodding or hanging down its head.

Cefpitofa, plants which produce many ftems from one root, and form a furface of turf or fod.

Ciliatum, whofe margin is guarded by parallel briftles, formed like the eye-lafh.

Circinalea *folia*, a hoop or ring, a term of foliation, expreffive of the leaves within the gemma, being rolled fpirally downward.

Circumfciffa *capfula*, cut tranfverfely, as in anagallis.

Cirrhiferus *pedunculus*, a peduncle bearing a tendril, as in vitis.

Cirrhofum *folium*, a leaf that terminates in a tendril, as in gloriofa.

Cirrhus, a clafper, or tendril, one of the fulcra of plants.

Claffis, a clafs, is defined by Linnæus to be an agreement of feveral genera in the parts of fructification, according to the principles of nature diftinguifhed by art.

Clavatus *petiolus*, *pedunculus*, when the foot-ftalk of the leaf or flower is club-fhaped, tapering from the bafe to its apex.

Clavicula, a little key, a tendril.

Claufa *corolla*, when the neck of the corolla is clofe fhut in with valves.

Coadunatæ, to gather together, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Coarctati *rami*, clofe together, oppofed to divaricatus.

Cochleatum *legumen*, a pod like the fhell of a fnail, as in medicago.

Coloratum *folium*, coloured, when leaves which are generally green, are of a different colour.

Columnella, a little column, the fubftance that paffes through the capfule, and connects the feveral partitions and feeds.

Columniferi, pillar-fhaped, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Coma, a bufh, or head of hair, a fpecies of fulcra, compofed of large bractææ, which terminate the ftalk, as in lavandula, falvia, &c.

Communis *gemma*, regards the contents of the gemma, containing both flower and fruit.

Communis *calyx*, when a cup contains both receptacle and flower.

Comofæ, a head of hair, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Comofa *radix*, the fibres which put forth at the bafe of a bulbous root, refembling a head of hair.

Compactum *folium*, when the leaf is of a compact and folid fubftance.

Completus *flos*, having a perianthium and corolla.

Compofitus *caulis*, a compound ftem, diminifhing as it afcends.

Compofitum *folium*, when the petiole bears more than one leaf, which obtains in the following fpecies, viz. articulatum, digitatum, conjugatum, pedatum, pinnatum decompofitum, fupra-decompofitum.

Compofitæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Compreffus *caulis*, *folium*, a leaf refembling a cylinder compreffed on the oppofite fides.

Concavum *folium*, hollowed: the margin forms an arch with the difk.

Conceptaculum, conceptacle or receiver, a pericarpium of a fingle valve, which opens on the fide lengthways, and has not the feeds faftened to it.
Conduplicatum *folium*, doubled together, when the fides of the leaf are parallel, and approach each other.
Conferti *rami*, branches crowded together.
Confertus *verticillus flos, et folia*, when flowers and leaves are formed into whorls round the ftalk, and are crowded together.
Confluentia *folia*, to flow together, as in the pinnated leaf, when the pinnæ run into one another.
Conglobatus *flos*, when flowers are collected into globular heads.
Conglomeratus *flos*, flowers irregularly crowded together.
Congefta *umbella*, flowers collected into a fpherical fhape, as in the allium.
Conica *fcabrities*, a fpecies of cetaceous fcabrities, fcarce vifible to the naked eye, on the furface of plants, formed like cones.
Coniferæ, plants bearing cones, fuch as pinus, cupreffus, &c. an order of plants in the Fragmenta methodi naturalis of Linnæus.
Conjugatum, to join or couple together, a fpecies of pinnate leaf, where the folioles come by pairs.
Connatum, to grow together, when two oppofite leaves unite at their bafe, fo as to have the appearance of one leaf.
Connivens *corolla*, when the apices of the petals converge, fo as to clofe the flower, as in Trollius Europæus.
Conniventes *antheræ*, approaching or inclining together.
Continuatum *folium*, continued, when the leaf appears to be a continuation of the fubftance of the ftalk.
Contorti, twifted, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Contrariæ *valvulæ*: valves are termed contraria, when the diffepimentum is placed tranfverfely between them.
Convexum *folium*, a leaf rifing from the margin to the centre of the leaf.
Convolutus *cirrhus*, a tendril twining in the fame direction with the fun's motion.
Convolutum *folium*, a term in foliation, when the leaf is rolled up like a fcroll of paper.
Conus, fee ftrobilus.
Corculum, the heart and effence of the feed.
Cordatum *folium*, the heart-fhaped leaf.
Cordiformis, fhaped like a heart.
Corolla, a wreath or crown, one of the feven parts of fructification.
Corollula, a little corolla.
Corona *feminis*, a crown adhering to many kinds of feeds ferving them as wings, which enables them to difperfe.
Coronariæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Coronula, a little crown.
Cortex, the outer rind or bark of vegetables.
Corydales, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Corymbus is a kind of fpike, the flowers of which have each its proper pedicellus, or partial foot-ftalk raifed to a proportional height, as in fpirea opulifolia.
Cotyledon, a fide-lobe of the feed, of a porous fubftance, and perifhable, or feminal leaves.
Crenatum *folium*, a notched leaf, when the margin is cut into angles that point towards neither of the extremities, obtufely crenate, when the angles are rounded, or acutely crenate, when the angles are pointed.
Crifpum *folium*, a curled leaf, when the circumference becomes larger than the difk admits of.
Crifiatus *flos*, when the flower has a tufted creft, as in polygala.
Cruciformes *flores*, crofs-fhaped flowers, confifting of four petals, difpofed in the form of a crofs, as in the clafs tetradinamia of Linnæus.
Cryptogamia, hidden marriages, the twenty-fourth clafs of the Linnæan fyftem.
Cubitus, a cubit, the ninth degree of the Linnæan fcale for meafuring plants, from the elbow to the extremity of the middle finger, or feventeen Parifian inches.
Cucullatum *folium*, leaves rolled up lengthways, in the form of a cone, as in geranium cucullatum, &c.
Cucurbitaceæ, gourds, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Culminiæ, the top or crown of any thing, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Culmus, a reed or ftraw, the proper ftem or trunk of a grafs.
Cuneiforme *folium*, a wedge-fhaped leaf.
Cufpidatum *folium*, a leaf whofe apex refembles the point of a fpear or lance.
Cyathiformis *corolla*, flowers of the form of a cup.
Cylindracea *fpica*, a fpike of flowers in form of a cylinder.
Cyma, that runs into long faftigiate peduncles, proceeding from the fame univerfal centre, but with irregular partial ones.
Cymofæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Cymofus *flos*, fee cyma.

D

Dædaleum *folium*, a leaf whofe texture is remarkably beautiful and exquifitely wrought.
Debilis *caulis*, a weak, feeble ftalk.
Decagynia, ten females, the fifth order in the tenth clafs; flowers that have ten ftyli.
Decandria, ten males, the tenth clafs of Linnæus.
Decaphyllus *calyx*, a calyx confifting of ten leaves.
Deciduum *folium*, leaves that fall off in winter.
Declinatus *caulis*, a ftalk bending towards the earth.
Decompofita *folia*, when a petiole once divided connects many folioles.
Decumbens, lying down.
Decurrens *folium*, running down, when the bafe of a feffile leaf extends itfelf downwards along the ftem, beyond the proper bafe or termination of the leaf.
Decurfive *folium pinnatum*, when the bafes of the foliole are continued along the fides of the petiolus.
Decuffata *folia*, to divide, when leaves grow in pairs, and oppofite, each pair being oppofite alternately.
Deflexus *ramus*, a branch bent a little downwards.
Deflorata *ftamina*, having fhed or difcharged the farina fecundans.
Defoliatio, the time in autumn when plants fhed their leaves.
Deltoides *folium*, a leaf formed like the Greek delta, as in mefembryanthemum deltoides.
Demerfum *folium*, in aquatic plants, leaves funk below the furface of the water.
Dendroides *furculus*, fhrub-like, a fubdivifion of the furculus in the genus hypnum.
Dentatum *folium*, leaves having horizontal points of the fame confiftence of the leaf, and ftanding at a little diftance from each other.
Denudatæ, to be ftripped naked, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Dependens *folium*, to hang down, leaves pointing towards the ground.
Depreffum *folium*, preffed down, when the fides rife higher than the difk.
Diadelphia, two brotherhoods, the feventeenth clafs in the fexual fyftem.
Diandria, two males, the fecond clafs in the fexual fyftem.

Dichotomus *caulis,* forked ftalks, when the divifions come by two and two.
Dicotyledones, when the feeds have two cotyledons that are the placenta of the embryo plant, and afterwards the feed leaves.
Didyma *anthera,* twins, when anthera come by twos on each filament.
Didynamia, the fuperiority of two, the fourteenth clafs in the fexual fyftem.
Difformia *folia,* different forms, when leaves on the fame plant come of different forms.
Diffufus *caulis,* when the branches of the ftalk fpread different ways.
Digitatum *folium,* fingered, when the apex of a petiole connects many folioles.
Digynia, two females, the fecond order in each of the firft thirteen claffes, except the ninth.
Dimidiatum, halved.
Diœcia, the twenty-fecond clafs in the fexual fyftem.
Dipetala *corolla,* flowers confifting of two petals, as in circæa, and commelina.
Diphyllus *calyx,* a calyx confifting of two leaves, as in the papaver, and fumaria.
Difcus, a difk, the middle part of a radiate compound flower.
Difperma, plants producing their feeds by twos, as in the umbellatæ.
Diffectum *folium,* leaves cut into lacinia, or divifions.
Diffepimentum, partitions of the fruit, which divide the pericarpium into cells.
Diffiliens *filiqua,* pods that burft with elafticity.
Diftans *verticillus,* when the whorls of flowers, in verticillate plan, ftand at a great diftance from one another.
Difticha *folia,* in two rows, when leaves all refpect two fides of the branches only.
Divaricati *rami,* branches ftanding wide from each other in different directions.
Divergentes *rami,* widening gradually.
Dodecandria, twelve males, the eleventh clafs in the fexual fyftem.
Dodrans, the feventh degree in the Linnæan fcale for meafuring the parts of plants, or nine Parifian inches.
Dodrantalis, nine inches.
Dolabriforme *folium,* a leaf refembling an ax, as in mefembryanthemum dolabriforme.
Dorfalis *arifta,* an awne or beard, fixed to the back, or external part of the gluma.
Drupa, a pulpy pericarpium, without valves, containing a ftone, as in the plum and peach.
Drupaceæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Dumofæ, a bufh, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Duplica *radix,* a double root, a fpecies of bulbous root, confifting of two folid bulbs, as in fome fpecies of orchis.
Duplicato *ferratum folium,* fawed double, with leffer teeth within the greater.

E

Ebracteatus *racemus,* without a bractea, or floral leaf.
Ecaudata *corolla,* without a tail or fpur, as in antirrhinum, cymbalaria.
Echinatum *pericarpium,* pods befet with prickles, like a hedgehog.
Efflorefcentia, the precife time when a plant fhews it firft flowers.
Emarginatum *folium,* when the apex of a leaf terminates in a notch; the fame may be applied to petala, and ftigma.
Enervium *folium,* leaves having no apparent nerves.
Enneandria, nine males, the ninth clafs in the fexual fyftem.
Enneapetala *corolla,* a flower confifting of nine petals.
Enodis *caulis, culmis,* ftalks and ftraws, having no knots or joints.
Enfatæ, plants having two d fhaped leaves, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Enfiforme *folium,* leaves fhaped like a two-edged fword, tapering towards the point.
Equitantia *folia,* riding, when the fides of the leaves approach in fuch a manner as the outer embrace the inner.
Erectus *caulis, ramus, folium,* upright, perpendicular.
Erofum *folium,* gnawed, when the leaf is finuate, and the margin appears as if it were gnawed or bitten.
Exferta *ftamina,* ftanding forth, when the ftamina appear above the corolla.
Exftipulatus, without ftipulæ.
Exfuccum *folium,* when the fubftance of the leaf is dry.
Extrafoliaceæ *ftipulæ,* ftipula, growing on the outfide of the leaves.

F

Factum *folium,* ftuffed, oppofed to tubulofum.
Fafciculata *folia,* bundled, leaves growing in bunches.
Fafcicularis *radix,* bundled, tuberous roots growing in bundles.
Fafciata *planta,* when many ftalks grow together, like a faggot or bundle.
Faftigiati *pedunculi,* pedunculi pointed at the apex.
Fauces, the jaws or chops.
Femina *planta,* a plant bearing female flowers on the fame root only.
Fibrofa *radix,* a fibrous root.
Filamentum, a thread, applied to the thread-like part of the ftamina.
Filices, ferns, one of the feven divifions of the vegetable kingdom, and an order of plants in the Fragmenta methodi naturalis of Linnæus.
Filiform *filamentum,* thread fhaped ftamina.
Fimbricata *petala,* a fringed petal, as in menyanthus,
Fiffum *folium,* a leaf fplit or cloven half-way down.
Fiftulofus *caulis,* a piped or hollow ftem.
Flabellatum *folium,* a fan-fhaped leaf.
Flaccidus *pedunculus,* the foot-ftalk of a flower that is feeble and flender.
Flagellum, a twig, or fhoot, like a whip or thong.
Flexuofus *caulis,* a ftalk having many turnings or bendings, taking a different direction at every joint.
Floralia *folia,* floral leaves that immediately attend the flower.
Floralis *gemma,* flower buds.
Flos, a flower.
Flofculus, a little flower.
Foliaceæ, *glandulæ,* glands growing on the leaves.
Foliaris *cirrhus,* a tendril growing from a leaf.
Foliaris *gemmatio,* leaf-buds.
Foliatio *plantæ,* the complication of the leaves, whilft folded within the gemma, or bud.
Foliatus *caulis,* a leafy ftalk.
Foliifera *gemma,* a bud producing leaves.
Foliolum, a little leaf, one of the fingle leaves, which together conftitute a compound leaf.
Foliofum *capitulum,* covered with leaves amongft the flowers or tops of the plant.
Folium a leaf.
Fornicatum *petalum,* vaulted or arched, as in the upper lip of the flowers in the clafs didynamia.
Frequens *planta,* plants growing frequently, or commonly, every where.

Frondeſcentia, the ſeaſon of the year when the leaves of plants are unfolded.

Frondoſus *caudex*, a ſpecies of trunk compoſed of a branch and a leaf blended together, as is frequently united with the fructification.

Fructeſcentia, the time of the year when a plant ſcatters its ripe ſeeds.

Fructificatio, the temporary part of a vegetable appropriated to generation, terminating the old vegetable, and beginning the new.

Fruſtranea *polygamia*, to no purpoſe, the third order of the claſs ſyngeneſia.

Frutex, a ſhrub.

Fruticoſus *caulis*, a ſhrubby ſtalk.

Fugaciſſima *petala*, petals that are fleeting, and of ſhort duration.

Fulcratus *caulis*, branches having props, ſee fulcrum.

Fulcrum, a prop or ſupport.

Fungi, a kind of muſhroom, one of the ſeven families of plants, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Furcata, forked.

Fuſiform *radix*, a ſpindle-ſhaped root.

G

Galea, a helmet applied to the corolla of the claſs gynandria, as in orchis.

Galeatum *labium*, the lip of a flower, ſhaped like a helmet.

Geminæ *ſtipulæ*, ſtipula growing in pairs.

Geminatus *pedunculus*, double foot-ſtalks growing from the ſame point.

Gemma, a bud, an hibernaculum on the aſcending caudex.

Gemmatio, a young bud.

Gemmiparus, bearing buds.

Genera *plantarum*, genera of plants, the ſecond ſubdiviſion in the Linnæan ſyſtem; it comprehends an aſſemblage of ſpecies, ſimilar in their parts of fructification, under the ſame claſs and order.

Geniculatus, *caulis*, *culmus*, *pedunculus*, a jointed ſtalk, ſtraw, or foot-ſtalk of a flower.

Genicula, little joints.

Germen, a ſprout or bud, the baſe of the piſtillum, the rudiment of the fruit yet in embryo.

Gibbum *folium*, bunching out, or gouty.

Glaber, ſmooth, having an even ſurface.

Gladiata *ſiliqua*, a ſword-ſhaped pod.

Glandulæ, glands, or ſecretory veſſels.

Glandulifera *ſcabrities*, a kind of briſtly roughneſs on the ſurface of ſome plants, on which there are minute glands at the extremity of each briſtle.

Glareoſis *locis*, gravelly places, where plants delight in gravel.

Glaucophyllus, a blueiſh, or azure-coloured leaf.

Globoſa *radix*, a round root.

Globularis *ſcabrities*, a ſpecies of glandular roughneſs, ſcarce viſible to the naked eye, the ſmall grains of which are exactly globular.

Glochoides, the ſmall points of the pubes of plants. Linnæus applies this term only to the hami triglochoids, with three hooked points.

Glomerata *ſpica*, flowers crowded together in a globular form.

Gluma, a huſk, or chaff, a ſpecies of calyx peculiar to corn and graſſes.

Glutinoſitas, like glue or paſte.

Gramina, graſſes, one of the ſeven families of the vegetable kingdom.

Granulata *radix*, roots conſiſting of many little knobs, like ſeeds or grain, attached to one another by ſmall ſtrings, as in ſaxifraga granulata.

Gymnoſpermia, naked ſeeded, the firſt order of the claſs didynamia.

Gynandria, when the male and female parts are joined together, the twentieth claſs in the Linnæan ſyſtem.

H

Habitualis *character*, the character or deſcription of a plant, taken from its habit, which conſiſts in the placentatio, radicatio, ramificatio, foliatio, ſtipulatio, pubeſcentia, infloreſcentia.

Habitus, the external appearance; Linnæus defines it, the conformity or affinity that the congeners of vegetables have to one another, in placentation, radification, &c.

Hamoſa *ſeta*, hooked briſtles.

Haſtatum *folium*, leaves reſembling the head of a ſpear or halbert.

Hemiſphericus *calyx*, half round, or half a ſphere.

Heptandria, ſeven males, the ſeventh claſs of the ſexual ſyſtem.

Herba, an herb; according to Linnæus, it is the part of the vegetable which ariſes from the root; it is terminated by the fructification, and comprehends the ſtem, leaf, props, and hibernacula.

Herbaceæ *plantæ*, are perennial plants, which annually periſh down to the root.

Herbaceus *caulis*, ſtalks that dry annually.

Hermaphroditus *flos*, flowers that contain both ſexes, as anthera and ſtigma.

Heſperidæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Hexagonus *caulis*, a ſtalk with ſix angles.

Hexandria, the ſixth claſs in the ſexual ſyſtem, which produces hermaphrodite flowers, with ſix ſtamina of equal length.

Hexagynia, an order of plants that produce ſix ſtyles.

Hexapetala *corolla*, flowers conſiſting of ſix petals.

Hexaphyllis *calyx*, a flower cup conſiſting of ſix leaves.

Hians *corolla*, a monopetalous flower that is gaping.

Hirſutus, rough, hairy.

Hiſpidus *caulis*, a ſtalk covered with ſtrong fragile briſtles.

Holeracea, pot herbs, an order of plants, in the Fragmenta methodi naturalis of Linnæus.

Horizontalis *flos*, flowers growing with their diſk parallel to the horizon.

Hibernaculum, winter-lodge, the part of a plant that incloſes and ſecures the embryo from external injuries.

Hybrida, a baſtard, a monſtrous production of two plants of different ſpecies, like the mule in the animal creation.

Hypocrateriformis *corolla*, a monopetalous flower ſhaped like a cup or ſalver.

I

Icoſandria, the twelfth claſs in the ſexual ſyſtem.

Imberbis *corolla*, a flower without a beard.

Imbricatus, tiled, when the ſcales of a ſtalk, or flower cup, lie over one another in the manner of tiles upon a houſe.

Immutatæ, unaltered.

Impar, odd, applied to a pinnated leaf terminating in an odd lobe.

Inæqualis *corolla*, an unequal flower.

Inanis *caulis*, hollow or empty ſtalks.

Incanum *folium*, leaves covered with whitiſh down.

Inciſum *folium*, leaves cut into irregular ſegments.

Incompletus *flos*, imperfect flowers without petals.

Incraffatus *pedunculus*, foot-ftalks of flowers that increafe in thicknefs as they approach the flowers.
Incumbens *anthera*, anthera which are affixed to the filament fideways.
Incurvatus *caulis*, a ftalk bowed towards the earth.
Indivifum *folium*, an entire undivided leaf.
Inerme *folium*, unarmed, a leaf without briftles or prickles.
Inferus *flos*, flowers whofe receptacle are fituated below the germen.
Inflatum *perianthium*, a calyx puffed out like a bladder.
Inflexa *folia*, to bend inwards towards the ftem.
Inflorefcentia, inflorefcence, fignifies the various modes in which flowers are joined to the plant by the pedunculus.
Infundibuliformis *corolla*, a monopetalous flower fhaped like a funnel.
Infertus *petiolus*, a foot-ftalk inferted into the ftem.
Integrum *folium*, an entire or undivided leaf.
Integerrimum *folium*, an entire leaf, whofe margin is deftitute of incifions or ferratures.
Interfoliaceus *pedunculus*, flower-ftalks arifing from between oppofite leaves.
Interruptum *folium pinnatum*, when the large folioles of a winged leaf are interrupted alternately by pairs of fmaller ones.
Interrupta *fpica*, a fpike of flowers, interrupted or broken by fmall clufters of flowers between the larger ones.
Intorfio, writhing or twifting.
Intrafoliaceæ *ftipulæ*, ftipulæ growing on the infide of the leaves of the plant.
Inundata *loca*, this term is applied by Linnæus to fuch places that are overflowed only in winter.
Involucellum, a partial involucrum.
Involucrum, a cover, the calyx of the umbelliferous plants ftanding at a diftance from the flower.
Involuta *folia*, rolled in leaves when their lateral margins are rolled fpirally inwards on both fides.
Irregularis *flos*, irregular flowers of deformed fhapes.
Juba, a creft of feathers.
Julus, a katkin.

L

Labiatus *flos*, a lipped flower.
Lacerum *folium*, a cleft or fiffure, leaves whofe margin is cut into fegments, as if rent or torn.
Laciniæ, fegments or incifions.
Laciniatum *folium*, a leaf cut into irregular incifions.
Lactefcentia, milky, thofe plants are called milky, whofe juices are white, yellow, or red.
Lacunofum *folium*, leaves that are deeply furrowed, by the veins being funk below the furface.
Lacuftris *planta*, plants which grow in lakes of water.
Lamina, a thin plate, the upper expanded part of a polypetalous flower.
Lana, wool, a fpecies of pubefcence, which covers the furface of plants.
Lanatum *folium*, a woolly leaf.
Lanceolatum *folium*, a lance-fhaped leaf.
Laterales *flores*, flowers coming from the fides.
Laxus *caulis*, loofe, weak, flender.
Legumen, pulfe, a pericarpium of two valves, in which the feeds are fixed along one future only.
Lenticularis *fcabrities*, a fpecies of glandular fcabritis, in the form of lentils.
Leprofus, fpotted like a leopard, exemplified in Lichen.
Lævis *caulis*, fmooth, having an even furface.
Liber, the inner rind or bark of a plant.
Lignofus *caulis*, a woody ftem.
Lignum, wood.
Ligulatus *flos*, when the petals, tubulated at the bafe, are plane linear towards the middle, and wideft at the extremity, in form of a bandage, and hence called ligulate.
Liliaceæ, like a lily, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Limbus, a border, the upper expanded part of a monopetalous flower.
Linea, a line, the fecond degree in the Linnæan fcale for meafuring plants, the twelfth part of an inch.
Lineare *folium*, a narrow leaf, whofe oppofite margins are almoft parallel, as in pinus.
Lineatum *folium*, leaves whofe fuperficies are marked with parallel lines, running lengthways.
Lingulatum *folium*, a leaf fhaped like a tongue.
Lobatum *folium*, when leaves are divided to the middle into parts that ftand wide from each other, and have their margins convex.
Loculamentum, a cell, the divifions of that fpecies of pericarpium called a capfula.
Locus *foliorum*, the particular part of the plant to which the leaf is affixed.
Lomentaceæ, bean meal, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Longiufculus, longifh.
Longum *perianthium*, when the tube of the calyx is equal in length to that of the corollæ.
Lucidum *folium*, clear, fhining.
Lunatum *folium*, moon-fhaped leaves, when they are round and hollowed at the bafe like a half-moon.
Lunulate, fhaped like a crefcent.
Luridæ, pale, wan, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Luxurians *flos*, a luxuriant flower.
Lyratum *folium*, leaves fhaped like a harp or lyre.

M

Marcefcens *corolla*, flowers withering on the plant.
Margo *folii*, the margin or edge of the leaf.
Mas planta, male plants, fee clafs dioecia.
Mafculus *flos*, male flowers, containing antheræ, but no ftigma.
Medulla, marrow, the pith or heart of a plant.
Membranaceum *folium*, when leaves have no diftinguifhable pulp between their furfaces.
Membranatus *caulis*, a ftalk covered with thick membranes.
Monadelphia, one brother, the fixteenth clafs in the fexual fyftem.
Monandria, one male, the firft clafs in the fexual fyftem.
Monocotyledones, a term in placentation, applied to plants whofe feed have a fingle cotyledon.
Monoecia, one houfe, the twenty-firft clafs in the fexual fyftem.
Monogynia, one female, the firft order of the firft thirteen claffes in the Lynæan fyftem.
Monopetala *corolla*, a monopetalous flower, i. e. having but one petal.
Monophyllum *involucrum*, confifting of one leaf.
Monofperma, having one feed.
Milliaris *fcabrities*, a fpecies of glandular roughnefs appearing on the furface of fome plants like grains of millet.
Mucronatum *folium*, a leaf terminating in a fharp point.
Multifidum *folium*, a leaf divided into many linear fegments or divifions.
Multiflorus *pedunculus*, a foot-ftalk bearing many flowets.
Multipartitum *folium*, a leaf divided into many parts.

Multiplicatus *flos*, a luxuriant flower, whofe corolla is multiplied fo as to exclude fome of the ftamina.
Multifiliquæ, many pods, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Muricatus *caulis*, a ftalk, whofe furface is covered with fharp points, like the murex fhell.
Muricatæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Mufci, moffes, one of the feven families in the vegetable kingdom, and an order of plants in the Fragmenta methodi naturalis of Linnæus.
Mutica *gluma*, when the arifta is wanting.
Mutilatus *flos*, a mutilated flower.

N

Natans *folium*, a leaf which fwims on the furface of water.
Navicularis *valvula*, when the valve of a feed veffel refembles a fhip.
Neceffariæ *polygamiæ*, neceffary marriages, the fourth order of the nineteenth clafs in the fexual fyftem.
Nectarium, that part of the corolla that contains the honey juice.
Nervofum *folium*, a leaf whofe furface is full of nerves or ftrings.
Nidulantia *femina baccarum*, feeds neftling in the pulp of a berry.
Nitidum *folium*, a bright fhining gloffy leaf.
Nucamentaceæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Nucleus, a kernel.
Nudus *caulis*, a naked ftalk.
Nutans *caulis*, a nodding ftalk.
Nux, a nut.

O

Obcordatum *petalum*, a heart-fhaped petal, with its apex downwards.
Obliquum *folium*, when the apex of the leaf points obliquely towards the horizon.
Oblongum *folium*, an oblong leaf.
Obfolete *lobatum folium*, leaves having lobes fcarce difcernible.
Obtufum *folium*, leaves blunt or rounded at the apex.
Obvolutum *folium*, rolled againft each other, when their refpective margins alternately embrace the ftraight margin of the oppofite leaf.
Octandria, eight males, the eighth clafs in the fexual fyftem.
Officinalis, plants ufed in medicine, and kept in the apothecaries fhops.
Operculum, a cover, as in the moffes.
Oppofiti *rami folia*, branches and leaves that grow by pairs oppofite each other.
Orbiculatum *folium*, round leaves.
Orchideæ *orchis*, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Ordo, order.
Orgya, a fathom, or fix Parifian feet.
Ovale *folium*, an oval leaf.
Ovarium, the germen.
Ovatum *folium*, an oval or egg-fhaped leaf.

P

Pagina *folii*, the furface of a leaf.
Palea, chaff, a thin membrane rifing from a common receptacle, which feparates the flofculi.
Paleaceus *pappus*, chaffy down.

Palmæ, palms, one of the feven families of the vegetable kingdom.
Palmata *radix*, a handed root, as in orchis.
Palmatum *folium*, a leaf fhaped like an open hand.
Paluftris, marfhy or fenny.
Panduriforme *folium*, fhaped like a guitar, a mufical inftrument fo called.
Panicula, a panicle, or loofe fpike of grafs.
Papilionaceus, butterfly-fhaped flower, as in the clafs diadelphia of Linnæus.
Papilionaceæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Papilofum *folium*, a nipple, a leaf covered with dots or points like nipples.
Pappus, down.
Papulofum *folium*, a leaf whofe furface is covered with pimples.
Parabolicum *folium*, a leaf in form of a parabola.
Parallelum *diffepimentum*, when the diffepiments are parallel to the fides of the pericarpium.
Parafitica *planta*, plants that grow only out of other plants, as the vifcum.
Partialis *umbella*, a partial umbel.
Partiale *involucrum*, when at the bafe of the partial umbel.
Partitum *folium*, a divided leaf.
Parvum *perianthium*, a little flower cup, or comparatively fmall, oppofed to magnum.
Patens *caulis*, *ramus*, &c. fpreading ftalks and branches.
Patulus *calyx*, a fpreading cup.
Pauciflоris, having few flowers.
Pedalis *caulis*, a ftalk a foot in height.
Pedatum *folium*, a fpecies of compound leaf, whofe divifions refemble the toes of a foot, as in helleborus fœtida.
Pedicellus, a little foot-ftalk.
Pedunculаris *cirrhus*, a tendril proceeding from the foot-ftalk of a flower.
Pedunculati *flores*, flowers growing on foot-ftalks.
Pedunculus, the foot-ftalk of a flower.
Peltatum *folium*, when the foot-ftalk is inferted into the difk of the leaf, and not into its bafe.
Penicilliformia *ftigmata*, a ftigma in form of a painter's pencil.
Pentagonus *caulis*, a five-angled ftalk.
Pentagynia, five males, the fifth order of a clafs.
Pentandria, five males, the fifth clafs in the fexual fyftem of Linnæus.
Pentapetala *corolla*, a flower confifting of five petals.
Pentaphyllus *calyx*, a calyx confifting of five leaves.
Perennis *radix*, a perennial root, continuing for many years.
Perfectus *flos*, flowers having petals, the perfect flowers of Ray, Tournefort, and other botanifts.
Perfoliatum *folium*, when the bafe of the leaf entirely furrounds the ftem, or when the ftalk grows through the centre of the leaf, as in craffula perfoliata.
Perforati *cotyledones*, to be pierced through, a fpecies of the monocotyledones exemplified in the germina; alfo an order of plants in the Fragmenta methodi naturalis of Linnæus.
Perianthium, a kind of calyx, fo called when contiguous to the fructification.
Pericarpium, a fpecies of pod that contains the feed.
Perichætium, a modification in the receptaculum in the mufci and algæ.
Perpendicularis *radix*, a perpendicular, or downright root.
Perfonatæ, mafked, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Pes, a foot.
Petaliformia *ftigmata*, a ftigma, refembling the fhape of a petal.
Petalodes *flos*, a flower having petals.

R

Petalum, the corollaceous teguments of a flower.
Petiolaris *cirrhus*, a tendril proceeding from the foot-ftalk of a leaf.
Petiolatum *folium*, a leaf growing on a foot-ftalk.
Petiolus, a little foot-ftalk.
Pileus, a hat or bonnet, the orbicular expanfion of a mufhroom, which covers the fructification.
Pili, hairs.
Pilofum *folium*, a leaf whofe furface is covered with long diftinct hairs.
Pinnatifidum *folium*, (a winged leaf) applied to fimple leaves whofe laciniæ are tranfverfe to the rachiæ.
Pinnatum *folium*, a winged leaf.
Piperitæ, pepper, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Piftillum, the ftyle, or female organ of generation, whofe office is to receive and fecrete the farina fecundans.
Pixidatum *folium*, a kind of foliage, where one leaf is let in to another by a joint, as in equifetum.
Placentatio *cotyledonis*, of the feed.
Planipetalus *flos*, a flower with plain flat petals.
Plantæ, plants, one of the feven families of vegetables, comprehending all which are not included in the other fix tribes.
Planum *folium*, a plain flat leaf.
Plenus *flos*, a full or double flower.
Plicatum *folium*, a plaited leaf.
Plumata *feta*, a feathered hair or briftle.
Plumofus *pappus*, a kind of foft down.
Plumula, the afcending fcaly part of the corculum.
Pollen, meal, the prolific powder contained in the anthera.
Pollex, a thumb, the length of the firft joint of the thumb, or a Parifian inch.
Polyadelphia, many brotherhoods, the eighteenth clafs in the fexual fyftem.
Polyandria, many males, the thirteenth clafs in the fexual fyftem of Linnæus.
Polycotyledones, many cotyledons.
Polygamia, many marriages, the twenty-third clafs in the fexual fyftem.
Polygynia, many females, an order of fome of the claffes in the fexual fyftem.
Polypetala *corolla*, a polypetalous flower, i. e. confifting of many petals.
Polyphyllum *involucrum*, an involucrum of many leaves.
Polyftachius *culmus*, a ftalk of grafs having many fpikes.
Pomaceæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Pomum, an apple.
Pori, pores.
Præmorfa *radix*, a bitten root, when it ends abruptly, as in fcabiofa.
Preciæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Prifmaticus *calyx*, a triangular flower-cup.
Procumbens *caulis*, lying on the ground.
Prolifer *flos*, flowers growing through, or out of one another, either from the centre or fide.
Prominulum *(effe, i.e. eminent m,* to jet out beyond the valves.
Pronum *difcum folii*, leaves having their face downwards.
Propago, a fhoot, the feed of moffes.
Proprium *involucrum*, an involucrum when at the bafe of an umbellated flower.
Pfeudo, a baftard.
Pubes, down or hair, one of the feven kinds of fulcra.
Pulpofum *folium*, a leaf having a pulpy or flefhy fubftance.
Pulveratum *folium*, a leaf powdered with a kind of duft like meal, as in primula farinofa.
Punctatum *folium*, a leaf fprinkled with hollow dots or points.
Putamineæ, like a fhell, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Q

Quadrangulare *folium*, a quadrangular leaf, having four prominent angles in the circumfcription of its difk.
Quadrifidum *folium*, a leaf divided into four parts.
Quadrijugum *folium*, a leaf having four pair of folioles.
Quadrilobum *folium*, a leaf confifting of four lobes.
Quadripartitum *folium*, a leaf confifting of four divifions down to the bafe.
Quaterna *folia*, when verticillate leaves come by fours, having four in each whorl.
Quina *folia*, verticillate leaves coming by fives.
Quinatum *folium*, when a digitate leaf has five folioles.
Quinquangulare *folium*, a leaf having five prominent angles in the circumfcription of the difk.
Quinquejugum *folium*, when a pinnated leaf has five pair of folioles.
Quinquelobum *folium*, a leaf having five lobes.
Quinquefidum *folium*, a leaf confifting of five divifions, with linear finufes, and ftraight margins.
Quinquepartitum *folium*, confifting of five divifions down to the bafe.

R

Racemus, a bunch of grapes or currants, or any other bunch of berries that bears that refemblance.
Rachis, the back bone, a fpecies of receptaculum, as in the panicum.
Rachis *folii pinnati*, the middle rib of a winged leaf, to which the folioles are affixed.
Radiatus *flos*, a fpecies of compound flowers, in which the florets of the difk are tubular, and thofe of the radius ligulate, as in the clafs fyngenefia.
Radicalia *folia*, leaves proceeding immediately from the root.
Radicans *caulis*, a ftalk bending to the ground, and taking root where it touches the earth.
Radicatum *folium*, leaves fhooting out roots.
Radicula, a little root.
Radius, a ray, the ligulate margin of the difk of a compound flower.
Radix, a root.
Ramea *folia*, regards leaves that grow only on the branches, and not on the trunk.
Ramofiffimus *caulis*, ftalks abounding with branches irregularly difpofed.
Ramus, a branch of a tree.
Ramofus *caulis*, a ftalk having many branches.
Receptaculum, a receptacle, the bafis on which the parts of fructification are connected.
Reclinatum *folium*, a leaf reclined or bending downward.
Recurvatum *folium*, a leaf bent backwards.
Reflexus *ramus*, a branch bent back towards the trunk.
Regularis *corolla*, a flower whofe parts are regular in its figure and magnitude.
Remotus *verticillus*, when the whorls of flowers and leaves ftand at a diftance from one another.
Reniforme *folium*, a kidney fhaped leaf.
Repandum *folium*, a leaf having a bending or waved margin, without any angles.
Repens *radix*, a creeping root extending horizontally.
Repens *caulis*, a creeping ftalk, either running along the ground, on trees, or rocks, and ftriking roots at certain diftances.

6

Reptans *flagellum*, creeping along the ground, as in fragaria.
Reftantes *pedunculi*, foot-ftalks remaining on, after the fructification has fallen off.
Refupinatio *florum*, when the upper lip of the flower faces the ground, and the lower lip is turned upwards.
Refupinatum *folium*, when the lower difk of the leaf looks upward.
Retroflexus *ramus*, a branch bent in different directions.
Retrofractus *pedunculus*, bent backwards towards its infertion, as if it were broken.
Retufum *folium*, when the apex of the leaf is blunt.
Revolutum *folium*, a leaf rolled back.
Rhœades, the red poppy, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Rhombeum *folium*, a leaf whofe fhape nearly refembles a rhombus.
Rhomboideum *folium*, a leaf of a geometrical figure, whofe fides and angles are unequal.
Rigidus *caulis, folium*, ftiff, hard, rigid.
Rimofus *caulis*, abounding with clefts and chinks.
Ringens, grinning and gaping.
Rofaceus *flos*, a flower whofe petals are placed in a circle, in form like thofe of a rofe.
Roftellum, a little beak, the defcending plain part of the corculum of the feed.
Rotaceæ, a wheel, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Rotatus *limbus, corolla*, a wheel-fhaped flower, expanded horizontally, having a tubular bafis.
Rotundatum *folium*, a roundifh leaf.
Rubra *lactefcentia*, red milkinefs in plants.
Ruderata *loca*, rubbifhy places.
Rugofum *folium*, a rough or wrinkled leaf.

S

Sagittatum *folium*, an arrow-fhaped leaf.
Sarmentofæ, a twig or fhoot of a vine, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Sarmentofus *caulis*, the fhoot of a vine, naked between each joint, and producing leaves at the joints.
Scaber *caulis, folium*, fcabby and rough, having tubercles.
Scabridæ, rough, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Scabrities, a fpecies of pubefcence, compofed of particles fcarce vifible to the naked eye, fprinkled on the furface of plants.
Scandens *caulis*, a climbing ftalk.
Scapus, a fpecies of ftalk which elevates the fructification, and not the leaves, as in narciffus.
Scariofum *folium*, leaves dry on the margin that found when touched.
Scitamina, fair, beautiful, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Scorpioides *flos*, a flower refembling the tail of a fcorpion.
Scutellum, a fpecies of fructification which is orbicular, concave, and elevated in the margin, as in fome fpecies of lichen.
Scyphifer, cup-bearing, a fubdivifion of the genus lichen.
Secretoria *fcabrities*, a fpecies of glandular roughnefs on the furface of fome plants.
Secunda *fpica*, a fpike of grafs with the flowers turned all towards one fide.
Securiformis *pubefcentia*, a fpecies of pubes on the furface of fome plants, the briftles refembling an axe or hatchet.
Semen, feed.
Seminale *folium*, feed leaves.
Semiteres *caulis*, half a cylinder, flat on one fide, and round on the other.
Sempervirens *folium*, an ever-green leaf.
Sena *folia*, leaves growing in fixes, as in galium fpurium.
Senticofæ, a briar or bramble, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Sepiariæ, a hedge, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Sericeum *folium*, a leaf whofe furface is of a foft filky texture.
Serratum *folium*, a fawed leaf.
Seffile *folium*, a leaf growing immediately to the ftem, without any foot-ftalk.
Setæ, a briftle, a fpecies of pubefcence, covering the furface of fome plants.
Setaceum *folium*, leaves fhaped like briftles.
Sexus *plantarum*, plants are diftinguifhed by the fex of their flowers, which are either male, female, or hermaphrodite.
Silicula, a little pod, a bivalve pericarpium, fee clafs tetradynamia.
Siliqua, a pod, a pericarpium confifting of two valves, in which the feeds are fixed alternately to each future.
Siliquofa, the fecond order in the clafs tetradynamia.
Siliquofæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Simplex *caulis*, a fimple or fingle ftem.
Simpliciffimus *caulis*, the moft fimple ftalk.
Sinuatum *folium*, a leaf whofe fides are hollowed or fcolloped.
Situs *foliorum*, the difpofition of leaves on the ftem and branches, which are either ftarry, by threes, oppofite, alternate, fcattered, or crowded.
Solidus *caulis*, a folid ftalk or ftem.
Solitarius *pedunculus*, when only one flower-ftalk proceeds from the fame part.
Solutæ *ftipulæ*, loofe, oppofed to adnatæ.
Spadix, the receptaculum of a palm, a pedunculus which proceeds from a fpatha.
Sparfi *rami, pedunculi, folia*, fcattered without order.
Spatha, a fpecies of calyx refembling a fheath.
Spathaceæ, like a fheath, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Spatulatum *folium*, a leaf in form of a fpatula, an inftrument ufed to fpread falve.
Species *plantarum*, the third fubdivifion in the Linnæan fyftem.
Spica, a fpike, a fpecies of inflorefcence refembling an ear of corn.
Spica *fecunda*, when the flowers all turn towards one fide.
Spica *difticha*, when the flowers are in two rows, and look two ways.
Spicula, a little fpike.
Spinæ, thorns or rigid prickles.
Spinofus *caulis*, ftrong prickles, whofe roots proceed from the wood of the ftem, and not from the furface of the bark.
Spirales *cotyledones*, feminal leaves twifted fpirally.
Spithama, a fpan, or feven Parifian inches.
Splendentia *folia*, a fhining leaf.
Squamofa *radix*, a fcaly root.
Squarrofum, rough, fcaly, or fcurfy.
Stamen, the filaments that fuftain the anthera.
Stamineus *flos*, flowers having ftamina, and no corolla.
Statuminatæ, a prop, an order of plants in the former Fragmenta methodi naturalis of Linnæus.
Stellata *folia*, leaves furrounding a ftem, like the rays of a circle.
Stellatæ *fetæ*, a fpecies of pubefcence called briftles, when they arife from a center in form of a ftar, as in the mefembryanthemum barbatum.
Stellata *planta*, one of Mr. Ray's claffes, the tetrandria monogynia of Linnæus.
Stellatæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.

Sterilis *flos*, a barren flower, masculus of Linnæus.
Stigma, apex of the pistillum.
Stimuli, stings.
Stipitatus *pappus*, a kind of trunk that elevates the down and connects it with the seed.
Stipula, one of the kinds of fulcra of plants, generally growing on each side of the base of the foot-stalks of leaves or flowers, and are either by twos, single, deciduous, abiding, adhering, loose, on the inside of the foot-stalks, or on the outside.
Stipulares *glandulæ*, glands produced from stipulæ.
Stolo, a shoot, which, running on the surface of the ground, strikes root at every joint, as in fragaria and others.
Striatus *caulis, culmus*, &c. channeled streaks, running lengthwise in parallel lines.
Strictus *caulis*, straight stiff shoots.
Strigæ, ridges, rows.
Strobilus, a species of pericarpium, formed from an amentum, as the cone of the pine-tree.
Stylus, the *style*, that part of the pistillum which elevates the stigma from the germen.
Submersum *folium*, when aquatic plants have their leaves sunk under the surface of the water.
Subramosus *caulis*, a stalk having few branches.
Subrotundum *folium*, a leaf almost round.
Subulatum *folium*, an awl-shaped leaf.
Succulentæ, juicy, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Suffrutex, an under shrub.
Sulcatus *caulis, culmus*, a stalk deeply furrowed lengthways.
Superflua *polygamia*, superfluous, the second order in the class syngenesia.
Superus *flos*, when the receptacle of the flower stands above the germen.
Supra-axillaris *pedunculus*, the foot-stalk of a flower, whose insertion is above the angle formed by the branch.
Supra-decomposita *folia*, are composite leaves which have little leaves growing on a subdivided foot-stalk.
Supra-foliaceus *pedunculus*, the foot-stalk of a flower inserted into the stem immediately above the leaf.
Surculus, a twig, the stalks or branches of mosses.
Syngenesia, to generate together, the nineteenth class in the sexual system.

T

Tegumentum, a cover, the perianthium and corolla.
Teres *caulis, folium*, a cylindrical stalk, or leaf.
Tergeminum *folium, compositum*, a leaf three times double, when a dichotomus petiolus is subdivided, having two foliola on the extremity of each division.
Terminalis *flos*, flower terminating a branch.
Terna *folia*, leaves in whorls by threes.
Ternatum *folium*, a chequered leaf, whose squares are of different colours.
Tessellatum *folium*, a chequered leaf, whose squares are of different colours.
Tetradynamia, the superiority or power of four, the fifteenth class in the sexual system.
Tetragonus *caulis*, a four-cornered or square stalk.
Tetragynia, four females, the fourth order of some of the classes in the sexual system.
Tetrandria, four males, the fourth class in the sexual system.
Tetrapetala *corolla*, a flower consisting of four petals.
Tetraphyllus *calyx*, a flower-cup consisting of four leaves.
Tetrasperma *planta*, producing four seeds.
Thalamus, a bed, the receptacle.
Theca, a sheath.
Thyrsus, a spike like a pine-cone.
Tomentosus *caulis, folia*, a stalk and leaf covered with a whitish down like wool.
Tomentum, a species of pubescence, covering the surface of some plants of woolly or downy substance.
Torosum *pericarpium*, brawny protuberances, like the swelling of the veins when a pericarpium is bunched out by the inclosed seeds.
Torta *corolla*, when the petals of a flower are twisted, as in nerium.
Tortilis *arista*, awns or beards of corn twisted like a screw.
Transversum *dissepimentum*, when the dissepiments are at right angles with the sides of the pericarpium.
Trapeziforme *folium*, a leaf having four prominent angles, whose sides are neither equal nor opposite.
Triandria, three males, the third class in the sexual system.
Triangulare *folium*, a triangular leaf.
Tricocca *capsula*, a capsule with three cells, and a single seed in each cell.
Tricoccæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Tricuspidata, three pointed.
Trifidum *folium*, a leaf divided into three linear segments, having straight margins.
Triflorus *pedunculus*, a foot-stalk bearing three flowers.
Trigonus *caulis*, a three-sided stalk.
Trigynia, three females, the third order in some of the classes.
Trihillatæ, a seed having three eyes.
Trijugum *folium*, a winged leaf, with three pair of foliola.
Trilobum *folium*, a leaf having three lobes.
Trinervum *folium*, a leaf having three strong nerves running from the base to the apex.
Triœcia, three houses, the third order in the class polygamia in the sexual system.
Tripartitum *folium*, a leaf divided into three parts down to the base.
Tripetala *corolla*, a flower consisting of three petals.
Tripetaloideæ, three-petalled, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Triphyllus *calyx*, a cup consisting of three leaves.
Tripinnatum *folium, compositum*, a leaf having a triple series of pinnæ, or wings.
Triplinerve *folium*, a leaf having three nerves running from the base to the apex.
Triquetrum *folium, caulis*, leaves and stalks having three plain sides.
Trisperma, three-seeded, as in euphorbia.
Triternatum *folium, compositum*, a compound leaf when the divisions of a triple petiolus are subdivided into threes.
Trivalve *pericarpium*, a pod consisting of three valves.
Truncatum *folium*, a leaf having its apex as it were cut off.
Truncus, the body or stem of a tree.
Tuberculatus, having pimples or tubercles.
Tuberculum, a little pimple.
Tuberosa *radix*, a tuberous or knobbed root.
Tubulatum *perianthium*, tubular flowers, as in the class didynamia.
Tubulosi *flosculi*, tubular florets nearly equal, one of the three divisions of compound flowers.
Tubus, a tube, the lower and narrow part of a monopetalous flower.
Tunicatus *radix*, a species of bulbous root, having coats lying one over another from the centre to the surface, as in the onion, tulip, &c.
Turbinatum *pericarpium*, a kind of pod shaped like a top, narrow at the base and broad at the apex.
Turgidum *legumen*, swollen, puffed out, as in ononis.
Turio, the young buds, or shoots of pines.

V

Vaginales, ſheathed, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Vaginans *folium*, a leaf like a ſheath, whoſe baſe infolds the ſtem.
Valvula, a valve, a partition of the external cover of that ſort of pericarpium called capſula.
Vegetabilia, one of the three kingdoms of nature.
Venoſum *folium*, the veins which run over the whole ſurface of a leaf.
Ventricoſa *ſpica*, a ſpike narrowing at each extremity, and bellying out in the middle.
Ventriculoſus *calyx*, a flower cup bellying out in the middle, but not in ſo great a degree as ventricoſus.
Vepreculæ, a briar or bramble, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Verrucoſa *capſula*, a capſule having little knobs or warts on its ſurface.
Verſatilis *anthera*, when the anthera is fixed by the middle on the point of the filament, and ſo poiſed as to turn like the needle of a compaſs.
Verticalia *folia*, leaves ſo ſituated that their baſe is perpendicular above the apex.
Verticillati *rami*, *flores*, *folia*, branches, flowers, or leaves ſurrounding the ſtem, like the rays of a wheel.
Verticillatæ, an order of plants in the Fragmenta methodi naturalis of Linnæus.
Verticillus, a ſpecies of infloreſcence, in which the flowers grow in whorls, as in mentha.
Veſicula, a little bladder.
Veſicularis *ſcabrities*, a kind of glandular roughneſs, reſembling veſiculæ.
Vexillum, a ſtandard, the upright petal of a papilionaceous flower.
Villoſus *caulis*, *folium*, a ſtalk, or leaf, covered with ſoft hairs.
Virgatus *caulis*, ſtalks ſhooting out; ſlender ſtraight branches or rods.
Viſcidum *folium*, a leaf whoſe ſurface is clammy.
Viſcoſitas, glewy, clammy.
Uliginoſa *loca*, boggy places.
Umbella, an umbel or umbrella.
Umbellatus *flos*, an umbellated flower, as in pentandria digynia.
Umbellula, a little umbel.
Umbilicatum *folium*, a peltate leaf, ſhaped like a navel, at the inſertion of the foot-ſtalk.
Uncinatum *ſtigma*, a hooked ſtigma.
Undatum *folium*, a waved leaf, whoſe ſurface riſes and falls in waves towards the margin.
Undulata *corolla*, a flower whoſe petals are waved.
Unguis, a nail, or claw, that part of a petal that is joined to the receptacle.
Unicus *flos*, one flower.
Unicus *radix*, a ſingle root.
Uniflorus *pedunculus*, one flower on a foot-ſtalk.
Unilateralis *racemus*, a bunch of flowers growing on one ſide.
Univerſalis *umbella*, an univerſal umbel.
Volva, the membranaceous calyx of the fungi.
Volubilis *caulis*, a twining ſtalk.
Urceolata *corolla*, a pitcher-ſhaped flower.
Urens *caulis*, *folium*, a leaf or ſtalk, burning, ſtinging, as nettles.
Utricula, a ſpecies of glandular, ſecretory veſſels, on the ſurface of various plants.
Vulgaris, common, the trivial name of many plants in the books of old botaniſts.

BOTANY-BAY. See New Holland.

BOTANOMANCY, from βοτανη *herb*, and μαντεια *divination*, an ancient ſpecies of divination, by means of plants; eſpecially ſage and fig-leaves. The manner of performing it was thus: the perſons who conſulted wrote their own names and their queſtions on leaves, which they expoſed to the wind; and as many of the letters as remained in their own places were taken up, and being joined together, contained an anſwer to the queſtion.

BOTARGO, a kind of ſauſage, made with the eggs and blood of the mullet, a large fiſh common in the Mediterranean. The beſt kind comes from Tunis in Barbary. The common way of eating it is with olive oil and lemon juice. There is a great conſumption of it throughout the Levant.

BOTE, (Sax.) ſignifies a recompence, ſatisfaction, or amends: hence comes *manbote*, compenſation or amends for a man ſlain, &c. In king Ina's laws is declared what rate was ordained for expiation of this offence, according to the quality of the perſon ſlain. From hence likewiſe we have our common phraſe, *to boot*, i. e. *compenſationis gratia*. There are *houſe-bote*, *plough-bote*, &c. privileges to tenants in cutting of wood, &c.

BOTELESS, (*ſine remedio*). In the charter of Hen. I. to Tho. Archbiſhop of York, it is ſaid, "that no judgment, or ſum of money, ſhall acquit him that commits ſacrilege; but he is in Engliſh called *boteleſs*, viz. without emendation." We retain the word ſtill in common ſpeech: as, It is *bootleſs* to attempt ſuch a thing; that is, It is *in vain* to attempt it.

BOTHNIA, a province of Sweden, at the end of the gulph of the ſame name. It is divided into two parts called *eaſt* and *weſt Bothnia*, the former of which belongs to Finland.

BOTT, among bone-lace weavers, a kind of round cuſhion of light matter placed on the knee, whereon they work or weave their lace with bobbins, &c.

Bott, in zoology. See Botts.

BOTTLE, a ſmall veſſel proper to contain liquors, made of leather, glaſs, or ſtone. The word is formed from *butellus*, or *botellus*, uſed in barbarous Latin writers, for a leſſer veſſel of wine; being a diminutive of *bota*, which denoted a butt or caſk of that liquor. The ancient Jewiſh bottles were kegs made of goats or other wild beaſts ſkins, with the hair on the inſide, well ſewed and pitched together; an aperture in one of the animal's paws ſerving for the mouth of the veſſel. With us bottles are chiefly made of thick coarſe glaſs: though there are likewiſe bottles of boiled leather made by the caſe-makers. Fine glaſs-bottles covered with ſtraw or wicker, are called *flaſks* or *flaſkets*. The quality of the glaſs has been ſometimes found to affect the liquor in the bottle.—The practice of cleaning wine-bottles with leaden ſhot is highly pernicious, as it frequently happens that ſome of the pellets are left behind; and when wine or beer is again poured into the bottles, this mineral poiſon will ſlowly diſſolve, and impregnate thoſe vinous liquors with its deleterious qualities. The ſweetneſs which is ſometimes perceived in red port wine commonly ariſes from this cauſe.

BOTTLING, the operation of putting up liquors in bottles corked, to keep, ripen, and improve. The writers on good huſbandry give divers rules concerning the bottling of beer, cyder, &c. The virtues of Spaw, Pyrmont, Scarborough, and other waters, depend on their being well bottled and corked, otherwiſe they loſe both their taſte and ſmell. To preſerve theſe, it is neceſſary the bottles be filled up to the mouth,

that all the air may be excluded, which is the great enemy of bottled liquors. The cork is alſo further ſecured by a cement. Some improve their bottled beer, by putting a raiſin or a morſel of coarſe ſugar into each bottle, which revives the liquor ſurpriſingly. Cyder requires ſpecial precautions in the bottling; being more apt to fly, and burſt the bottle, than other liquors. The beſt way is to have the liquor thoroughly fine and ſettled before it be bottled: for want of this, ſome leave the bottles open awhile, or open them after two or three days bottling, to give them vent. If one bottle break, through fermentation, it is beſt to give them all vent, and cork them up again. Poor cyder is more apt to break the bottles than rich, eſpecially in ſummer, or when laid in too warm a ſituation. Some ſoak the corks in ſcalding water, to render them more pliant and ſerviceable. Another particular to be obſerved is, to lay the bottles ſo as that the liquor may always keep the cork wet and ſwelled. Something alſo depends on the place where the bottles are ſet, which ought to be ſuch as expoſes them as little as poſſible to the alterations and impreſſions of the air: the ground is better for this purpoſe than a frame, and ſand better than the bare ground. To haſten the ripening of bottled liquors, ſome ſet them in a warm place, or even expoſed to the ſun, where a few days will bring them to maturity.

BOTTOM, in a general ſenſe, denotes the loweſt part of a thing, in contradiſtinction to the top or uppermoſt part. In navigation, it is uſed to denote as well the channel of rivers and harbours, as the body or hull of a ſhip. Thus, in the former ſenſe, we ſay, *a gravelly bottom, clayey bottom, ſandy bottom*, &c. and in the latter ſenſe, a *Britiſh bottom*, a *Dutch bottom*, &c.— By ſtatute, certain commodities imported in foreign *bottoms* pay a duty called *petty cuſtoms*, over and above what they are liable to if imported in Britiſh bottoms.

BOTTOMRY, in commerce (a practice which originally aroſe from permitting the maſter of a ſhip in a foreign country to hypothecate the ſhip in order to raiſe money to refit), is in the nature of a mortgage of a ſhip; when the owner takes up money to enable him to carry on his voyage, and pledges the keel or bottom of the ſhip *(pars pro toto)* as a ſecurity for the repayment. In which caſe it is underſtood, that if the ſhip be loſt, the lender loſes alſo his whole money; but if it return in ſafety, then he ſhall receive back his principal, and alſo the premium or intereſt agreed upon, however it may exceed the legal rate of intereſt. And this is allowed to be a valid contract in all trading nations, for the benefit of commerce, and by reaſon of the extraordinary hazard run by the lender. And in this caſe, the ſhip and tackle, if brought home, are anſwerable (as well as the perſon of the borrower) for the money lent. But if the loan is not upon the veſſel, but upon the goods and merchandize, which muſt neceſſarily be ſold or exchanged in the courſe of the voyage, then only the borrower, perſonally, is bound to anſwer the contract; who therefore, in this caſe, is ſaid to take up the money at *reſpondentia*. Theſe terms are alſo applied to contracts for the repayment of money borrowed, not on the ſhip and goods only, but on the mere hazard of the voyage itſelf; when a man lends a merchant 1000*l.* to be employed in a beneficial trade, with condition to be repaid with extraordinary intereſt, in caſe ſuch a voyage be ſafely performed: which kind of agreement is ſometimes called *fœnus nauticum*, and ſometimes *uſura maritima*. But as this gave an opening for uſurious and gaming contracts, eſpecially upon long voyages, it was enacted by the ſtatute 19 Geo. II. c. 37. that all monies lent on bottomry, or at *reſpondentia*, on veſſels bound to or from the Eaſt Indies, ſhall be expreſsly lent only upon the ſhip, or upon the merchandize; that the lender ſhall have the benefit of ſalvage; and that if the borrower has not on board effects to the value of the ſum borrowed, he ſhall be reſponſible to the lender for ſo much of the principal as hath not been laid out, with legal intereſt and all other charges, though the ſhip and merchandize be totally loſt.

BOTTONY: A croſs bottony, in heraldry, terminates at each end in three buds, knots, or buttons, reſembling, in ſome meaſure, the three-leaved graſs; on which account Segoing, in his *Treſor Heraldique*, terms it *croix treſflée*. It is the badge of the order of St. Maurice.

BOTTS, in zoology, a ſpecies of worms which are found in great number in the ſtomachs and inteſtines of horſes, and are extremely difficult to deſtroy. See OESTRUS.

M. Valliſnieri is the firſt who has traced theſe worms to the laſt ſtage of their transformation, and has ſeen them change into a hairy kind of fly like the drone. It is in the ſummer ſeaſon probably, or the beginning of autumn, that the females of theſe flies apply themſelves to the anus of the horſe, and there depoſit their eggs. The preciſe inſtant of their entrance will ſcarcely admit of an eye-witneſs; yet it ſeems that Dr. Gaſpari luckily attained this very uncommon ſight as he was one day looking at his horſes in the field. From being very quiet, he obſerved, that on a ſudden they became very reſtleſs, and ran about in great agitation, prancing, plunging, and kicking, with violent motions of their tails. He found, that theſe extraordinary effects were produced by a fly which had ſettled upon one of them, paſſed under the tail, and ſo made its way to the anus. In conſequence of the itching brought on, the inteſtine was protruded, and the fly taking the advantage of this, penetrated further, and ſecured itſelf in the fold of the inteſtine in a ſituation proper for laying its eggs; which once effected, it has done all that is neceſſary.

Theſe botts, when hatched by the heat of the parts, ſoon make their way into the inteſtines of the horſe, and very commonly penetrate even to the ſtomach, where they hook themſelves very firmly by the tail, eſpecially on a portion of that viſcus, which, in the horſe, has the remarkable peculiarity of being covered with a cuticle, hence becoming unaffected by thoſe ſtimuli which act on the villous ſurface of the other parts. There is however a time when theſe bott-worms are of themſelves deſirous to leave this their habitation, it being no longer convenient for them after the purpoſes of their growth are anſwered. Their transformation to a fly muſt be performed out of the horſe's body: and accordingly, when the time of their transformation draws near, they approach towards the anus of the horſe; and then leave him of their own accord, or with the excrement, with which they then ſuffer themſelves to be carried along.

According to M. de Reaumur's obſervations, the bott-worms have two unequal claws, by which they are enabled to remain in the inteſtines of the horſe as long as they pleaſe, in oppoſition to all efforts of the excrement to force them out.—Theſe claws are a ſort of anchor, as if formed of two ſmall fiſhhooks differently diſpoſed from thoſe of common anchors, but contrived to produce the ſame effect. Beſides theſe two claws, nature has given them a very great number of triangular ſpines or briſtles, very ſufficient to arm them againſt the coats of the inteſtines, and to reſiſt the force employed to drive them towards the anus. When one of theſe botts has left the inteſtine of the horſe, its ſkin by degrees hardens and thickens, and at length forms a ſolid ſhell or cod, the form of which ſcarce differs from that of the worm; but before it paſſes into a nymph, it is of the form of an oblong ball, and remains ſo much longer than worms of the fleſh-fly kind. M. de Reaumur having met with worms that retained this figure five or ſix days, found that botts do not become nymphs immediately upon their firſt change; but that, in order to become flies, they muſt undergo one change more than caterpillars ordinarily do to become butterflies.—For the cure of horſes troubled with botts, ſee FARRIERY.

Horfes, though greatly incommoded by thefe worms, are feldom very ferioufly affected by them. It has indeed been afferted that they have proved fatal to fome horfes by their immenfe numbers, but the fact is doubtful.

BOTWAR, a town of Germany, in the circle of Suabia. E. long. 9. 15. N. lat. 49. 0.

BOTZENBURG, a town of Germany, in the duchy of Mecklenburg, feated on the Elbe. E. long. 10. 48. N. lat. 53. 34.

BOVA, an epifcopal town of Italy, in the kingdom of Naples, feated near the Apennine mountains. E. long. 16. 15. N. lat. 37. 15.

BOUCHAIN, a fortified town of France, in the department of the North, and late province of Hainault, divided into two parts by the river Scheldt. E. long. 3. 15. N. lat. 50. 17.

BOUCHE OF COURT, the privilege of having meat and drink at court fcot-free. The word is alfo written *bowge*, *bouge*, and *budge*; it is mere French, where it fignifies *mouth*.—The French ufed the phrafe, *Avoir bouche a la cour*; that is, *to have table or diet at court*. This privilege is fometimes only extended to bread, beer, and wine: it was a cuftom anciently, as well in the houfes of noblemen as in the king's court. Thomas earl of Lancafter retained Sir John de Ewre, to ferve him with ten men at arms in time of war, allowing them *bouge of court*, with livery of hay and oats, horfe-fhoes and nails. Sir Hugh Merrill had the fame privilege for life, on condition of ferving king Edward II.

BOUDRY, a fmall town of Swifferland, in the province of Neufchatel. E. long. 7. 5. N. lat. 47. 11.

BOVEY-COAL, an inflammable foffile found in England, France, Italy, Swifferland, Germany, Ireland, &c. It is of a brown or brownifh black colour, and of a laminar ftructure. It is compofed of wood, penetrated by petroleum or bitumen; and frequently contains pyrites, alum, &c.

BOUGH, denotes much the fame with BRANCH.—Green boughs anciently made part of the decoration of altars and temples, efpecially on feftive occafions. Oaken boughs were offered to Jupiter; thofe of laurel, to Apollo; of olive, to Minerva; myrtle, to Venus; ivy, to Bacchus; pine, to Pan; and cyprefs, to Pluto. Some make them the primitive food of mankind before acorns were invented.

BOUGIE, an inftrument employed by furgeons in the cure of ftrictures of the urethra.

What are called *Simple* bougies, or thofe defigned to act mechanically on ftrictures in the urethra, have been prepared from various receipts; the ingredients being for the moft part alike, but differing in their proportions. We fhall therefore confine our account to the following compofitions, the former of which is recommended by Mr. Hunter:—℞ Olei olivæ lib. iij. Ceræ flavæ lib. j. Minii lib. ifs. Thefe are to be boiled together over a flow fire for fix hours. Bougies made with this compofition will be found much too foft for immediate ufe, but after keeping fome months, will acquire fufficient firmnefs. If this be an objection however, it may eafily be removed, and the plafter made of a ftiffer confiftence, by adding two or three ounces more wax and the like quantity of minium, and continuing the boiling till the latter is diffolved.

Bougies ought to be fmooth and fupple, and yet of fufficient firmnefs to admit of being pretty ftrongly urged by the hand of the furgeon, without bending or twifting in the urethra. They are formed of narrow flips of thin linen rag, which, after being equally dipped into the melted compofition, are firmly folded up, and afterwards rolled on a marble flab till their furface is perfectly uniform. Their fhape fhould be nearly equal, except towards the point, which fhould taper very gradually for about the length of an inch.

A tolerably good compofition for bougies may alfo be formed with litharge plafter and yellow wax, to which may be added, a fmall quantity of red fulphurated quickfilver. The following formula is from Swediaur:—℞ Ceræ flavæ lib. j. Spermatis ceti drach. iii. Ceruffæ acetatæ drach. ij ad viij. Thefe are to be boiled together as in the former inftance, and the proportion of acetated cerufe regulated according as the bougies are defigned to be of a firmer or a weaker confiftence. When of a large fize, they fhould always be of the latter defcription, that they may the more readily conform to the fhape of the paffage when introduced.

Bougies are likewife formed of catgut, a fubftance well calculated to penetrate a ftrictured part in the firft inftance, as it admits of being made fmaller than the plafter bougie, and yet poffeffes a fufficient degree of elafticity and ftrength to allow of being pufhed forward with fome force. Catgut bougies are alfo well calculated to pafs through an aperture which takes a winding fort of direction, a cafe in which the common bougie very frequently fails. They do lefs however towards dilating the ftricture than is generally fuppofed, as they foon become foft and flabby, and in that ftate, rather yield to the preffure of the ftricture, than produce the effect of dilating it.

But befides thefe there is a fort of bougie which is called *medicated*. Many formulæ of this kind are given in the *Pharmacopœia Chirurgica*, and among the reft the receipt of the noted *Daran*.

There exifts however a ferious objection to all medicated bougies that are compofed of very active ingredients, namely, that the healthy, no lefs than the unfound parts of the urethra, are expofed to their effects, and may become difeafed in proportion as the difeafed parts become found. For thefe reafons, and becaufe of the impoffibility of medicating fo much and no more of the bougie than comes in contact with the ftricture, furgeons have, for the moft part, given up the ufe of them. Bougies into the compofition of which quick-filver was introduced were at one time in repute for the cure of ftrictures.

Some furgeons have preferred the common plafter bougie with a little red nitrated quickfilver, or fome other efcharotic rubbed upon, or rather incorporated with, the fmall end, which they have afterwards endeavoured to pafs into the ftricture. But the objections to this method are obvious.

A late invention, in which catgut is involved in elaftic gum, is perhaps one of the greateft improvements ever made in the compofition of fimple bougies. The gum defends the catgut from the moifture of the urethra, and renders the bougie pliant in all its parts, whilft a very fuitable degree of firmnefs refults from the intermixture of the catgut. Some injury however is done by the coat of varnifh with which thofe bougies are fometimes covered, the urethra being very confiderably irritated from this caufe when the bougie is retained for any length of time.

By the way, it may not be improper to obferve, that the practice of keeping the bougie in, as formerly directed by Mr. Sharp and others, for feveral hours together, has been relinquifhed of late years on account of the injury fuppofed to be done by it to the functions of the mufculi acceleratores. It is now the practice to wear a bougie only for a few minutes at a time; but there certainly are cafes, where this treatment cannot but prove inefficacious.

BOUHOURS (Dominic), a celebrated French critic, was born at Paris in 1628; and has been by fome confidered as a proper perfon to fucceed Malherbe, who died about that time. He was entered into the fociety of Jefuits at the age of 16; and was appointed to read lectures upon polite literature in the college of Clermont at Paris, where he had ftudied: but he was fo inceffantly affected with the head-ach, that he could not purfue the deftined tafk. He afterwards undertook the education of two fons of the duke of Longueville, which he dif-

charged with great applaufe. The duke had fuch a regard for Bouhours, that he would needs die in his arms; and the "Account of the pious and Chriftian death" of this great perfonage was the firft work which Bouhours gave the public. He was fent to Dunkirk to the Popifh refugees from England; and in the midft of his miffionary occupations, found means to compofe and publifh books. Among thefe were, *Entretiens d' Arifte & d' Eugene*, or "Dialogues between Ariftus and Eugenius;" a work of a critical nature, and concerning the French language. His book was printed no lefs than five times at Paris, twice at Grenoble, at Lyons, at Bruffels, at Amfterdam, at Leyden, &c. and embroiled him in quarrels with a great number of cenfors, with Menage in particular, who, however, lived in friendfhip with our author before and after. The fame of this piece, and the pleafure he took in reading it, recommended Bouhours fo effectually to the celebrated minifter Colbert, that he trufted him with the education of his fon the marquis of Segnelai. He wrote afterwards feveral other works; the chief of which are, 1. Remarks and doubts upon the French language. 2. Dialogues upon the art of thinking well in works of genius. 3. The life of St. Ignatius. 4. The art of pleafing in converfation. 5. The life of St. Francis Xavier, apoftle of the Indies and of Japan. This laft work was tranflated from the French into Englifh by Mr. Dryden, and publifhed at London, in the year 1688, with a dedication to James II.'s queen prefixed to it.

BOUILLON, a town of France, in the duchy of the fame name, and in the territory of Luxemburg, with a fortified caftle, feated on a rock that is almoft inacceffible. E. long. 5. 20. N. lat. 49. 45.

Bouillon, in the manege, a wart or excrefcence of flefh that grows either upon or juft by the frufh, infomuch that the frufh fhoots out, juft like a flefhy tumour, and makes the horfe halt; and this is called the *flefh blowing upon the frufh*. Manege horfes, that never wet their feet, are fubject to thefe excrefcences, which make them very lame. See Frush.

BOVINA affectio, a difeafe of black cattle, caufed by a worm lodged between the fkin and the flefh, and perforating the latter. This is not mentioned by the ancient Greeks, and is but little known in Europe.

BOVINES, a fmall town of the Auftrian Netherlands, in the province of Namur, feated on the river Maefe or Meufe, in E. long. 4. 50. N. lat. 49. 45.

BOVINO, an epifcopal town of Italy, in the Capitanata, feated at the foot of the Apennine mountains, in E. long. 16. 15. N. lat. 41. 17.

BOULAINVILLIERS (Henry de), Lord of St. Saife, and an eminent French writer, was defcended from a very ancient and noble family, and born at St. Saife in 1658. His education was among the fathers of the oratory; where he difcovered from his infancy thofe uncommon abilities for which he was afterwards diftinguifhed. He applied himfelf principally to the ftudy of hiftory; and his performances in this way are numerous and confiderable. He was the author of a hiftory of the Arabians; Fourteen letters upon the ancient parliaments of France; a Hiftory of France to the reign of Charles VIII.; the State of France, with hiftorical memoirs concerning the ancient government of that monarchy, to the time of Hugh Capet, "written (fays Mr. Montefquieu) with a fimplicity and honeft freedom worthy of that ancient family from which their author was defcended." Mr. Boulainvilliers died at Paris in 1722; and after his death his Life of Mahomet was publifhed.

BOULANGER (John), an engraver, who flourifhed towards the end of the laft century, was a native of France. His firft manner of engraving appears to have been copied, in fome degree, from that of Francis de Poilly; but foon after he adopted one of his own, which, though not original, he however greatly improved. He finifhed the faces, hands, and all the naked parts of his figures, very neatly with dots inftead of ftrokes, or ftrokes and dots. The effect is fingular enough, and by no means unpleafing; only, in fome few inftances, he has oppofed the coarfe graving of his draperies, and background, fo violently to the neater work of the flefh, that the outline of the latter is thereby rendered hard, and the general appearance of it flat and chalky. This ftyle of engraving has been carried to its greateft perfection in the prefent day, particularly in England. He did not draw the naked parts of his figures correctly, or with fine tafte. His draperies are apt to be heavy, and the folds not well marked. However, his beft prints poffefs much merit, and are defervedly held in great efteem.

BOULCOLACA, among the modern Greeks, denotes the fpectre of fome wicked perfon who died excommunicated by the patriarch, reanimated by the devil, and caufing great difturbance among the people; of which many ftrange ftories are told. The word is Greek, and is fometimes written βρυκολακος, and fuppofed to be derived from βωρκος, or βωρκα "mud," and λακκος a "ditch," on account of the filthinefs of the fight.

BOULDER-wall, a kind of wall built of round flints or pebbles, laid in ftrong mortar, and ufed where the fea has a beach caft up, or where there are plenty of flints.

BOULETTE, in the manege. A horfe is called *boulette*, when the fetlock, or paftern joint, bends forward, and out of its natural fituation, whether through hard riding, or his being too fhort-jointed, in which cafe the leaft fatigue will occafion it.

BOULLONNE (Lewis), painter to the French king, and profeffor of the academy of painting, diftinguifhed himfelf by his art; and died at Paris in 1674, aged 65. There are three of his pictures in the church of Notre Dame.—He left two fons who were admired for their fkill in painting. The elder, who is well known under the name of *Bon Boullonne*, was firft inftructed by his father; after which he went to perfect himfelf in Italy, and for that purpofe the king allowed him a penfion: at his return, he was made profeffor of the academy of painting. Lewis XIV. employed him in adorning feveral of his palaces; and there are a great number of his pictures at Paris. His talents for copying the pictures of the great Italian mafters were fo very extraordinary, that he frequently deceived the greateft judges. He died in 1717.—*Lewis Boullonne*, his brother, after being alfo inftructed by his father, gained the prize of painting at 18 years of age; upon which he obtained the king's penfion. He fet out for Italy at his brother's return, and acquired great fkill in defigning and colouring. At his return to Paris he was much employed; and at length became director of the academy of painting, knight of the order of St. Michael, and firft painter to the king. Louis XIV. allowed him feveral penfions, and raifed him and his pofterity to the rank of nobility. He embellifhed the church of the Invalids, the chapel of Verfailles, &c. and died at Paris in 1733.

BOULOGNE, a large and handfome town of France, in the department of the Straits of Calais, and late province of Boulonnois. It is divided into two towns; the higher, and the lower. The former is ftrong both by nature and art; and the latter is only furrounded with a fingle wall. The harbour has a mole for the fafety of the fhips, which at the fame time prevents it from being choaked up. E. long. 1. 42. N. lat. 50. 42.

BOULTINE, a term which workmen ufe for a moulding, the convexity of which is juft one-fourth of a circle; being the member juft below the plinth in the Tufcan and Doric capitals.

BOULUKE, in the military orders of the Turks, a body of the janizaries, with an officer in the place of a colonel at their head, ſent upon ſome particular enterpriſe; they are ſelected out of the corps for this, and, as ſoon as the buſineſs is over, are received again into their former companies.

BOUNCE, in ichthyology, the Engliſh name of a ſpecies of ſqualus. See SQUALUS.

BOUND *Bailiffs*, are ſheriffs officers for executing of proceſs. The ſheriffs being anſwerable for their miſdemeanors, the bailiffs are uſually bound in a bond for the due execution of their office; and thence are called *bound-bailiffs*, which the common people have corrupted into a much more homely appellation.

BOUNDS OF LANDS. See ABUTTALS.

BOUNTY, in commerce, a premium paid by government to the exporters of certain Britiſh commodities, as ſail-cloth, gold and ſilver lace, ſilk-ſtockings, fiſh, corn, &c. The happy influence which bounties have on trade and manufactures is well known: nor can there be a more convincing proof of the good intentions of the government under which we live, than the great care that is taken to give all poſſible encouragement to thoſe who ſhall eſtabliſh or improve any hazardous branch of manufacture or commerce.

All undertakings, in reſpect either to mercantile enterpriſes, or in the eſtabliſhment of manufactures, are weak and feeble in their beginnings; and if unſucceſsful, either ſink entirely, or at leaſt are ſeldom revived in the ſame age. Accidents of this nature are not only deſtructive to private perſons, but exceedingly detrimental to the public intereſt. On this principle, more eſpecially ſince trade has been cultivated, ſuch attempts have been thought deſerving, and have been favoured with, public ſupport. This in former times uſually flowed from the crown, in the form of letters-patent, charters, or other grants of privileges, which, however requiſite they might be, were notwithſtanding very frequently objects of cenſure. If ſuch as obtained them failed in their endeavours, they were reputed *projectors*; if, on the other hand, they ſucceeded, they were conſidered as *monopolizers*. Corporations, which imply the uniting certain individuals into a body, that they may thereby become more uſeful to the *community*, were alſo created by the crown with this view. Many of theſe were formed for promoting trade; and, according to the old ſyſtem of our government, were thought neceſſary and uſeful. But they are now degenerated into ſo many ſyſtems of monopoly, and tend only to be of ſervice to the individuals that compoſe that ſmall body of directors or managers, who ſuperintend their concerns. On the ſame principle, privileges were granted to private perſons, on a ſuggeſtion, that what was immediately of uſe to them would terminate in public utility. Theſe alſo did good in bringing in many arts and manufactures; though, in ſome caſes, tending to private intereſt more than public emolument, they were liable to legal correction. In later times, and in concerns of moment, a much better method has been adopted, as often as it hath been found practicable, by rejecting private or particular intereſt, and propoſing the deſigned advantages to ſuch as ſhould perform the ſtipulations on which they are granted. Theſe bounties, as they are paid by the public, ſo they are ſolely calculated for the benefit of the public. They are ſometimes given to encourage induſtry and application in raiſing a neceſſary commodity; which was intended by the bounty on exporting corn. The intention of this bounty was to encourage agriculture; and the conſequence hath been, that we now grow more than twice as much as we did at the eſtabliſhment of the bounty; we even conſume twice as much bread as we then grew; yet in A. D. 1697, we exported a fifteenth part of what we grew, of late years a twenty-ninth part only. The bounty on this twenty-ninth part amounted to ſomewhat more than 50,000 l. and the produce to more than 400,000 l. It is evident that all this is ſo much clear gain to the nation. But this is far from being all that we have annually gained. For if our cultivation is doubled, as indeed it is, then the rent of lands, the ſubſiſtence of working hands, the profits of the tradeſmen ſupplying them with utenſils, clothes, the value of horſes employed, &c. muſt all be taken into the account. Beſides this, we muſt add the freight, amounting to half the bounty, otherwiſe we ſhall not form a complete idea of the advantages gained.

Bounties are alſo occaſionally given with a view to promote manufactures, as in the caſe of thoſe made of ſilk. Many laws are to be found in our ſtatute-books in favour of the ſilk manufacture, made with great wiſdom and propriety, for the encouragement and ſupport of many thouſands of induſtrious perſons employed therein. By ſtatute 8 Geo. I. cap. 15. § 1. a bounty was given on the due exportation of ribbons and ſtuffs, of ſilk only, of three ſhillings upon a pound weight; ſilks, and ribbons of ſilk, mixed with gold and ſilver, four ſhillings a pound; on ſilk gloves, ſilk ſtockings, ſilk fringes, ſilk laces, and ſewing ſilk, one ſhilling and three-pence a pound; on ſtuffs of ſilk and grogram yarn, eight-pence a pound; on ſilks mixed with incle or cotton, one ſhilling; on ſtuffs of ſilk mixed with worſted, ſix-pence a pound, for three years: and, from experience of their utility, theſe were continued by ſubſequent acts of the legiſlature.

Sometimes bounties are given to ſupport a new manufacture againſt foreigners already in poſſeſſion of it, as in making linen and ſail-cloth. The promoting of the manufacture of Britiſh ſail-cloth was undoubtedly a very important national object, as the conſumption was very large, and of conſequence the purchaſe of it from foreigners an heavy expence on the public. Many methods were therefore deviſed, and countenanced by law, both here and in Ireland, for introducing and encouraging our own in preference to that of ſtrangers, more eſpecially in the royal navy. By ſtat. 12 Ann, cap. 16. § 2. a bounty was given of one penny per ell on all that was exported for a term, and continued by ſubſequent ſtatutes. By 4 Geo. II. cap. 27. § 4. an additional bounty of another penny an ell is granted. Theſe bounties were to be paid out of an additional duty on imported ſail-cloth. By the ſame ſtatute every ſhip built in Britain, or in the plantations, is, under the penalty of 50 l. to be furniſhed with a complete ſuit of ſails of Britiſh manufacture. The amount of theſe bounties marks the progreſs of the manufacture, which is alſo aſſiſted by the fund on which the payment is aſſigned.

It is however to be underſtood, that theſe aſſiſtances are never beſtowed but on mature deliberation, in virtue of ſtrong proofs, and with a moral certainty of a national benefit. The great intention of bounties is to place the Britiſh trader on ſuch ground as to render his commerce beneficial to his country. In order to this, ſome profit muſt accrue to himſelf, otherwiſe he would not embark therein; but this, whatever it be, muſt prove inconſiderable in compariſon of what reſults to the public. For if, by the help of ſuch a bounty, one or many traders export to the value of 1000, 10,000, or 100,000 pounds worth of commodities or manufactures, whatever his or their profit or loſs (for the latter, through avidity and overloading the market, ſometimes happens) may be, the nation gains the 1000 l. 10,000 l. or 100,000 l.; which was the object of the legiſlature in granting the bounty. Upon this conſideration, that the entire produce of what is exported accrues to the nation, the legiſlature, when an alteration of circumſtances required it, have made no ſcruple of augmenting a bounty; as in the caſe of refined ſugar exported, from three to nine ſhillings per hundred weight. In like manner, the original bounty of one pound per ton in favour of veſſels employed in the whale

fiſhing hath been doubled, and many new regulations made, in order to render this fiſhery more advantageous to the public. As a bounty is given on malt when allowed to be exported, ſo an equivalent of 30 ſhillings per ton hath been granted on all Britiſh made malt-ſpirits when exported, which is a common benefit to land, to manufactures, and the commerce of the country.

It muſt be admitted indeed, that on whatever account, or to whatever amount, this reward is given, the public ſeem to pay, and private perſons ſeem to receive. But theſe private perſons receive it as the hire from the public, for performing a ſervice which otherwiſe they would not perform, the benefit of which accrues to the public, and who can therefore very well afford to pay that reward in reality, which, as we have ſtated it, ſhe only ſeems to do. For, looking a little cloſer, we cannot help obſerving, that the bounty is paid to individuals, who, as ſuch, make a part of the public. But the commodities or manufactures exported are ſold to foreigners; and the whole produce of them, be it what it will, comes into the purſe of the public. By attending to this ſelf-evident doctrine, every reaſonable and public-ſpirited man will be eaſily reconciled to bounties; and the three following conſiderations will be ſufficient to obviate the moſt common objections that have been made to the practice of giving them. 1. That no bounty can be deſired but on the plea of national utility, which always deſerves notice, and cannot be miſtaken. It muſt likewiſe be alleged and proved, that this is the only means whereby the national benefit can be attained. 2. The ſums iſſued on this account not only ſhow the clear expence of the bounty, but alſo indicate the profit gained by the public; for as the one cannot exiſt without the other, that amount muſt be the inconteſtable index of both. 3. It muſt be remembered (and of this too ſome inſtances might be given), that if bounties ſhould be improperly beſtowed, they will of courſe prove ineffectual, and after a few fruitleſs trials will remain unclaimed, and conſequently produce no expence. There is indeed another objection which hath been made againſt the giving of bounties. This is grounded on the frauds to which they are ſuppoſed to be liable; and particularly the relanding of the goods on which the bounty hath been paid, and thereby deceiving and cheating the public. But whoever peruſes the laws made on this head, and attentively conſiders the numerous precautions taken to fix every circumſtance relative to the obtaining the bounty, the checks on the ſhipping of goods, the ſecurities taken for their due exportation, the certificates required to aſcertain their being actually delivered and ſold in a foreign market, muſt be convinced, that to diſcharge all thoſe ſecurities, in caſe of an intended fraud, is a thing very difficult, if not altogether impracticable.

To the foregoing remarks we may add, that bounties are uſually granted only for a limited time; are always liable to be ſuſpended; and of courſe can never be the cauſe of any great national loſs. There is no doubt that, excluſive of frauds, the immoderate thirſt of gain may tempt intereſted men to aim at converting what was calculated for public benefit to its detriment, for their own private advantage. Thus, on a proſpect of ſhort crops in other countries, men may take meaſures within the letter, but directly againſt the ſpirit, of the law, to ſend ſo much of our corn abroad as to endanger a famine at home. For this the wiſdom of parliament provides, not barely by ſuſpending the bounty, but by prohibiting exportation and opening the ports for foreign ſupplies. We cannot with any ſhadow of juſtice aſcribe ſcarcity to the bounty on the exportation. If this was the caſe, ſuſpenſions would be frequent, whereas there have been but five in a courſe of 70 years. If the bounty had any ſhare, the larger the exportation, the greater would be the ſcarcity. In A. D. 1750 we exported more than one fifth of our growth of wheat, which was notwithſtanding but at four ſhillings per buſhel; whereas a century before, A. D. 1650, when we had neither bounty nor exportation, wheat was at nine ſhillings and ſixpence per buſhel. The cauſes of ſcarcity are unkindly ſeaſons; which though human policy cannot prevent, yet their ſad effects have been evidently leſſened by our increaſed growth, ſince the bounty and exportation were allowed by law.

Queen Anne's Bounty, for augmenting poor livings under 50l. *per annum*, conſiſts of the produce of the firſt fruits and tenths, after the charges and penſions payable out of the ſame are defrayed. A corporation for management of the ſame was ſettled, &c. in 1704. See Augmentation.

BOURBON, or Mascarenhas (iſle of), an iſland of Africa, in the Indian Ocean, about 60 miles long, and 45 broad. They have not a ſafe harbour in the iſland; but many good roads for ſhipping. On the S. E. is a volcano. It is a fertile iſland; producing, in particular, excellent tobacco. The climate is hot, but not to ſuch a degree as might be expected from its ſituation, the breezes from the mountains being conſtant and very refreſhing. Moſt ſorts of cattle are found here, good in their kind, and are very cheap. As to fruits, they have bananas, oranges, citrons, tamarinds, and other kinds; neither does it want valuable commodities, particularly ebony, cotton, white pepper, gum benzoin, aloes, and tobacco; all excellent in their kind, when compared with thoſe of other countries. This iſland is alſo happy in its deficiencies; for no animals that are venomous are to be found therein, and only two ſorts that are diſagreeable to the ſight, *viz.* ſpiders of the ſize of a pigeon's egg, which weave nets of a ſurpriſing ſtrength, reckoned by ſome capable of being treated ſo as to become as valuable as ſilk; and bats of a moſt enormous ſize, which are not only ſkinned and eaten, but eſteemed alſo the greateſt delicacy that they have.

The iſland of Bourbon was diſcovered by the Portugueſe in 1545, as appears by a date inſcribed by them upon a pillar when they firſt landed; but when the French ſettled in Madagaſcar, this iſland was totally deſolate. Three Frenchmen being baniſhed thither, and left there for three years, made ſuch a report of it at their return as ſurpriſed their countrymen. They lived moſt of that time upon pork; and though they were in a manner naked, yet they affirmed that they never had the leaſt pain or ſickneſs whatever. This tempted one Anthony Taureau to go over thither in 1654, accompanied by ſeven French and ſix negroes, who carried with them the cattle from which the iſland has been ſtocked ever ſince. The French have ſome conſiderable towns in this iſland, with a governor; and here their Eaſt India ſhips touch for refreſhments. It is 300 miles E. of Madagaſcar. Long. 55. 30. E. Lat. 20. 52. N.

Bourbon *Lanci*, a town of France, in the department of Saone and Loire, and late province of Burgundy. It is remarkable for its caſtle and hot mineral waters; and there is a large marble pavement, called the Great Bath, which is a work of the Romans. It is 15 miles S. W. of Autun. Long. 4. 6. E. Lat. 46. 47. N.

Bourbon *L'Archambaud*, a ſmall town of France, in the department of Allier, and late province of Bourbonnois. It is ſituated in a bottom, near the river Allier, and is remarkable for its hot baths, and for giving name to the family of the late unfortunate king of France. It is 15 miles W. of Moulins, and 362 S. of Paris. Long. 3. 5. E. Lat. 46. 55. N.

Bourbon, *Family of*, before the eſtabliſhment of the republican conſtitution, were the reigning princes in the kingdom of France. Henry IV. in 1589, though of the 10th generation, was the neareſt heir; and ſucceeded Henry III. (the laſt of the Valois race), whoſe brother Francis II. married Mary Queen of Scots, and both died without iſſue. Louis XVI.

who was dethroned and beheaded, was the 5th king of the Bourbon family in fucceffion. This family alfo mounted the throne of Spain in 1700, by Philip V. grandfon to Louis XIV. which was the occafion of the long and bloody war that ended in the peace of Utrecht. A branch of the Spanifh family likewife afcended the throne of the Two Sicilies in 1734. Thefe three branches entered into a treaty offenfive and defenfive in 1761, which went by the name of the *family compact*, but which the new order of things in Europe has for the moft part annihilated.

BOURBONNE-LE-BAINS, a town of France, in the department of Upper Marne and late province of Champagne, famous for its hot baths. It is 17 miles E. of Langres. Lon. 5. 45. E. Lat. 47. 54. N.

BOURBONNOIS, a province of France, bounded on the N. by Nivernois and Berry; on the W. by Berry and part of Marche; on the S. by Auvergne, and on the E. by Burgundy and Forez. It abounds in corn, fruit, pafture, wood, game, and wine. It now forms the department of Allier.

BOURDEAUX, an ancient city of France, in the department of Gironde and late province of Guienne. It is an archbifhop's fee, has a univerfity, and an academy of arts and fciences. It is built in the form of a bow, of which the river Garonne is the ftring: this river is bordered by a large quay, and the water rifes four yards at full tide, for which reafon the largeft veffels can come up to it very readily. It contains upward of 100,000 inhabitants, and is one of the firft cities of France for magnitude, riches, and beauty. The cathedral, and the churches belonging to the late religious orders, the Dominicans and Chartreux, are much admired. The fpire of St. Michael's was a beautiful Gothic piece till 1768, when more than 100 feet of it was thrown down by a hurricane. The caftle, called the trumpet, is feated at the entrance of the quay, and the river runs round its walls. Moft of the great ftreets lead to the quay; but are all narrow, except one. The town has 12 gates; and near another caftle are fine walks. The moft remarkable antiquities are the palace of Galienus, built like an amphitheatre, and feveral aqueducts in different places. Almoft in the centre of the town was a fine equeftrian ftatue in bronze, erected to Louis XV. in 1743, with the following infcription:

Ludovico quindecimo,
Sæpe victori, femper pacificatori;
Suos omnes, quam late regnum patet,
Paterno pectore gerenti;
Suorum in animis penitus habitanti.

The beauty of the river Garonne, and the fertility of the adjoining country, were probably the caufes which induced the Romans to lay the foundations of this city. Bourdeaux has a confiderable trade; and they fhip every year 100,000 tons of wine and brandy. This is the place where Edward the Black Prince refided feveral years, and his fon, afterward Richard II. was born. It is 87 miles S. of Rochelle, and 325 S. W. of Paris. Long. 0. 30. W. Lat. 44. 50. N.

BOURDELOT (John), a learned French critic, who lived at the clofe of the 16th and beginning of the 17th centuries. He diftinguifhed himfelf by writing notes on Lucian, Petronius, and Heliodorus; by an Univerfal Hiftory; Commentaries on Juvenal; a Treatife on the Etymology of French words; and by fome other works which were never publifhed.—There was alfo an abbé Bourdelot, his fifter's fon, who changed his name from Peter Michon to oblige his uncle. He was a celebrated phyfician at Paris, who gained great reputation by a Treatife on the Viper, and other works. He died in 1685.

BOURDINS, a town of the Auftrian Netherlands, in the province of Namur. E. long. 5. 0. N. lat. 50. 35.

BOURDON (Sebaftian), a famous painter, born at Montpelier, in 1619. He ftudied feven years at Rome; and acquired fuch reputation, that at his return to France he had the honour of being the firft who was made rector of the academy of painting at Paris. He fucceeded better in his landfcapes than in his hiftory-painting. His pieces are feldom finifhed; and thofe that are fo, are not always the fineft. He once laid a wager with a friend, that he would paint 12 heads after the life, and as big as the life, in one day. He won it; and thefe are faid not to be the worft things he ever did. His moft confiderable pieces are, The gallery of M. de Bretonvilliers, in the ifle of Notre Dame; and, The feven works of mercy, which he etched himfelf. But the moft efteemed of all his performances is, The martyrdom of St. Peter, drawn for the church of Notre Dame: it is kept as one of the choiceft rarities of that cathedral. Bourdon was a Calvinift: much valued and refpected, however, in a Popifh country, becaufe his life and manners were good. We have alfo by this mafter a great number of etchings; which are executed in a bold, mafterly ftyle, and much more finifhed than thofe we generally meet with from the point of the painter. They are juftly held in the higheft eftimation by the generality of collectors. He died in 1673, aged 54.

BOURDONEE, in heraldry, the fame with POMEE.

BOURG, the capital of the ifland of Cayenne, a French colony on the coaft of Guiana, in South America; in W. long. 52. 0. N. lat. 5. 0.

BOURG, a town of France, in the department of Ain and late province of Breffe. Near this place is the magnificent church and monaftery of the late Auguftins, in which is the maufoleum of Margaret of Auftria, aunt of Charles V. and other fine pieces of fculpture. Bourg is feated on the river Reffouffe, 20 miles S. E. of Macon, and 233 S. E. of Paris. Long. 5. 19. E. Lat. 56. 11. N.

BOURG, a fmall town of France, in the department of Gironde and late province of Guienne, with a good harbour on the river Dordogne, near the point of land formed by the confluence of that river and the Garonne, which is called the Bec-d'Ambez, and is thought a dangerous paffage. It is 15 miles N. of Bourdeaux. Long. 0. 30. W. Lat. 45. 5. N.

BOURGANEUF, a fmall well built town of France, in the department of Creufe and late province of Marche. It is remarkable for a very large and lofty tower, faced with ftones cut diamond wife. It was erected, toward the end of the 15th century, by Zifim, brother of Bajazet II. emperor of the Turks, when he was obliged to exile himfelf, after the lofs of a decifive battle. Bourganeuf is feated on the river Taurion, 20 miles N. E. of Limoges, and 200 S. of Paris. Lon. 1. 55. E. Lat. 45. 59. N.

BOURGES, an antient town of France, in the department of Cher and late province of Berry, once an archiepifcopal fee and a univerfity. Although, in extent, it is one of the greateft cities in France, the inhabitants hardly amount to 25,000, and their trade is inconfiderable. This city was the birth-place of Lewis XI. the Nero of France, and the celebrated preacher Bourdaloue. It is feated on the rivers Auron and Yevre, 25 miles N. W. of Nevers, and 125 S. of Paris. Lon. 2. 28. E. Lat. 47. 5. N.

BOURGET, a town of Savoy, on a lake of the fame name, fix miles N. of Chamberry. Long. 5. 50. E. Lat. 45. 41. N.

BOURGOGNE, or BURGUNDY, as we call it; a late province of France, bounded on the E. by Franche Comté, on the W. by Bourbonnois and Nivernois, on the S. by Lyonois, and on the N. by Champagne. It is fertile in corn, fruits, and excellent wines. It is 112 miles in length, and 75 in breadth; and is now formed into the three departments of Côte d'Or, Saone and Loire, and Yonne.

BOURGUIGNONS, or BURGUNDIANS, were one of the northern nations who over-ran the Roman empire, and fettled in Gaul. They were of a great ftature, and very warlike; for which reafon the emperor Valentinian the Great engaged them in his fervice againft the Germans. They lived in tents which were clofe to each other, that they might the more readily unite in arms on any unforefeen attack. Thefe conjunctions of tents they called *burghs*; and they were to them what towns are to us. Sidonius Apollinaris tells us, that they wore long hair, took great pleafure in finging, and were fond of praife for their vocal talents. He adds, that they ate great quantities; and anointed their hair with butter, deeming that unction very ornamental. Their crown was at firft elective, and the authority of their kings expired with their fuccefs. They were not only accountable for their own mifconduct, but likewife for the calamities of nature, and the caprice of fortune. They were depofed if they had loft a battle; if they fucceeded ill in any enterprife; or if, in fhort, any great event had not correfponded with the hopes of the public. They were not more favourably treated in cafe of a bad harveft or vintage, or if any epidemical diftemper had ravaged the ftate. At firft they were governed by many kings, and *hendin* was the title of the royal dignity. But in latter times they were fubjected to one fovereign; and they grew humane and civilized, efpecially when Chriftianity was propagated in their country. Before that epocha, their religion was much the fame with that of the other northern nations. They had many priefts, the chief of whom was diftinguifhed by the name of *finiftrus*. He was perpetual, and they paid him great refpect and veneration.

BOURIGNON (Antonietta), a famous enthufiaftic preacher and pretended prophetefs, was born at Lifle in 1616. At her birth fhe was fo deformed, that it was debated fome days in the family whether it was not proper to ftifle her as a monfter: but her deformity diminifhing fhe was fpared; and afterwards obtained fuch a degree of beauty, that fhe had her admirers. From her childhood to her old age fhe had an extraordinary turn of mind. She fet up for a reformer, and publifhed a great number of books filled with very fingular notions; the moft remarkable of which are intitled *The light of the World*, and *The teftimony of Truth*. She was an enemy to reafon and common fenfe, which fhe maintained ought to give place to the illumination of divine faith; and afferted, that whenever any one was born again by embracing her doctrine, fhe felt the pains and throes of a woman in labour. Befides thefe extravagancies, fhe had other forbidding qualities: her temper was morofe and peevifh, and fhe was extremely avaricious. She dreffed like an hermit, and travelled to France, Holland, England, and Scotland. In the laft fhe made a ftrong party, and fome thoufand fectarifts, known by the name of *Bourignonifts*. She died at Franeker in the province of Frife, October 30th, 1680. Her works have been printed in 18 vols. 8vo.

BOURN, a town of Lincolnfhire in England, feated in E. long. 1. 17. N. lat. 52. 40. It is a pretty large place, has a good market for corn and provifions, and is noted for the coronation of king Edmund.

BOURNE, or BURN, an appellation anciently given to all little brooks or rivulets, and ftill ufed in the fame fenfe in Scotland and in the north of England.

BOURO, an ifland in the Eaft Indian ocean, between the Moluccas and Celebes. It is well cultivated; and is now fubject to the Dutch, who have built a fortrefs here. Some mountains in it are exceeding high, and the fea on one fide is uncommonly deep. It produces nutmegs and cloves, as well as cocoa and banana trees; befides many vegetables introduced by the Dutch. It is about 50 miles in circumference. E. long. 129°. S. lat, 4. 30.

BOUTANT, or ARCH-BOUTANT, in architecture, an arch, or part of an arch, abutting againft the reins of a vault to prevent its giving way.

A Pillar BOUTANT, is a large chain or pile of ftone, made to fupport a wall, terrace, or vault.

BOUTE, in the manege. A horfe is called *boute*, when his legs are in a ftraight line from the knee to the coronet: fhort-jointed horfes are apt to be boute, and on the other hand long-jointed horfes are not.

BOUTS-RIMES, a popular term in the French poetry; fignifying certain rhymes, difpofed in order, and given to a poet together with a fubject, to be filled up with verfes ending in the fame words, and the fame order. The invention of the bouts-rimés is owing to one Du Lot, a poet, in the year 1649. In fixing the bouts, it is ufual to choofe fuch as feem the remoteft, and have the leaft connection with each other. This is but a trifling art, though fome good authors fancy that thefe rhymes, which are of all others the eafieft, affift the invention, and furnifh new thoughts. Sarafin has a poem on the defeat of the bouts rimés. The academy of Lanternifts at Thouloufe have contributed towards keeping in countenance the bouts-rimés, by propofing each year a fet of fourteen, to be filled up on the glories of the grand monarque: the victorious fonnet to be rewarded with a fine medal. The following, which was filled up by P. Commire, may ferve as a fpecimen:

Tout eft grand dans le roi, l'afpect feul de fon bufte
Rend nos fiers ennemis plus froids que des glaçons.
Et Guillaume n'attend que le tems des moiffons,
Pour fe voir fuccomber fous un bras fi robufte.
Qu'on ne nous vante plus les miracles d' Augufte;
Louis de bien regner lui feroit des leçons:
Horace en vain l'egale aux dieux dans fes chanfons:
Moins que mon heros il étoit fage et jufte, &c.

BOUTON, an ifland in the Eaft Indian ocean, about 12 miles diftant from the fouth eaft part of the ifland of Macaffar, or Celebes. The inhabitants are fmall, but well fhaped, and of a dark olive complexion. The principal town is Callafujung, which is about a mile from the fea, on the top of a fmall hill, and round it a ftone wall. The houfes are not built upon the ground, but on pofts. The religion of the inhabitants is Mahometan. E. long. 122. 30. S. lat. 4. 30.

BOUVILLON, a city of Luxemburg in the Auftrian Netherlands, fituated in E. long. 5. 0. N. lat. 49. 55.

BOW, *arcus*, a weapon of offence made of wood, or other elaftic matter, which, after being ftrongly bent, by means of a ftring faftened to its two ends, in returning to its natural ftate throws out an arrow with great force. It is alfo called the *long-bow*, by way of diftinction from the crofs-bow or arbaleft.

The bow is the moft ancient and the moft univerfal of all weapons. It has been found to obtain among the moft barbarous and remote people, and who had the leaft communication with the reft of mankind. The ufe of this weapon was firft abolifhed in France under Louis XI. in 1481, and in their place were introduced the Swifs arms, that is, the halbard, pike, and broad-fword. The long-bow was formerly in great vogue in England; moft of our victories in France were acquired by it; and many laws were made to regulate and encourage its ufe. The parliament under Henry VIII. complain "of the difufe of the long-bow, heretofore the fafe-guard and defence of this kingdom, and the dread and terror of its enemies." 33 Hen. VIII. cap. 6. The art of ufing bows is called *archery*, and thofe practifed therein *archers*, or *bowmen*. See ARCHERY.

The ftrength of a bow may be calculated on this principle, that its fpring, *i. e.* the power whereby it reftores itfelf to its natural pofition, is always proportionate to the diftance or fpace from whence it is removed.

The moft barbarous nations often excel in the fabric of the

particular things which they have the greateſt neceſſity to employ in the common offices of life. The Laplanders, who ſupport themſelves almoſt entirely by hunting, have an art of making bows, which we in theſe improved parts of the world have never arrived at. Their bow is made of two pieces of tough and ſtrong wood, ſhaved down to the ſame ſize, and flatted on each ſide; the two flat ſides of the pieces are brought cloſely and evenly together, and then joined by means of a particular kind of glue. The two pieces, thus united, never ſeparate, and the bow is of much more force to expel the arrow, than it could poſſibly have been under the ſame dimenſions if made of only one piece.

The bow-ſtring of the ancients, called τριχωσις, was made of horſe-hair, and hence alſo called ιππεια; though Homer's bow-ſtrings are frequently made of hides cut into ſmall thongs; whence τοξα βοεια. The uppermoſt part of the bow, to which the ſtring was faſtened, was called κορωνη, being commonly made of gold, and the laſt thing towards finiſhing the bow. The Grecian bows were frequently beautified with gold or ſilver; whence we have mention of *aurei arcus*; and Apollo is called Αργυροτοξος. But the matter of which they were ordinarily compoſed, ſeems to have been wood; though they were anciently, Scythian-like, made of horn, as appears from that of Pandarus in Homer, Iliad. δ. v. 105.

To Apollo is attributed the invention of the bow, which was communicated to the primitive inhabitants of Crete, who are ſaid to have been the firſt of mortals who underſtood the uſe of bows and arrows. Hence, even in latter ages, the Cretan bows were famous, and preferred by the Greeks to all others. Some, however, rather chooſe to honour Perſes, the ſon of Perſeus, with the invention of the bow; while others aſcribe it to Scythes, ſon of Jupiter, and progenitor to the Scythians, who were excellent at this art, and by many reputed the firſt maſters of it. From them it was derived to the Grecians, ſome of whoſe ancient nobility were inſtructed by the Scythians in the uſe of the bow, which in thoſe days paſſed for a moſt princely education. It was firſt introduced into the Roman army in the ſecond Punic war.

The Indian nations ſtill retain the bow. In the repoſitory of the Royal Society, a Weſt Indian bow two yards long is preſerved. The Scythian bow was famous for its incurvation, which diſtinguiſhed it from the bows of Greece and other nations; being ſo great as to form an half-moon or ſemicircle: whence the ſhepherd in Athenæus, being to deſcribe the letters in Theſeus's name, and expreſſing each of them by ſome appoſite reſemblance, compares the third to the Scythian bow; meaning not the more modern character Σ, but the ancient C, which is ſemicircular, and bears the third place in ΘΗCΕVC.

Croſs-Bow, is alſo called *arbaleſt* or *arbalet*; which word is derived from *arbaliſta*, i. e. *arcubaliſta*, "a bow with a ſling." The arbalet conſiſts of a ſteel-bow, ſet in a ſhaft of wood, furniſhed with a ſtring and a trigger; and is bent with a piece of iron fitted for that purpoſe. It ſerves to throw bullets, large arrows, darts, &c. The ancients had large machines for throwing many arrows at once, called *arbalets* or *baliſtæ*. See *Baliſta*.

Bow, is alſo an inſtrument uſed at ſea, for taking the ſun's altitude; conſiſting of a large arch of 90° graduated, a ſhank or ſtaff, a ſide vane, a ſight vane, and an horizon vane. It is now laid aſide.

Bow, among builders, a beam of wood or braſs, with three long ſcrews that direct a lathe of wood or ſteel to any arch; chiefly uſed in drawing draughts of ſhips and projections of ſpheres, or wherever it is requiſite to draw large arches.

Bow, in muſic, a ſmall machine, which, being drawn over the ſtrings of a muſical inſtrument, makes it reſound. It is compoſed of a ſmall ſtick, to which are faſtened a ſufficient number of horſe-hairs, and a ſcrew which ſerves to give theſe hairs a proper tenſion. In order that the bow may touch the ſtrings briſkly, it is uſual to rub the hairs with roſin. The ancients do not appear to have been acquainted with bows of hair: in lieu of them they touched their inſtruments with a plectrum; over which our bows have greatly the advantage, for giving long and ſhort ſounds, and other modifications which a plectrum cannot produce.

Bow, among artificers, an inſtrument ſo called from its figure; in uſe among gunſmiths, lockſmiths, watchmakers, &c. for making a drill go. Among turners it is the name of that pole fixed to the ceiling, to which they faſten the cord that whirls round the piece to be turned.

Bow, a neat and ſmall town of Devonſhire in Wales, ſeated at the head of a river that falls into the Taw. It is 14 miles N. W. of Exeter. Long. 4. 0. N. lat. 50. 45.

Bow, or *Stratford le Bow*, a conſiderable village of Middleſex, two miles and a half N. E. by E. of London. It has many mills, manufactories, and diſtilleries, on the river Lea, which here ſeparates Middleſex from Eſſex. It is ſaid that the bridge here was the firſt built of ſtone in England; and that from its arches it received the name of Bow. The church, formerly a chapel of eaſe to Stepney, was made parochial in 1740.

Bows of a Saddle, are two pieces of wood laid arch-wiſe to receive the upper part of a horſe's back, to give the ſaddle its due form, and to keep it tight. The fore-bow, which ſuſtains the pommel, is compoſed of the withers, the breaſts, the points or toes, and the corking. The hind-bow bears the trouſequin or quilted roll. The bows are covered with ſinews, that is with bull's pizzles beaten, and ſo run all over the bows to make them ſtronger. They are ſtrengthened with bands of iron to keep them tight; and on the lower ſide are nailed the ſaddle ſtraps, with which they make faſt the girths.

Bow, *Epaule*, in ſhip-building, the rounding part of a ſhip's ſide forward, beginning at the place where the planks arch inwards; and terminated where they cloſe, at the ſtem or prow. It is proved by a variety of experiments, that a ſhip with a narrow bow is much better calculated for ſailing ſwiftly, than one with a broad bow; but is not ſo well fitted for a high ſea, into which ſhe always *pitches* or plunges her fore-part very deep, for want of ſufficient breadth to repel the volume of water which ſhe ſo eaſily divides in her fall. The former of theſe is called by ſeamen a *lean*, and the other a *bluff* bow. Bouguer, in his Traité de Navire, ſays, "The bow which meets with the leaſt reſiſtance in a direct courſe, not only meets with the leaſt reſiſtance in oblique courſes, but alſo has the additional property of driving the leaſt to leeward; which is a double advantage gained by forming the bow ſo as to give it that figure which will be leaſt reſiſted in moving through any medium."

On the Bow, in navigation, an arch of the horizon comprehended between ſome diſtant object and that point of the compaſs which is right a-head, or to which the ſhip's ſtern is directed. This phraſe is equally applicable when the object is beheld from the ſhip, or diſcovered by trigonometrical calculation: as, we ſaw a fleet at day-break bearing three points *on the ſtarboard-bow*; that is, three points from that part of the horizon which is right a-head, towards the right-hand. See the article Bearing.

Bow-*dye*, a kind of ſcarlet red, ſuperior to madder; but inferior to the true ſcarlet grain for fixedneſs and duration. It was brought into England, and firſt practiſed at the village of Bow, near London, by Kephler, a Dutchman, in the year 1643.

Bow-*grace*, in the ſea-language, a frame or compoſition of old ropes or junks of cables, uſed to be laid out at the bows, ſtems, and ſides of ſhips, to preſerve them from great flakes of ice, chiefly when they ſail in high north or ſouth latitudes.

Bow-*net*, or *Bow-wheel*, an engine for catching fiſh, chiefly lobſters and craw-fiſh, made of two round wicker baſkets,

pointed at the end, one of which is thruſt into the other; at the mouth is a little rim, four or five inches broad, ſomewhat bent inwards. It is alſo uſed for catching ſparrows.

Bow-*Legged*, or *Bandy-legged*. Some children are bow-legged from their birth; others become ſo from a morbid ſoftneſs of the tibia, and from ſetting them on their feet too early. It is the common conſequence of bad nurſing, joined to a ſcrofulous or rickety diſpoſition in the infant. All attempts to remedy the deformity by irons, ſtraps, &c. &c. are in general abortive, and often increaſe the evil. We ought only to rely on the uſe of a proper diet, good air, frequent exerciſe, but above all the *daily* uſe of the *cold bath*, to which children ought to be habituated from their earlieſt ſtate of infancy. On this ſubject, ſee farther the excellent admonitions of M. Rouſſeau, in the 1ſt vol. of his Emilius.

Bow-*Line*, or *Bowling*, a rope faſtened near the middle of the leech, or perpendicular edge of the ſquare ſails, by three or four ſubordinate parts called *bridles*. It is only uſed when the wind is ſo unfavourable that the ſails muſt be all braced ſideways, or cloſe-hauled to the wind: in this ſituation the bow-lines are employed to keep the weather or windward edges of the principal ſails tight, forward, and ſteady, without which they would always be ſhivering, and rendered incapable of ſervice. To *check* the bow-line is to ſlacken it, when the force of the wind requires it.

Bow-*Pieces*, are the pieces of ordnance at the bow of a ſhip.

Bow-*Bearer*, an inferior officer of the foreſt, who is ſworn to make inquiſition of all treſpaſſes againſt vert or veniſon, and to attach offenders.

BOWER, in gardening, a place under covert of trees, differing only from an arbour, as being round or ſquare, and made with a kind of dome or ceiling at top.

Bower, in the ſea language, the name of an anchor carried at the bow of a ſhip. There are generally two bowers, called *firſt* and *ſecond*, *great* and *little*, or *beſt* and *ſmall* bower. See Anchor.

BOWESS, or Bowet, in falconry; a young hawk, when ſhe draws any thing out of her neſt, and covets to clamber on the boughs.

BOWL, denotes either a ball of wood, for the uſe of bowling; or a veſſel of capacity, wherein to hold liquors.

BOWLDER-stones, ſmall ſtones, of a roundiſh figure, and no determinate ſize, found on the ſea-ſhore, and on banks or rather channels of rivers.

BOWLING, the art of playing at bowls.—This game is practiſed on bowling-greens. The ſkill of bowling depends much on a knowledge of the ground, and the right choice of a bowl ſuitable to it. The terms uſed in bowling are, to *bowl wide*, which is when the bias does not hold, or is not ſtrong enough; *narrow*, when it is too ſtrong, or holds too much; *finely bowled*, is when the ground is well choſen, and the bowl paſſes near the block, even though it goes much beyond it; *bowling through*, or a *yard over*, is done in order to move the block; an *over bowl*, that which goes beyond it; *a bowl laid at hand*, is that put down within the gameſter's reach, to be in the way of the next bowler, and hinder his having the advantage of the beſt ground; *bowling at length*, neither bowling through nor ſhort; a *dead length*, a juſt or exact one; *throwing* or *flinging*, is diſcharging a bowl with a ſtrength purpoſely too great for a length, in order to carry off either the block or ſome near bowl; *bowl-room*, or *miſſing wood*, is when a bowl has free paſſage, without ſtriking on any other; *get off*, is when a bowl, being narrow, is wanted to be wider; *bowl beſt at block*, that neareſt the block; *drawing a caſt or bowl*, is to win it by bowling nearer, without ſtirring either the bowl or block; a bowl is ſaid to *rub*, when it meets with ſome obſtacle in the ground, which retards its motion, and weakens its force; *it is gone*, when far beyond the block. *Block* ſignifies a little bowl laid for a mark, alſo called a *jack*. *Mark*, is a proper bowling diſtance, not under ſo many yards; and being at leaſt a yard and a half from the edge of the green. *Ground*, a bag or handkerchief laid down to mark where a bowl is to go. *Lead*, the advantage of throwing the block, and bowling firſt. *Caſt*, is one beſt bowl at an end. *End*, a hit, or when all the bowls are out. The *game*, or *up*, is five caſts or beſt bowls.

Bowling-*Green*, in gardening, a kind of parterre in a grove, laid with fine turf, requiring to be frequently mowed. Bowling-greens are of Engliſh origin, but have been adopted by the French and Italians, who have them only for ornament; being ſtrangers to or not fancying the exerciſe of bowling.

Bowling-*Bridles*, are the ropes by which the bow-line is faſtened to the leech of the ſail.

BOWSE, in the ſea-language, ſignifies as much as to *hale* or *pull*. Thus *bowſing upon a tack*, is haling upon a tack. *Bowſe away*, that is, Pull away all together.

BOWSPRIT, or Boltsprit, a kind of maſt, reſting ſlopewiſe on the head of the main ſtem, and having its lower end faſtened to the partners of the fore-maſt, and farther ſupported by the fore-ſtay. It carries the ſprit-ſail, ſprit-top-ſail, and jack-ſtaff; and its length is uſually the ſame with that of the fore-maſt.

BOWYER (William), the moſt learned printer of his age, was born at White Friars in London, December 17, 1699. His father, whoſe name alſo was William, had been eminent in the ſame profeſſion; and his maternal grandfather (Icabod Dawks) was employed in printing the celebrated Polyglott bible of biſhop Walton. After having acquired a grammatical education under the care of Mr. Ambroſe Bonwicke, a nonjuring clergyman of known piety and learning, who then lived at Headly, near Leatherhead in Surry, he was admitted a ſizar at St. John's College, Cambridge, where he continued under the tuition of the Reverend Dr. John Newcome, till June 1722, during which period he probably took his degree of Bachelor of Arts.

A ſhort time after, Mr. Bowyer entered into the printing-buſineſs along with his father; and the firſt book which received the benefit of his correction was the complete edition of Selden, in three volumes folio, by Dr. David Wilkins. This edition was begun in 1722, and finiſhed in 1726; and Mr. Bowyer's great attention to it appeared in his drawing up an epitome of Selden *de Syncdriis*, as he read the proof-ſheets. In 1727, he drew up an excellent ſketch of William Baxter's Gloſſary of the Roman Antiquities. This was called "A view of a book intitled *Reliquiæ Baxterianæ*. In a letter to a friend." By this firſt public proof of Mr. Bowyer's abilities, Dr. Wotton and Mr. Clarke were highly pleaſed; but as it was never publiſhed, and very few copies printed, it is very ſeldom found with the gloſſary. In 1728 he married Miſs Ann Prudom, his deceaſed mother's niece, a very accompliſhed lady, by whom he had two ſons, William and Thomas; the former of whom died an infant. In 1729 Mr. Bowyer publiſhed a curious treatiſe, intitled, "A Pattern for young Students in the Univerſity; ſet forth in the Life of Ambroſe Bonwicke, ſome time ſcholar of St. John's College, Cambridge:" but though this treatiſe was generally aſcribed to Mr. Bowyer, it was in reality the production of Mr. Ambroſe Bonwicke, the elder. About this time it appears, that Mr. Bowyer had written a pamphlet againſt the Separatiſts, though neither the title nor the occaſion of it are now remembered. The ſame year, through the friendſhip of the Right Hon. Arthur Onſlow, he was appointed printer of the Votes of the Houſe of Commons; which office he held, under three ſucceſſive ſpeakers, for near fifty years. In 1731 Mr. Bowyer publiſhed, and, it is believed, *tranſlated* Voltaire's Life of Charles XII. This year alſo his wife dying, he remained a widower till 1747, when he married a very benevolent and worthy woman, Mrs. Elizabeth Bill, by

whom he had no children. In 1733 he publiſhed a piece in two ſheets 4to, intitled, "The Beau and the Academic;" being a tranſlation from a Latin poem recited that year at the Sheldonian theatre; and in 1736 he was admitted into the Society of Antiquarians, where he became an active and uſeful member. In 1742 our author publiſhed a tranſlation of Trapp's Latin Lectures on Poetry, in which he was aſſiſted by Mr. Clarke, though the latter had a contemptible opinion of the performance. From this time Mr. Bowyer occaſionally diſtinguiſhed himſelf by a diſplay of his literary talents, either in original publications, or in rendering the performances of other writers more valuable by his excellent remarks and additions; till, in the year 1754, with a view of leſſening his fatigues, he commenced a partnerſhip with a relation, which was diſſolved however in three years. On the death of Mr. Richardſon in 1761, Mr. Bowyer ſucceeded him as printer to the Royal Society, through the favour of the late Earl of Macclesfield; and, under the friendſhip of five ſucceſſive preſidents, enjoyed that office till his death.

In 1763, Mr. Bowyer publiſhed an excellent edition of the Greek Teſtament, in two vols. 12mo. which ſold with great rapidity: the Conjectural Emendations were well received by the learned, and are thought to ſtamp a conſiderable value on the work. The preſident and fellows of Havard college, in Cambridge, expreſſed their approbation of this edition in very high terms.

Among other learned works which were ſubmitted to his opinion, was Dr. Warburton's Divine Legation, which, it is well known, received very conſiderable advantage from Mr. Bowyer's corrections; and this even in an edition which was neceſſarily given to another preſs. In 1761 he was employed to print his Lordſhip's Doctrine of Grace. A ſecond edition being ſoon wanted, and Mr. Bowyer not having been intruſted with the care of it, he prepared a ſeries of letters to the biſhop in his own defence; of which, together with a few he had formerly received from that great writer, he afterwards printed *twelve copies*, of which *ten* have ſince been deſtroyed. However, there is the beſt authority for aſſerting, that notwithſtanding any little altercations which happened, Dr. Warburton always retained a ſincere regard for our author. In 1765, at the requeſt of Thomas Hollis, Eſq. Mr. Bowyer wrote a ſhort Latin preface to Dr. Wallis's *Grammatica Linguæ Anglicanæ*. He wrote alſo a larger Engliſh preface for the ſame work, which, however, ſtill remains unprinted. In 1766 he entered into partnerſhip with Mr. Nichols, who had been trained by him to the profeſſion, and had for ſeveral years aſſiſted him in the management of his buſineſs. The ſame year, Mr. Bowyer wrote an excellent Latin preface to *Joannis Harduini, Jeſuitæ, ad Cenſuram Scriptorum veterum Prolegomena. Juxta Autographum.* In 1767 he was appointed to print the Journals of the Houſe of Lords and the Rolls of Parliament. This year he printed Mr. Clarke's excellent and learned work on "The Connection of the Roman, Saxon, and Engliſh Coins;" and wrote ſome notes upon it, which are interſperſed throughout the volume with thoſe of the author. Part of the Diſſertation on the Roman Seſterce was likewiſe Mr. Bowyer's production; and the index, which is an uncommonly good one, was drawn up by him entirely.

In January 1771 Mr. Bowyer loſt his ſecond wife, and in conſequence of that event, received a letter of conſolation from his old friend Mr Clarke, who had ſent him one almoſt forty years before on a ſimilar occaſion. In the Philoſophical Tranſactions for this year was printed a very ingenious "Inquiry into the Value of the ancient Greek and Roman money," by the late Matthew Raper, Eſq. But his opinions not coinciding with thoſe of Mr Bowyer, he printed a ſmall pamphlet, intitled, "Remarks, occaſioned by a late Diſſertation on the Greek and Roman money." In 1773 three little tracts were publiſhed by him, under the title of Select Diſcourſes." In 1774 he corrected a new edition of Schrevelius's Greek Lexicon: to which he has added a number of words, diſtinguiſhed by an aſteriſk, which he himſelf had collected in the courſe of his ſtudies. Conſiderable additions, ſtill in manuſcript, were made by him to the Lexicons of Hederic and Buxtorf, the Latin ones of Eaber and Littleton, and the Engliſh Dictionary of Bailey; and he left behind him many other proofs of his critical ſkill in the learned languages. In 1774 was publiſhed, "The Origin of Printing," in two eſſays. The original idea of this valuable tract was Mr Bowyer's, but it was completed by Mr. Nichols. Although our author, during the laſt ten years of his life, had been afflicted with the palſy and ſtone, he not only preſerved a remarkable cheerfulneſs of temper, but was enabled to ſupport the labour of almoſt inceſſant reading; and he regularly corrected the learned works, eſpecially the Greek books, which came from his preſs. This he continued to do till within a few weeks of his death, which happened in November 1777, when he had nearly completed his 78th year.—For more than half a century Mr. Bowyer was unrivalled as a learned printer; and many of the moſt maſterly productions of this kingdom have come from his preſs. To his literary and profeſſional abilities he added an excellent moral character; and he was particularly diſtinguiſhed by his inflexible probity, and un uncommon alacrity in relieving the neceſſitous.

BOWYERS, artificers whoſe buſineſs is to make bows; in which ſenſe, bowyers ſtand diſtinguiſhed from fletchers, who made arrows. The bowyers company in London was incorporated in 1620: and conſiſts of a maſter, two wardens, twelve aſſiſtants, and 30 on the livery. See ARCHERY.

BOX, in its moſt common acceptation, denotes a ſmall cheſt or coffer for holding any thing.

Dice-Box, a narrow deep cornet, channelled within, wherein the dice are ſhaken and thrown. This anſwers to what the Romans called *fritillus*; whence, *crepitantes fritilli*; and, in Seneca, *reſonante fritillo*. The ſame author uſes alſo *concutere fritillum*, figuratively, for playing.—Beſides the fritillus, the Romans, for greater ſecurity, had another kind of dice-box called *pyrgus*, πυργος, and ſometimes *turricula*. It was placed immoveable in the middle of the table, being perforated or open at both ends, and likewiſe channelled within; over the top was placed a kind of funnel, into which the dice were caſt out upon the fritillus; whence deſcending, they fell through the bottom on the table; by which all practiſing on them with the fingers was effectually prevented. For want of ſome contrivance of this kind, our ſharpers have opportunities of playing a variety of tricks with the box, as palming, topping, ſlabbing, &c.

Box is alſo uſed for an uncertain quantity or meaſure: thus a box of quickſilver contains from one to two hundred pounds weight; a box of prunellas only 14lb. a box of rings for keys, two groſs, &c.

Box-Tree, in botany. See BUXUS.

African-Box. See MYRSINE.

BOXERS, a kind of *athletæ*, who combat or contend for victory with their fiſts. Boxers amount to the ſame with what among the Romans were called *pugiles*. The ancient boxers battled with great force and fury, inſomuch as to daſh out each others teeth, break bones, and often kill each other. The ſtrange disfigurements theſe boxers underwent were ſuch that they frequently could not be known, and rendered them the ſubject of many railleries. In the Greek anthology there are four epigrams of the poet Lucilius, and one of Lucian, wherein their disfigurements are pleaſantly enough expoſed.

BOXING, the exerciſe of fighting with the fiſts, either naked or with a ſtone or leaden ball graſped in them: in which ſenſe, boxing coincides with the *pugillatus* of the Romans, and what

on our amphitheatres is ſometimes called trial of manhood. When the champions had σφαιραι, or balls, whether of lead or ſtone, it was properly denominated σφαιρομαχια. The ancient boxing differed from the *pugna cæſtuum*, in which the combatants had leathern thongs on their hands, and balls to offend their antagoniſts; though this diſtinction is frequently overlooked, and fighting with the *cæſtus* ranked as a part of the buſineſs of *pugiles*. We may diſtinguiſh three ſpecies of boxing; *viz.* where both the head and hands were naked; where the hands were armed and the head naked; and where the head was covered with a kind of cap called amphotides, and the hands alſo furniſhed with the *cæſtus*. The art of boxing is very ancient, having been exerciſed in the heroic ages. Thoſe who prepared themſelves for it, uſed all the means that could be contrived to render themſelves fat and fleſhy, that they might be better able to endure blows: whence corpulent men or women were uſually called *pugiles*, according to Terence: *Siqua eſt habitior paulo, pugilem eſſe aiunt.*

This vulgar though favourite art has been in a manner appropriated by the Engliſh. About half a century ago it was encouraged by the firſt of the nobility, patroniſed by the firſt ſubject in the realm, and tolerated by the magiſtrates. Before the eſtabliſhment of Broughton's amphitheatre, a Booth was erected at Tottenham Court, in which the proprietor, Mr. George Taylor, invited the profeſſors of the art to diſplay their ſkill, and the public to be preſent at its exhibition. The bruiſers then had the reward due to their proweſs, in a diviſion of the entrance-money, which ſometimes was 100, or 150l. The general mode of ſharing was for two thirds to go to the winning champion, while the remaining third was the right of the loſer; though ſometimes by an expreſs agreement of the parties, the conqueror and the vanquiſhed ſhared alike. The nobility and gentry having complained of the inconveniencies ſuſtained at Taylor's Booth, prevailed on Mr. Broughton, who was then riſing into note as the firſt bruiſer in London, to build a place better adapted for ſuch exhibitions behind Oxford-road. After a courſe of years, however, theſe exhibitions became gradually leſs patroniſed and frequented, owing probably to the refinement of our manners. Lately, indeed, they again became faſhionable, till a fatal iſſue which attended one of theſe brutal conteſts brought the practice again into diſrepute; one of the combatants having been killed on the ſpot. To the diſgrace of the times, theſe ſavage practices were encouraged by thoſe perſons whoſe elevated ſtation in ſociety impoſe on them the duty of ſetting a good example to the lower orders of the community.

Boxing, among ſailors, is uſed to denote the rehearſing the ſeveral points of the compaſs in their proper order.

Boxing is alſo uſed for the tapping of a tree to make it yield its juice. The boxing of maple is performed by making an hole with an ax or chiſſel into the ſide of the tree about a foot from the ground; out of it flows a liquor of which ſugar is made.

BOXTEHUDE, a town of Germany, in the circle of Lower Saxony, ſubject to the Danes. It is ſeated on the rivulet Eſſe, which falls into the Elbe, in E. long. 9. 35. N. lat. 53. 40.

BOXTEL, a town in Dutch Brabant, with ſluices, ſeated on the river Bommel. E. long. 5. 15. N. lat. 51. 30.

BOYAR, a term uſed for a grandee of Ruſſia and Tranſylvania. Becman ſays, that the boyars are the upper nobility; and adds, that the Czar of Muſcovy, in his diplomas, names the boyars before the waywodes. See Waywode.

BOYAU, in fortification, a ditch covered with a parapet, which ſerves as a communication between two trenches. It runs parallel to the works of the body of the place; and ſerves as a line of contravallation, not only to hinder the ſallies of the beſieged, but alſo to ſecure the miners. But when it is a particular cut that runs from the trenches to cover ſome ſpot of ground, it is drawn ſo as not to be enfiladed or ſcoured by the ſhot from the town.

BOYER (Abel), a well-known gloſſographer and hiſtoriographer, born at Caſtres in France, in 1664. Upon the revocation of the edict of Nantz, he went firſt to Geneva, then to Franeker, where he finiſhed his ſtudies; and came finally to England, where he applied himſelf ſo cloſely to the ſtudy of the Engliſh language, and made ſo great a proficiency therein, that he became an author of conſiderable note in it, being employed in the writing of ſeveral periodical and political works. He was for many years concerned in, and had the principal management of, a newſpaper called the *Poſt-boy*. He likewiſe publiſhed a monthly work, intitled, the *Political ſtate of Great-Britain*. He wrote a life of queen Anne in folio, which is eſteemed a very good chronicle of that period of the Engliſh hiſtory. But what has rendered him the moſt known, and eſtabliſhed his name to the lateſt poſterity, are the excellent Dictionary and Grammar of the French language, which he compiled, and which have been and ſtill are reckoned the beſt in their kind. He alſo wrote, or rather tranſlated from the French of M. de Racine, the tragedy of Iphigenia, which he publiſhed under the title of *The Victim*. It was performed with ſucceſs at the theatre of Drury-lane, and is far from being a bad play. Nor can there perhaps be a ſtronger inſtance of the abilities of its author, than ſucceſs in ſuch an attempt; ſince writing with any degree of correctneſs or elegance, even in proſe, in a language which we were not born to the ſpeaking of, is an excellence not very frequently attained; but to proceed ſo far in the perfection of it as to be even ſufferable in poetry, and more eſpecially in that of the Drama, in which the diction and manner of expreſſion require a peculiar dignity and force, and in a language ſo difficult to attain the perfect command of as the Engliſh, is what has been very ſeldom accompliſhed.—He died in the year 1729.

Boyer, in navigation, a kind of Flemiſh ſloop, or ſmall veſſel of burden, having a bowſprit, a caſtle at each end, and a tall maſt; chiefly fit for the navigation of rivers, and in many of its parts reſembling a ſmack.

BOYES, idolatrous prieſts among the ſavages of Florida. Every prieſt attends a particular idol, and the natives addreſs themſelves to the prieſt of that idol to which they intend to pay their devotion. The idol is invoked in hymns, and his uſual offering is the ſmoke of tobacco.

BOYLE (Richard), one of the greateſt ſtateſmen of the laſt century, and generally ſtyled the *Great earl of Corke*, was the youngeſt ſon of Mr. Roger Boyle, and was born at Canterbury, on the 3d of October 1566. He ſtudied at Bennet college, Cambridge; afterwards became a ſtudent in the Middle Temple. Having loſt his father and mother, and being unable to ſupport himſelf in the proſecution of his ſtudies, he became clerk to Sir Richard Manhood, one of the chief barons of the exchequer; but finding that by his employment he could not raiſe his fortune, he went to Ireland in 1588, with fewer pounds in his pocket than he afterwards acquired thouſands a-year. He was then about twenty-two, had a graceful perſon, and many other accompliſhments, which enabled him to render himſelf uſeful to ſeveral of the principal perſons employed in the government, by drawing up for them memorials, caſes, and anſwers. In 1595, he married Joan the daughter and coheireſs of William Anſley, who had fallen in love with him; and ſhe dying in labour of her firſt child, which was born dead, in 1599, left him an eſtate of 500l. a-year in land. In conſequence of various ſervices, and the great abilities he diſplayed, he gradually roſe to the higheſt offices, and even to the dignity of the peerage of Ireland; to which he was raiſed by king James I.

on the 29th of September 1616, by the ſtyle and title of *baron of Youghal,* in the county of Cork: four years after, he was created viſcount Dungarvon and earl of Cork; and in 1631 was made lord treaſurer of Ireland, an honour that was made hereditary to his family. He particularly diſtinguiſhed himſelf by the noble ſtand he made, when the fatal rebellion broke out in that kingdom, in the reign of Charles I.; and in his old age acted with as much bravery and military ſkill, as if he had been trained from his infancy to the profeſſion of arms. He turned the caſtle of Liſmore, his capital ſeat, into a fortreſs capable of demanding reſpect from the Iriſh. He immediately armed and diſciplined his ſervants and proteſtant tenants; and by their aſſiſtance, and a ſmall army raiſed and maintained at his own expence, which he put under the command of his four ſons, defended the province of Munſter, and in the ſpace of a year took ſeveral ſtrong caſtles, and killed upwards of 3000 of the enemy: during which time he paid his forces regularly; and when all his money was gone, like a true patriot, converted his plate into coin. This great man died on the 15th of September, in the year 1634.

Boyle (Roger), earl of Orrery, the fifth ſon of Richard, ſtyled the *Great earl of Corke,* was born April 25, 1621; and by the credit of his father with the lord deputy Faulkland, raiſed to the dignity and title of *baron Broghill,* when only ſeven years old. He was educated at the college of Dublin, where he ſoon diſtinguiſhed himſelf as an early and promiſing genius. He afterwards made the tour of France and Italy; and at his return aſſiſted his father in oppoſing the rebellious Iriſh, in which he behaved with all the ſpirit of a young, and all the diſcretion of an old, officer. Upon the murder of the king, he retired to Marſton in Somerſetſhire, and hid himſelf in the privacy of a cloſe retirement; but being at length aſhamed to ſit the tame ſpectator of all the miſchief that appeared around him, he reſolved to attempt ſomething in favour of the king; and under the pretence of going to the Spa for the recovery of his health, he determined to croſs the ſeas, and apply himſelf to king Charles II. for a commiſſion to raiſe what forces he could in Ireland, in order to reſtore his majeſty, and recover his own eſtate. To this purpoſe, he prevailed on the earl of Warwick to procure a licence for his going to the Spa; and having raiſed a conſiderable ſum of money, came up to London to proſecute his voyage: but he had not been long in town when he received a meſſage from Cromwell, who was then general of the parliament's forces, that he intended to wait upon him. The lord Broghill was ſurpriſed at this meſſage, having never had the leaſt acquaintance with Cromwell; and deſired the gentleman to let the general know, that he would wait upon his excellency. But while he was waiting the return of the meſſenger, Cromwell entered the room; and after mutual civilities had paſſed between them, told him in few words, that the committee of ſtate were appriſed of his deſign of going over and applying to Charles Stuart for a commiſſion to raiſe forces in Ireland; and that they were determined to make an example of him, if he himſelf had not diverted them from that reſolution. The lord Broghill interrupted him, by aſſuring him that the intelligence which the committee had received was falſe, and that he neither was in a capacity nor had any inclination to raiſe diſturbances in Ireland: but Cromwell, inſtead of making any reply, drew ſome papers out of his pocket, which were the copies of ſeveral letters which the lord Broghill had ſent to thoſe perſons in whom he moſt confided, and put them into his hands. The lord Broghill, upon the peruſal of theſe papers, finding it to no purpoſe to diſſemble any longer, aſked his excellency's pardon for what he had ſaid, returned him his humble thanks for his protection againſt the committee, and entreated his direction how to behave in ſuch a delicate conjuncture. Cromwell told him, that though till this time he had been a ſtranger to his perſon, he was not ſo to his merit and character: he had heard how gallantly his lordſhip had behaved in the Iriſh wars; and therefore, ſince he was named *lord lieutenant of Ireland,* and the reducing that kingdom was now become his province, he had obtained leave of the committee to offer his lordſhip the command of a general officer, if he would ſerve in that war; and he ſhould have no oaths or engagements impoſed upon him, nor be obliged to draw his ſword againſt any but the Iriſh rebels.

The lord Broghill was infinitely ſurpriſed at ſo generous and unexpected an offer. He ſaw himſelf at liberty by all the rules of honour, to ſerve againſt the Iriſh, whoſe rebellion and barbarities were equally deteſted by the royal party and the parliament. He deſired, however, ſome time to conſider of what had been propoſed to him. But Cromwell briſkly told him, that he muſt come to ſome reſolution that very inſtant: that he himſelf was returning to the committee, who were ſtill ſitting; and if his lordſhip rejected their offer, they had determined to ſend him to the tower. Upon this, the lord Broghill, finding that his liberty and life were in the utmoſt danger, gave his word and honour that he would faithfully ſerve him againſt the Iriſh rebels: on which Cromwell once more aſſured him, that the conditions which he had made with him ſhould be punctually obſerved; and then ordered him to repair to Briſtol, adding, that he himſelf would ſoon follow him into Ireland. Lord Broghill, therefore, having ſettled the buſineſs of his command, went over into that country; where, by his conduct and intrepidity, he performed many important ſervices, and fully juſtified the opinion Cromwell had conceived of him. By his own intereſt he now raiſed a gallant troop of horſe, conſiſting chiefly of gentlemen attached to him by perſonal friendſhip; which corps was ſoon increaſed to a complete regiment of 1500 men. Theſe he led into the field againſt the Iriſh rebels; and was ſpeedily joined by Cromwell, who found his new ally of the greateſt conſequence to the intereſt of the commonwealth.

Cromwell, when he became protector, occaſionally ſent for lord Broghill, merely to take his advice. And we are told, that, not long after his coming to England, he formed a project for engaging Cromwell to reſtore the old conſtitution. The baſis of the ſcheme was to be a match between the king (Charles II.) and the protector's daughter. As his lordſhip maintained a ſecret correſpondence with the exiled monarch and his friends, it was imagined that he was beforehand pretty ſure that Charles was not averſe to the ſcheme, or he would not have ventured to have propoſed it ſeriouſly to Cromwell; who at firſt ſeemed to think it not unfeaſible. He ſoon changed his mind, however, and told Broghill that he thought his project impracticable: "For (ſaid he) Charles can never forgive me the death of his father." In fine, the buſineſs came to nothing, although his lordſhip had engaged Cromwell's wife and daughter in the ſcheme; but he never durſt let the protector know that he had previouſly treated with Charles about it.

On the death of the protector, lord Broghill continued attached to his ſon Richard, till, when he ſaw that the honeſty and good-nature of that worthy man would infallibly render him a prey to his many enemies, he did not think it adviſable to ſink with one that he could not ſave. The dark clouds of anarchy ſeemed now to be hovering over the Britiſh iſland. Lord Broghill ſaw the ſtorm gathering, and he deemed it prudent to retire to his command in Ireland, where he ſhortly after had the ſatisfaction of ſeeing things take a turn extremely favourable to the deſign he had long been well-wiſher to, viz. that of the king's reſtoration. In conſideration of his eminent ſervices in promoting this event, Charles created him Earl of Orrery by letters-patent bearing date September 5, 1660, and he was ſoon after made one of the lords juſtices of Ireland; and his conduct, while at the head of affairs in that kingdom, was

ſuch as greatly added to the general eſteem in which his character was held before.

His lordſhip's active and toilſome courſe of life at length brought upon him ſome diſeaſes and infirmities; notwithſtanding which, on the king's deſiring to ſee him in England, he went over in 1665. He found the court in ſome diſorder; ſince his majeſty was on the point of removing the great earl of Clarendon, lord high chancellor; and there was alſo a great miſunderſtanding between the two royal brothers. Lord Orrery undertook to reconcile the king with the duke of York; which he effected by prevailing on the latter to aſk his majeſty's pardon for ſome ſteps he had taken in ſupport of the lord chancellor.

On his return to Ireland he found himſelf called to a new ſcene of action, the Dutch war being then at its height; and the duke de Beaufort, admiral of France, meditating a deſcent upon Ireland. This however was rendered abortive by the prudent meaſures of lord Orrery; but in the midſt of theſe labours, a diſpute aroſe betwixt him and his old friend the duke of Ormond, then lord lieutenant. This quarrel, though at firſt of a private nature, became at laſt very public, loſt him his public employments, though not the king's favour; as he ſtill came frequently to court, and ſometimes to council, where, on all occaſions, he gave his opinion and advice with the freedom of an honeſt plain-dealing man.

In 1678, being attacked more cruelly than ever by his old enemy the gout, he made his laſt voyage to England for medical advice. But his diſorder was not to be got the better of; ſo that having in his laſt illneſs given the ſtrongeſt proofs of Chriſtian patience, manly courage, and rational fortitude, he breathed his laſt on the 16th of October 1679, in the 59th year of his age. His lordſhip wrote, 1. A work intitled *The art of war*. 2. Parthenîſſa, a romance, in one volume folio. 3. Several poems. 4. Dramatic pieces, two volumes. 5. State-tracts, in one volume folio, &c. Mr. Walpole, ſpeaking of this nobleman, ſays, he never made a bad figure but as a poet. As a ſoldier, his bravery was diſtinguiſhed, his ſtratagems remarkable. As a ſtateſman, it is ſufficient to ſay that he had the confidence of Cromwell. As a man, he was grateful, and would have ſupported the ſon of his friend: but, like Cicero and Richelieu, he could not be content without being a poet; though he was ill qualified, his writings of that kind being flat and trivial.

Boyle (Robert), one of the greateſt philoſophers, as well as beſt men, that any country has ever produced, was the ſeventh ſon and the fourteenth child of Richard earl of Cork, and was born at Liſmore, in the province of Munſter in Ireland, the 25th of January, 1626-7; the very year of the death of the learned lord Bacon, whoſe plans of experimental philoſophy our author afterwards ſo ably ſeconded. While very young, he was inſtructed in his father's houſe to read and write, and to ſpeak French and Latin. In 1635, when only eight years old, he was ſent over to England to be educated at Eton ſchool. Here he ſoon diſcovered an extraordinary force of underſtanding, with a diſpoſition to cultivate and improve it to the utmoſt.

After remaining at Eton between three and four years, his father ſent him along with his brother Francis, in 1638, on their travels upon the continent. They paſſed through France to Geneva, where they ſettled for ſome time to purſue their ſtudies; here our author reſumed his acquaintance with the elements of the mathematics, which he had commenced at Eton when ten years old, in conſequence of an illneſs which prevented his other uſual ſtudies.

In the autumn of 1641, he quitted Geneva, and travelled through Switzerland and Italy to Venice, from whence he returned again to Florence, where he ſpent the winter, ſtudying the Italian language and hiſtory, and the works of the celebrated aſtronomer Galileo, who died in a village near this city during Mr. Boyle's reſidence here.

About the end of March 1642, he ſet out from Florence, viſited Rome and other places in Italy, then returned to the ſouth of France. At Marſeilles, in May 1642, Mr. Boyle received letters from his father, which informed him that the rebellion had broken out in Ireland, and with how much difficulty he had procured 250l. then remitted, to help him and his brother home. This remittance however never reached them, and they were obliged to return to Geneva with their governor Mr. Marcombes, who contrived on his own credit, and by ſelling ſome jewels, to raiſe money enough to carry them to England, where they arrived in 1644. On their arrival they found that their father was dead, and had left our author the manor of Stalbridge in England, with ſome other conſiderable eſtates in Ireland.

From this time Mr. Boyle's chief reſidence, for ſome years at leaſt, was at his manor of Stalbridge, from whence he made occaſional excurſions to Oxford, London, &c; applying himſelf with great induſtry to various kinds of ſtudies, but eſpecially to philoſophy and chemiſtry; and ſeizing every opportunity of cultivating the acquaintance of the moſt learned men of his time. He was one of the members of that ſmall but learned body of men, who, when all academical ſtudies were interrupted by the civil wars, ſecreted themſelves about the year 1645; and held private meetings, firſt in London, afterwards at Oxford, to cultivate ſubjects of natural knowledge upon that plan of experiment which lord Bacon had delineated. They ſtyled themſelves, then, *The Philoſophic College*; but after the reſtoration, when they were incorporated, and diſtinguiſhed openly, they took the name of the *Royal Society*.

In the ſummer of 1654 he retired to ſettle at Oxford, the Philoſophical Society being removed from London to that place, that he might enjoy the converſation of the other learned members, his friends, who had retired thither, ſuch as Wilkins, Wallis, Ward, Willis, Wren, &c. It was during his reſidence here that he improved that admirable engine the air-pump; and by numerous experiments was enabled to diſcover ſeveral qualities of the air, ſo as to lay a foundation for a complete theory. He declared againſt the philoſophy of Ariſtotle, as having in it more of words than things; promiſing much, and performing little; and giving the inventions of men for indubitable proofs, inſtead of building upon obſervation and experiment. He was ſo zealous for this true method of learning by experiment, and ſo careful about it, that though the Carteſian philoſophy then made a great noiſe in the world, yet he could never be perſuaded to read the works of Deſcartes, for fear he ſhould be amuſed and led away by plauſible accounts of things founded on conjecture, and merely hypothetical. But philoſophy, and enquiries into nature, though they engaged his attention deeply, did not occupy him entirely; as he ſtill continued to purſue critical and theological ſtudies. He had offers of preferment to enter into holy orders, by the government, after the reſtoration. But he declined the offer, chooſing rather to purſue his ſtudies as a layman, in ſuch a manner as might be moſt effectual for the ſupport of religion; and began to communicate to the world the fruits of theſe ſtudies. Theſe fruits were very numerous and important, as well as various: the principal of which, as well as of ſome other memorable occurrences of his life, were nearly in the following order.

In 1660 came out, 1. New experiments, phyſico-mechanical, touching the ſpring of the air and its effects.—2. Seraphic love; or ſome motives and incentives to the love of God, pathetically diſcourſed of in a letter to a friend. A work which it has been ſaid was owing to his courtſhip of a lady, the daughter of Cary earl of Monmouth; though our author was

never married.—3. Certain phyfiological effays and other tracts, in 1661.—4. Sceptical chemift, 1662; reprinted about the year 1679, with the addition of many experiments and notes on the producibleneſs of chemical principles.

In the year 1663, the Royal Society being incorporated by king Charles II. Mr. Boyle was named one of the council; and as he might juftly be reckoned among the founders of that learned body, fo he continued one of the moft ufeful and induftrious of its members during the whole courfe of his life. His next publications were, 5. Confiderations touching the ufefulneſs of experimental and natural philofophy, 1663.—6. Experiments and confiderations upon colours; to which was added a letter, containing Obfervations on a diamond that fhines in the dark, 1663. This treatife is full of curious and ufeful remarks on the hitherto unexplained doctrine of light and colours; in which he fhews great judgement, accuracy, and penetration; and which may be faid to have led the way to Newton, who made fuch great difcoveries in that branch of phyfics.—7. Confiderations on the ftyle of the holy fcriptures, 1663. This was an extract from a larger work, intitled An effay on fcripture; which was afterwards publifhed by Sir Peter Pett, a friend of Mr. Boyle's.

In 1664 he was elected into the company of the royal mines; and was all this year occupied in profecuting various good defigns, which was probably the reafon that he did not publifh any additional works. Soon after came out, 8. Occafional reflections upon feveral fubjects, 1665. This piece expofed our author to the cenfure of the celebrated Dean Swift, who, to ridicule thefe difcourfes, wrote *A pious meditation upon a broomftick, in the ftyle of the honourable Mr. Boyle*.—9. New experiments and obfervations upon cold, 1665.—10. Hydroftatical paradoxes made out by new experiments, for the moft part phyfical and eafy, 1666.—11. The origin of forms and qualities, according to the corpufcular philofophy, 1666.—Both in this and the former year, our author communicated to his friend Mr. Oldenburgh, then fecretary to the Royal Society, feveral curious and excellent fhort pieces of his own, upon a great variety of fubjects, and others tranfmitted to him by his learned friends, which are printed in the Philof. Tranfactions.

In the year 1668 Mr. Boyle refolved to fettle in London for life; and for that purpofe he removed to the houfe of his fifter, the lady Ranelagh, in Pall-Mall. This removal was to the great benefit of the learned in general, and particularly of the Royal Society, to whom he gave great and continual affiftance, as abundantly appears by the feveral pieces communicated to them from time to time, and printed in their Tranfactions. To avoid improper wafte of time, he had fet hours in the day appointed for receiving fuch perfons as wanted to confult him, either for their own affiftance, or to communicate new difcoveries to him: and he befides kept up an extenfive correfpondence with the moft learned men in Europe; fo that it is wonderful how he could bring out fo many new works as he did. His next publications were, 12. A continuation of new experiments touching the weight and fpring of the air; to which is added, A difcourfe of the atmofphere of confiftent bodies, 1669.—13. Tracts about the cofmical qualities of things; cofmical fufpicions; the temperature of the fubterraneous regions; the bottom of the fea; to which is prefixed an introduction to the hiftory of particular qualities, 1669.—14. Confiderations on the ufefulneſs of experimental and natural philofophy, the 2d part, 1671.—15. A collection of tracts upon feveral ufeful and important points of practical philofophy, 1671.—16. An effay upon the origin and virtues of gems, 1672.—17. A collection of tracts upon the relation between flame and air; and feveral other ufeful and curious fubjects, 1672. Befides furnifhing, in this and the former year a number of fhort differtations upon a great variety of topics, addreffed to the Royal Society, and inferted in their Tranfactions.—18. Effays on the ftrange fubtilty, great efficacy, and determinate nature, of effluvia; with a variety of experiments on other fubjects, 1673.—19. The excellency of theology compared with philofophy, 1673. This difcourfe was written in the year 1665, while our author, to avoid the great plague which then raged in London, was forced to go from place to place in the country, having little or no opportunity of confulting his books.—20. A collection of tracts upon the faltneſs of the fea, the moifture of the air, the natural and preternatural ftate of bodies; to which is prefixed a dialogue concerning cold, 1674.—21. A collection of tracts containing fufpicions about hidden qualities of the air; with an appendix touching celeftial magnets: animadverfions upon Mr. Hobbes's problem about a vacuum; a difcourfe of the caufe of attraction and fuction, 1674.—22. Some confiderations about the reafonableneſs of reafon and religion; by T. E. (the final letters of his names). To which is annexed a difcourfe about the poffibility of the refurrection; by Mr. Boyle, 1675. The fame year feveral papers communicated to the Royal Society, among which were two upon quick-filver growing hot with gold.—23. Experiments and notes about the mechanical origin or production of particular qualities, in feveral difcourfes on a great variety of fubjects, and among the reft on electricity, 1676. He then communicated to Mr. Hook a fhort memorial of fome obfervations made upon an artificial fubftance that fhines without any preceding illuftration; publifhed by Hook in his *Lectiones Gutlerianæ*.—24. Hiftorical account of a degradation of gold made by an anti-elixir.—25. Aërial noctiluca; or fome new phænomena, and a procefs of a factitious felf-fhining fubftance, 1680. This year the Royal Society, as a proof of the juft fenfe of his great worth, and of the conftant and particular fervices which through a courfe of many years he had done them, made choice of him for their prefident; but he being extremely, and, as he fays, peculiarly tender in point of oaths, declined that honour.—26. Difcourfe of things above reafon; inquiring, whether a philofopher fhould admit any fuch, 1681.—27. New experiments and obfervations upon the icy noctiluca; to which is added a chemical paradox, grounded upon new experiments, making it probable that chemical principles are tranfmutable, fo that out of one of them others may be produced, 1682.—28. A continuation of new experiments, phyfico-mechanical, touching the fpring and weight of the air, and their effects, 1682.—29. A fhort letter to Dr. Beale, in relation to the making of frefh water out of falt, 1683.—30. Memoirs for the natural hiftory of human blood, efpecially the fpirit of that liquor, 1684.—31. Experiments and confiderations about the porofity of bodies, 1684.——32. Short memoirs for the natural and experimental hiftory of mineral waters, &c. 1685.—33. An effay on the great effects of even languid and unheeded motion, &c. 1685.—34. Of the reconcileableneſs of fpecific medicines to the corpufcular philofophy, &c. 1685.—35. Of the high veneration man's intellect owes to God, peculiarly for his wifdom and power, 1685.—36. Free inquiry into the vulgarly received notion of nature, 1686.—37. The martyrdom of Theodora and Didymia, 1687. A work he had drawn up in his youth.—38. A difquifition about the final caufes of natural things, and about vitiated light, 1688.

Mr. Boyle's health declining very much, he abridged greatly his time given to converfations and communications with other perfons, to have more time to prepare for the prefs fome others of his papers, before his death, which were as follow:—39. *Medicina Hydroftatica*, &c. 1690.—40. The Chriftian Virtuofo, &c. 1690.—41. *Experimenta et Obfervationes Phyficæ*, &c. 1691; which is the laft work that he publifhed.

Mr. Boyle died on the laft day of December of the fame

year 1691, in the 65th year of his age, and was buried in St. Martin's church in the Fields, Weftminfter; his funeral fermon being preached by Dr. Gilbert Burnet bifhop of Salifbury; in which he difplayed the excellent qualities of our author, with many circumftances of his life, &c. But as the limits of this work will not allow us to follow the bifhop in the copious and eloquent account he has given of this great man's abilities, we muft content ourfelves with adding the following fhort eulogium by the celebrated phyfician, philofopher, and chemift, Dr. Boerhaave; who, after having declared lord Bacon to be the father of experimental philofophy, afferts, that "Mr. Boyle, the ornament of his age and country, fucceeded to the genius and inquiries of the great chancellor Verulam. Which, fays he, of Mr. Boyle's writings fhall I recommend? All of them. To him we owe the fecrets of fire, air, water, animals, vegetables, foffils: fo that from his works may be deduced the whole fyftem of natural knowledge."

Mr. Boyle left alfo feveral papers behind him, which have been publifhed fince his death. Beautiful editions of all his works have been printed at London, in five volumes folio, and fix volumes 4to. Dr. Shaw alfo publifhed in three volumes 4to, the fame works "abridged, methodized, and difpofed under the general heads of Phyfics, Statics, Pneumatics, Natural Hiftory, Chemiftry, and Medicine; to which he has prefixed a fhort catalogue of the philofophical writings, according to the order of time when they were firft publifhed.

Boyle's *Lectures*, a courfe of eight fermons or lectures preached annually, fet on foot by the honourable Robert Boyle, Efq. by a codicil annexed to his will in 1691; whofe defign, as expreffed by the inftitutor, is, to prove the truth of the Chriftian religion againft infidels, without defcending to any controverfies among Chriftians; and to anfwer new difficulties, fcruples, &c. For the fupport of this lecture he affigned the rent of his houfe in Crooked-lane to fome learned divine within the bills of mortality, to be elected for a term not exceeding three years, by the late Archbifhop Tennifon and others. But the fund proving precarious, the falary was ill paid: to remedy which inconveniencies, the faid archbifhop procured a yearly ftipend of 50l. for ever, to be paid quarterly, charged on a farm in the parifh of Brill in the county of Bucks. To this appointment we are indebted for many learned and elaborate defences both of natural and revealed religion.

BOYNE, a river in Ireland, which rifes in Queen's county in the province of Leinfter, and runs north-eaft by Trim and Cavan, falling at laft into the Irifh channel a little below Drogheda. It is memorable for a battle fought on its banks between James II. and King William III. in which the former was defeated.

BOYSE, Boys, or Bois (John), one of the tranflators of the Bible in the reign of James I. was fon of William Bois, rector of Weft Stowe, near St. Edmundfbury, Suffolk, and born at Nettleftead in Suffolk on the 3d of January 1560. He died on the 14th of January 1643, in the 84th year of his age; leaving a great many manufcripts behind him, particularly a Commentary on almoft all the books of the New Teftament.—When he was a ftudent at Cambridge, he received from the learned Dr. Whitaker three rules for avoiding thofe diftempers which ufually attend a fedentary life, to which he adhered with equal conftancy and fuccefs. The firft was, To ftudy always ftanding; the fecond, Never to ftudy in a window; and the third, Never to go to bed with his feet cold.

BOZOLO, a town of Italy, in the duchy of Mantua, capital of a territory of the fame name, and fubject to the houfe of Auftria. E. lon. 10. 25. N. lat. 45. 9.

B QUADRO, Quadrato, or *Durale*, in mufic, called by the French *b quarre*, from its figure ♮. This is what we call *B natural* or *fharp*, in diftinction to B *mol* or *flat*. See Flat and Sharp. If the flat ♭ be placed before a note in the thorough bafs, it intimates, that its third is to be minor; and if placed with any cypher over a note in the bafs, as ♭6, or ♭5, &c. it denotes, that the fifth or fixth thereto are to be flat. But if the quadro ♮ be placed over any note, or with a cypher, in the thorough bafs, it has the contrary effect; for, by it, the note or interval thereto is raifed to its natural order.

BRABANCIONES, in middle-age writers, a kind of Netherland foldiery, infamous for rapine, being little better than commiffioned banditti, who hired themfelves to fight for any that could pay them beft. The word is varioufly written by the hiftorians of thofe days. All derive them from the country of Brabant, which was the chief nurfery of thofe troops. They are alfo frequently confounded with the *Routiers*, *Roturiers*, *Ruptarii*, *Ruterarii*, *Cortereaux*, &c.

BRABANT, a large province of the Netherlands, with the title of a duchy. It is bounded on the north by the province of Holland and the duchy of Guelderland; on the eaft, by the fame duchy and the bifhopric of Liege; on the fouth, by the province of Namur and Hainhalt; and on the weft, by Zealand. It is divided into Dutch Brabant and Auftrian Brabant; watered by feveral rivers, of which the Scheldt, the Ruppel, and the Dommel, are the chief. The foil is very fertile; and it contains 26 fortified towns, of which Bruffels is the capital.

BRABEJUM, the African almond: a genus of the monœcia order, belonging to the polygamia clafs of plants. In the male the corolla is four-parted; there are four ftamina inverted in the throat; the ftile is bifid and abortive. The female has a four-parted corolla, revoluted upwards, with four ftamina, one piftil with two ftigmas; the fruit is a roundifh drupa with a globular feed. Of this genus there is but one fpecies, viz. the ftellatifolium, which is a native of the Cape of Good Hope. In Europe it feldom grows above eight or nine feet high, but in its native foil is a tree of a middling growth. It rifes with an upright ftem, which is foft, and full of pith within, and covered with a brown bark. The leaves come out all round the branches at each joint: they are indented at their edges, ftanding on very fhort foot-ftalks. The flowers are produced towards the end of their fhoots, which are of a pale colour inclining to white. This may be propagated, though with difficulty, by layers made in April; but they are often two years before they produce roots ftrong enough to be taken from the plants. When the branches are laid down, it will be proper to flit them at the point, as is practifed in laying carnations, which will promote their taking root. In winter, the plants fhould have a good greenhoufe; but in fummer they fhould be placed abroad in a fheltered place.

BRABEUTES, or Brabeuta, in antiquity, an officer among the Greeks, who prefided at the public games, and decided controverfies that happened among the antagonifts in the gymnaftical exercifes. The number of brabeutæ was not fixed; fometimes there was only one, but more commonly they amounted to nine or ten.

BRACCIANO, a town of St. Peter's patrimony, about 12 miles north of Rome, fituated on the weft fide of a lake to which it gives name. E. long. 13°. N. lat. 42°.

BRACCIOLINI (Francis), an Italian poet, a native of Poftoia, and the friend of Pope Urban VIII. died about the year 1644, aged 80. He wrote, 1. An epic poem, intitled, The crofs reconquered, under the emperor Heraclius. 2. An heroic poem, intitled, The mockery of the Pagan gods. 3. The election of Pope Urban VIII. in 23 books.

BRACE, is commonly taken for a couple or pair, and applied by huntfmen to feveral beafts of game, as a brace of bucks, foxes, hares, &c.

Brace, or *Braſſe*, is alſo a foreign meaſure, anſwering to our fathom. See Fathom.

Brace, in architecture, a piece of timber framed in with bevil joints, the uſe of which is to keep the building from ſwerving either way. When the brace is framed into the king-peiſes or principal rafters, it is by ſome called a *ſtrut*.

Brace, in writing or printing, this ſort of crooked line incloſing a paſſage, as in a triplet.

Braces, in the ſea-language, are ropes belonging to all the yards of a ſhip, except the mizen, two to each yard, reeved through blocks that are faſtened to pennants, ſeized to the yard-arms. Their uſe is either to ſquare or traverſe the yards. Hence to brace the yard, is to bring it to either ſide. All braces come aftward on; as, the main brace comes to the poop, the main top-ſail brace comes to the mizen-top and thence to the main ſhrouds, the fore and fore top-ſail braces come down by the main and main top-ſail ſtays, and ſo of the reſt. But the mizen-bowline ſerves to brace to the yard, and the croſs-jack braces are brought forwards to the main ſhrouds, when the ſhip ſails cloſe by a wind.

Braces *of a Coach*, thick ſtraps of leather on which it hangs, and by which the body is connected with the ſprings.

BRACELET, an ornament worn on the wriſt, much uſed among the ancients: it was made of different materials, and in different faſhions, according to the age and quality of the wearer. The word is French, *bracelet*: which Menage derives further from *bracaletum*, a diminutive of *bracile*, a word occurring in writers of the Juſtinian age; all formed from the Latin *brachium*, arm. It amounts to the ſame with what was called by the ancients, *armilla*, *brachiale*, *occabus*; in the middle age, *boga*, *bauga*, *armiſpatha*. Bracelets are much worn by the ſavages of Africa, who are ſo exceſſively fond of them, as to give the richeſt commodities, and even their fathers, wives, and children, in exchange for thoſe made of no richer materials than ſhells, glaſs-beads, and the like. They form alſo, in modern civilized countries, a common part of the ornaments of the ladies.

BRACHIÆUS, the name of a muſcle. See Anatomy, *Table of the Muſcles*.

Coraco BRACHIALIS. See Anatomy, *ibid*.

BRACHIUM, or Arm. See Anatomy.

BRACHMINS, or Brachmans, a branch of the ancient Gymnoſophiſts, or philoſophers of India, remarkable for the ſeverity of their lives and manners. See the article Gymnosophists. Some ſay they derive their name from the patriarch Abraham, whom they call in their language *Brachma*, or *Brama*. Others deduce it from the name of their god *Brachma*; which ſome again take to be the ſame with Abraham: whence Poſtel calls them *Abrachmanes*. F. Thomaſſin derives the word from the Hebrew *barach*, to fly or eſcape; becauſe the Brachmans retire into the country and live in deſerts. The ſame author gives us another derivation, viz. from the Hebrew *barach*, *(benedicere, orare)* to bleſs or pray; in regard this is their principal occupation.—The Greeks aſcribe to them the doctrine of the immortality of the ſoul, and certain notions concerning the nature of the Supreme Being and future rewards and puniſhments. To this ſpecies of knowledge the Brachmans added an infinite number of religious obſervances, which were adopted by Pythagoras in his ſchool; ſuch as faſting, prayer, ſilence, and contemplation. They were looked upon as the friends of the gods, becauſe they affected to pay them ſo much regard; and as the protectors of mankind, becauſe they paid them no regard at all. No bounds were therefore ſet to the reſpect and gratitude that were ſhewn them: princes themſelves did not ſcruple to conſult theſe recluſes upon any critical conjuncture, from a ſuppoſition, no doubt, that they were inſpired; ſince it was impoſſible to imagine that they had the advantages of experience. We can ſcarcely, however, deny, that there might be among them ſome men of real virtue, whoſe minds reliſhed the pure and ingenious delights of ſtudy and ſcience; and who, by nobly raiſing their thoughts to the contemplation of the Supreme Being, muſt have had more powerful incitements to render themſelves worthy of his care, and none to juſtify them in deceiving and tyrannizing over their fellow mortals. There appear ſtill ſome remains of the ancient Brachmans in the Eaſt, under the denomination of Bramins. See Bramins.

BRACHYGRAPHY, the art of ſhort-hand-writing. See Short-Hand.

BRACHYLOGY, from βραχυς, and λογος, *expreſſion*, in rhetoric, the expreſſing any thing in the moſt conciſe manner. This, ſo far as conſiſtent with perſpicuity, is a virtue and beauty of ſtyle; but if obſcurity be the conſequence, which is often the caſe, it becomes a blemiſh and inexcuſable defect.—Quintilian gives an inſtance of brachylogy from Salluſt: *Mithridates corpore ingenii perinde armatus*; "Mithridates, as it were, armed with the hugeneſs of his ſtature."

BRACHYPTERA, a term uſed by Willughby, to denote thoſe hawks which have their wings ſo ſhort as not to reach to the end of the tail. Of this kind are the goſs-hawk, ſparrow-hawk, and ſome others.

BRACHYPYRENIA, in the hiſtory of foſſils, a genus of ſeptariæ, with a ſhort round kind of nucleus. See Septariæ.

BRACHYTELOSTYLA, in natural hiſtory, the name by which Dr. Hill calls thoſe cryſtals which are compoſed of a ſhort hexangular column terminated at each end by an hexangular pyramid. See Crystal.

BRACKET, among carpenters, &c. a kind of wooden ſtay, ſerving to ſupport ſhelves, buſts, &c.

Brackets, in a ſhip, the ſmall knees, ſerving to ſupport the galleries, and commonly carved. The timbers that ſupport the gratings in the head are alſo called *brackets*.

Brackets, in gunnery, are the cheeks of the carriage of a mortar: they are made of ſtrong planks of wood, of almoſt a ſemicircular figure, and bound round with thick iron plates; they are fixed to the beds by four bolts, which are called *bed-bolts*; they riſe up on each ſide of the mortar, and ſerve to keep her at any elevation, by means of ſome ſtrong iron bolts, called *bracket-bolts*, which go through theſe cheeks.

BRACKLAU, a ſtrong town in Poland, capital of a palatinate of the ſame name. The houſes are built of wood. It was taken by the Turks in 1672, but retaken three years afterwards. It is ſeated on the river Bog, in E. long. 29. 20. N. lat. 48. 5.

BRACKLAW, a palatinate of that name, which is the Eaſtern part of Podolia; it is alſo called *Lower Podolia*, and is of greater extent than Upper Podolia, but is more deſolate, on account of the neighbourhood of the Tartars.

BRACKLEY, a borough-town in Northamptonſhire in England, ſeated on the edge of the county, next Buckinghamſhire, on a branch of the river Ouſe. It is an ancient and large corporation town, containing two pariſh churches; is governed by a mayor and aldermen; and ſends two members to parliament. It had formerly a college, which is turned into a free ſchool. W. long. 1. 15. N. lat. 52. 0.

BRACTEA, in natural hiſtory, denotes a ſpangle, or thin flake of any ſubſtance.

Bractea, in botany, a thin leaf or plate of any *folium florale*, ranged by Linnæus among the *fulcra* of plants. Theſe floral leaves differ in ſhape and colour from the other *folia* of the plant; are generally ſituated on the pedunculus, and often ſo near the corolla as to be eaſily miſtaken for the *calyx*; than which, however, the *bractea* are generally more permanent. Examples of the floral leaves are ſeen in the tilia, fumaria, bulboſa, lavendula, &c.

BRACTEARIA, in natural hiſtory, a genus of talcs, compoſed of ſmall plates in form of ſpangles, each plate either being very thin, or fiſſile into very thin ones. Of this genus there are a great many ſpecies, called, from their different colours, *mica aurea*, or gold-glimmer; and *mica argentea*, ſilver-glimmer, or cats-ſilver, &c.

BRACTON (Henry), lord chief juſtice of England in the reign of Henry III. was, as it is ſuppoſed, a native of Devonſhire. He was educated at Oxford, where he took the degree of doctor of laws, and was made one of the itinerant judges about the year 1244. Ten years after, he became chief juſtice, and had the earl of Derby's houſe in London aſſigned him for his town reſidence, during the minority of that nobleman. He is ſaid to have filled this important office with ſingular reputation during 20 years. When he died is not known; probably it was in the reign of Edward I. He wrote *De legibus et conſuetudinibus Angliæ*, which is one of the moſt ancient, and alſo moſt methodical books on our laws. His method is copied from Juſtinian. This work was printed at London in 1569, folio; and in 1640, 4to: the former impreſſion is very incorrect.

BRAD, a town of Sclavonia, ſeated on the north ſide of the river Save, in E. long. 18. 40. N. lat. 45. 20.

BRADFIELD, a town of Eſſex in England, in E. long. 0. 30. N. lat. 51. 14.

BRADFORD, a town of Wiltſhire in England, ſeated in W. long. 2. 40. N. lat. 51. 20.

BRADFORTH, a town in the weſt of Yorkſhire, ſeated on a branch of the river Aire, in W. long. 1. 35. N. lat. 53. 40.

BRADLEY (Dr. James), a celebrated Engliſh aſtronomer, the third ſon of William Bradley, was born at Sherborne in Glouceſterſhire in the year 1692. He was fitted for the univerſity at Northleach in the ſame county, at the boarding-ſchool of Mr. Egles and Mr. Brice. From thence he was ſent to Oxford, and admitted a commoner of Baliol college March 15, 1710; where he took the degree of bachelor the 14th of October 1714, and of maſter of arts the 21ſt of January, 1716. His friends intending him for the church, his ſtudies were regulated with that view; and as ſoon as he was of a proper age to receive holy orders, the biſhop of Hereford, who had conceived a great eſteem for him, gave him the living of Bridſtow, and ſoon after he was inducted to that of Landewy Welfry in Pembrokeſhire.

He was nephew to Mr. Pound, a gentleman well known in the learned world by many excellent aſtronomical and other obſervations, and who would have enriched it much more, if the journals of his voyages had not been burnt at Pulo Condor, when the place was ſet on fire, and the Engliſh who were ſettled there cruelly maſſacred, Mr. Pound himſelf very narrowly eſcaping with his life. With this gentleman, at Wanſtead, Mr. Bradley paſſed all the time that he could ſpare from the duties of his function; being then ſufficiently acquainted with the mathematics to improve by Mr. Pound's converſation. It may eaſily be imagined that the example and converſation of this gentleman did not render Bradley more fond of his profeſſion, to which he had before no great attachment: he continued however as yet to fulfil the duties of it, though at this time he had made ſuch obſervations as laid the foundation of thoſe diſcoveries which afterward diſtinguiſhed him as one of the greateſt aſtronomers of his age. Theſe obſervations gained him the notice and friendſhip of the lord chancellor Macclesfield, Mr. Newton afterward Sir Iſaac, Mr. Halley, and many other members of the Royal Society, into which he was ſoon after elected a member.

Soon after, the chair of Savilian profeſſor of aſtronomy at Oxford became vacant, by the death of the celebrated Dr. John Keil; and Mr. Bradley was elected to ſucceed him on the 31ſt of October 1721, at 29 years of age; his colleague being Mr. Halley, who was profeſſor of geometry on the ſame foundation. Upon this appointment, Mr. Bradley reſigned his church livings, and applied himſelf wholly to the ſtudy of his favourite ſcience. In the courſe of his obſervations, which were innumerable, he diſcovered and ſettled the laws of the alterations of the fixed ſtars, from the progreſſive motion of light, combined with the earth's annual motion about the ſun, and the nutation of the earth's axis, ariſing from the unequal attraction of the ſun and moon on the different parts of the earth. The former of theſe effects is called the *aberration* of the fixed ſtars, the theory of which he publiſhed in 1727; and the latter the *nutation* of the earth's axis, the theory of which appeared in 1737: ſo that in the ſpace of about 10 years, he communicated to the world two of the fineſt diſcoveries in modern aſtronomy; which will for ever make a memorable epoch in the hiſtory of that ſcience. See ABERRATION and NUTATION.

In 1730 our author ſucceeded Mr. Whiteſide, as lecturer in aſtronomy and experimental philoſophy in the Muſeum at Oxford, which was a conſiderable emolument to him, and which he held till within a year or two of his death; when the ill ſtate of his health induced him to reſign it.

Our author always preſerved the eſteem and friendſhip of Dr. Halley; who, being worn out by age and infirmities, thought he could not do better for the ſervice of aſtronomy, than procure for Mr. Bradley the place of regius profeſſor of aſtronomy at Greenwich, which he himſelf had many years poſſeſſed with the greateſt reputation. With this view he wrote many letters, deſiring Mr. Bradley's permiſſion to apply for a grant of the reverſion of it to him, and even offered to reſign it in his favour, if it ſhould be thought neceſſary: but Dr. Halley died before he could accompliſh this kind object. Our author however obtained the place, by the intereſt of lord Macclesfield, who was afterward preſident of the Royal Society; and upon this appointment the univerſity of Oxford ſent him a diploma of doctor of divinity.

The appointment of aſtronomer royal at Greenwich, which was dated the 3d of February 1741-2, placed our author in his proper element; and he purſued his obſervations with unwearied diligence. However numerous the collection of aſtronomical inſtruments at that obſervatory, it was impoſſible that ſuch an obſerver as Dr. Bradley ſhould not deſire to increaſe them, as well to anſwer thoſe particular views, as in general to make obſervations with greater exactneſs. In the year 1748 therefore he took the opportunity of the viſit of the Royal Society to the obſervatory, annually made to examine the inſtruments and receive the profeſſor's obſervations for the year, to repreſent ſo ſtrongly the neceſſity of repairing the old inſtruments, and providing new ones, that the ſociety thought proper to make application to the king, who was pleaſed to order 1000 pounds for that purpoſe. This ſum was laid out under the direction of our author, who, with the aſſiſtance of the late celebrated Mr. Graham and Mr. Bird, furniſhed the obſervatory with as complete a collection of aſtronomical inſtruments, as the moſt ſkilful and diligent obſerver could deſire. Dr. Bradley, thus furniſhed with ſuch aſſiſtance, purſued his obſervations with great aſſiduity during the reſt of his life; an immenſe number of which was found after his death, in 13 folio volumes, and were preſented to the univerſity of Oxford in the year 1776, on condition of their printing and publiſhing them; but which however, unfortunately for the improvement of aſtronomy, now after a lapſe of almoſt 20 years, has never yet been done.

During Dr. Bradley's reſidence at the Royal Obſervatory, the living of the church at Greenwich became vacant, and was offered to him: upon his refuſing to accept it, from a conſcientious ſcruple, "that the duty of a paſtor was incompatible

with his other ſtudies and neceſſary engagements," the king was pleaſed to grant him a penſion of 250l. over and above the aſtronomer's original ſalary from the Board of Ordnance, "in conſideration (as the ſign manual, dated the 15th Feb. 1752, expreſſes it) of his great ſkill and knowledge in the ſeveral branches of aſtronomy and other parts of the mathematics, which have proved ſo uſeful to the trade and navigation of this kingdom"—a penſion which has been regularly continued to the aſtronomers royal ever ſince.

About 1748, our author became entitled to biſhop Crew's benefaction of 30l. a year, to the lecture-reader in experimental philoſophy at Oxford. He was elected a member of the Academy of Sciences at Berlin, in 1747; of that at Paris, in 1748; of that at Peterſburgh, in 1754; and of that at Bologna, in 1757. He was married in the year 1744, but never had more than one child, a daughter.

By too cloſe application to ſtudy and obſervations, Dr. Bradley became afflicted, for near two years before his death, with a grievous oppreſſion on his ſpirits; which interrupted his uſeful labours. This diſtreſs aroſe chiefly from an apprehenſion that he ſhould outlive his rational faculties: but this ſo much dreaded evil never came upon him. In June 1762 he was ſeized with a ſuppreſſion of urine, occaſioned by an inflammation in the kidneys which terminated his exiſtence the 13th of July following. His death happened at Chalfont in Glouceſterſhire, in the 70th year of his age; and he was interred at Minchinhampton in the ſame county.

As to his character, Dr. Bradley was remarkable for a placid and gentle modeſty, very uncommon in perſons of an active temper and robuſt conſtitution. Although he was a good ſpeaker, and poſſeſſed the rare but happy art of expreſſing his ideas with the utmoſt preciſion and clearneſs, yet no man was a greater lover of ſilence, for he never ſpoke but when he thought it abſolutely neceſſary. Nor was he more inclined to write than to ſpeak, as he has publiſhed very little: he had a natural diffidence, which made him always afraid that his works might injure his character; ſo that he ſuppreſſed many which might have been worthy of publication.

BRADNINCH, a town of Devonſhire, once a conſiderable place, but ſome time ago totally deſtroyed by fire. W. long. 3. 35. N. lat. 50. 45.

BRADS, among artificers, a kind of nails uſed in building, which have no ſpreading heads as other nails have. They are diſtinguiſhed by iron-mongers by ſix names; as *joiners brads*, *flooring-brads*, *batten-brads*, *bill-brads* or *quarter-beads*, &c. Joiners-brads are for hard wainſcot; batten-brads are for ſoft wainſcot; bill-brads are uſed when a floor is laid in haſte, or for ſhallow joiſts ſubject to warp. See Nail.

BRADSHAW (John), Lord Preſident of the Council who condemned king Charles I: an event which brought upon his memory all the opprobrium that the ingenious malice of the party that triumphed over the republicans of that day could deviſe. Neither have there been wanting hiſtorians, ſo far the dupes of vulgar clamour as to put upon record, and hand down to poſterity in their writings, the moſt deſpicable falſehoods reſpecting the motives of his political conduct, as well as of his birth and origin; for the execrations of party confound all diſtinctions, and blacken with one promiſcuous touch, all the objects againſt whom their ungovernable fury happens to be directed. It is not wonderful indeed that the biography of a man, whom it was the faſhion of thoſe times to conſider as a vice even to *name*, ſhould be mutilated and imperfect, nor that the direct traces of his family deſcent ſhould be inſcrutable to the inveſtigations of the herald or the antiquary. Thoſe whoſe averſion held him forth as a ſanguinary regicide, were able to indulge, without danger of contradiction, in any reveries they thought proper, reſpecting his low birth and the impurity of his motives; for it is to be ſuppoſed none of his family or friends would dare to oppoſe the current of popular odium, by attempting a vindication, to which, however conformable to truth, few could be prevailed on to attend. Whether we ſhould apply the epithets *juſt* or *expedient* to the cataſtrophe in which Bradſhaw took ſo conſpicuous a ſhare, we leave to be decided by thoſe who adhere to or who impugn the political tenets of the Stuart race. We ſhall content ourſelves with repelling a great calumny which one writer has copied from another, and which involves the preſident Bradſhaw in the common reproach of having been the tool of the uſurper Cromwell. Whether he was or not, will appear from the following extracts taken from the memoirs of that honeſt *hiſtorian* of his *own times*, Ludlow, who, though implicated himſelf in the death of Charles, was never accuſed, even by his enemies, of having recorded a falſehood. Theſe are taken from the 4to edition publiſhed in 1771, and are as follows:

P. 118. "On the 10th Jan. 1648, the High Court of Juſtice eſtabliſhed by an act of the parliament for the trial of king Charles I. choſe ſerjeant Bradſhaw to be their preſident, and Mr. Liſle and Mr. Say to be his aſſiſtants."

P. 211. "In England they better underſtood the deſign that was carrying on, inſomuch, that many perſons of known virtue and integrity were choſen to ſit in this aſſembly (the new parliament), in particular the lord preſident Bradſhaw, ſir Arthur Hazelrig, &c. &c."

P. 240. "Cromwell ſummons him and others to council, and is obeyed. As ſoon as Cromwell ſaw the lord preſident, he required him to take out a new commiſſion for his office of chief juſtice of Cheſter, which he refuſed, alleging that he held that place by a grant from the parliament of England, to continue *quamdiu ſe bene geſſerit*. And whether he had carried himſelf with that integrity which his commiſſion exacted from him, he was willing to ſubmit to a trial by twelve Engliſhmen; to be choſen even by Cromwell himſelf."

P. 244. "The preſident Bradſhaw, notwithſtanding what had paſſed, reſolved to go his circuit, as chief juſtice of Cheſter, unleſs he ſhould be prevented by force. But Cromwell thought it more adviſable to permit him to execute his office, than, by interrupting his circuit, to make a breach with thoſe of the long robe, whoſe aſſiſtance was ſo neceſſary to the carrying on his deſign. By the intrigues of Cromwell, he and other ſteady favourers of the commonwealth loſt their ſeats."

P. 261. "In the parliament called by Richard Cromwell, the preſident Bradſhaw was returned for the county of Cheſter, by the ſheriff."

P. 277. "And the better to ſhew the conſideration the parliament had for ſome eminent perſons who were not of their body, it was agreed that the lord preſident Bradſhaw, the lord Fairfax, and others, ſhould be members of the council of ſtate."

P. 282. "The lord preſident Bradſhaw, ſerjeant Fountain, and ſerjeant Tyrell, were made commiſſioners of the broad ſeal."

P. 307. "During thoſe diſorders, the council of ſtate ſtill aſſembled at the uſual place; and at one of their meetings, colonel Sydenham, who was one of them, made a ſpeech, wherein he endeavoured to juſtify theſe proceedings of the army, undertaking to prove that they were neceſſitated to make uſe of this laſt remedy, by a particular call of the Divine Providence. But the lord preſident Bradſhaw, who was then preſident, though by long ſickneſs very weak and much extenuated, yet animated by his ardent zeal and conſtant affection to the common cauſe, upon hearing thoſe words, ſtood up and interrupted him, declaring his abhorrence of that deteſtable action, and telling the council, that being now going to his God, he had not patience to ſit there to hear his great name ſo openly blaſphemed; and thereupon departed, and withdrew himſelf from public employment."

The reader will have no difficulty in applying thefe paffages, to which we fhall here add, that a variety of communications refpecting the fubject of our remarks are to be found in different volumes of the Gentleman's Magazine. There is a Bradfhaw of Pennington in Lancafhire, who is of the prefident's family; and he has alfo lineal defcendants, of another name, in London and Liverpool.

Guthrie, fpeaking of thofe with whom Bradfhaw acted, makes the following remarks: "They who brought Charles to the block (fays he) were men of different perfuafions and principles, but many of them poffeffed moft amazing abilities for government. They omitted no meafure that could give a perpetual exclufion to kingly power in England; and it cannot be denied, that, after they erected themfelves into a commonwealth, they did prodigious things for retrieving the glory of England by fea. They were joined by many of the prefbyterians, and both parties hated Cromwell and Ireton, though they were forced to employ them in the reduction of Ireland, and afterwards againft the Scots, who had received Charles II. as their king. By cutting down the timber upon the royal domains, they produced, as it were by magic, all at once, a fleet fuperior to any that had ever been feen in Europe. Their general, Cromwell, invaded Scotland; and though he was there reduced to great difficulties, he totally defeated the Scots at the battles of Dunbar and Worcefter. The fame commonwealth paffed an act of navigation; and declaring war againft the Dutch, who were thought till then invincible by fea, they effectually humbled thofe republicans in repeated engagements."

BRADY (Nicholas), an excellent divine and poet, born at Bandon, in the county of Cork, October 28th, 1659. He ftudied at Weftminfter-fchool, and afterwards at Oxford and Dublin college. He was a zealous promoter of the Revolution; and, in 1690, when the troubles broke out in Ireland, by his intereft with M'Carty, king James's general, he thrice prevented the burning of the town of Bandon. Having quitted feveral preferments in Ireland, he fettled in London, where he was fucceffively promoted to feveral livings; and at the time of his death was rector of Clapham, minifter of Richmond, and chaplain to the Duke of Ormond's troop of horfe-guards. He wrote part of the new verfion of the Pfalms, now fung in many churches in England and Ireland; the Æneids of Virgil, in 4 vols.; and 3 vols. of fermons. He died May 20th, 1726.

BRADYPUS, or Sloth, a genus of quadrupeds, belonging to the order of bruta (fee plate 51). The characters are thefe: They have no fore-teeth in either jaw; the dog-teeth are blunt, folitary, and longer than the grinders; they have five grinders on each fide. The body is covered with hair.

There are only two fpecies of bradypus, viz. 1. The *tridactylus*, or American floth, has a fhort tail, and only three toes on each foot. It is about the fize of a fox. The body is covered over with hair of a grey colour; the face is naked; the throat is yellowifh; the fore-feet are longer than the hind-feet; the claws, which are three on each foot, are compreffed, and very ftrong; and they have no mammæ on the breaft; they have no external ears, but only two winding holes. It is the moft fluggifh and moft flow of all animals, and feems to move with the utmoft pain. Its food is fruit, or the leaves of trees. If it cannot find fruit on the ground, it looks out for a tree well loaded, and with great pain climbs up: to fave the trouble of defcending, it flings off the fruit; and, forming itfelf into a ball, drops from the branches, continues at the foot till it has devoured all, nor ever ftirs till compelled by hunger. It never drinks, and is terrified by rain.

Mr. Stillingfleet extracts the following extraordinary account of this animal from Kercher's *Mufurgia*: "The defcription (fays Kircher) I had from father Torus, who refided in America, who had animals of this kind in his poffeffion, and made many experiments in relation to their nature and qualities. Its figure is extraordinary; it is about the bignefs of a cat, of a very ugly countenance, and has claws extended like fingers. The hinder part of the head and neck are covered with hair. It fweeps the ground with its fat belly, never rifes upon its feet, and moves fo flowly, that it would fcarce go the length of a bow-fhot in 15 days, though conftantly moving, and it is therefore called the *floth*. It lives generally upon tops of trees, and employs two days to crawl up, and as many to get down again. Nature has doubly guarded this animal againft its enemies. Firft, by giving it fuch ftrength in its feet, that whatever it feizes, it holds fo faft, that it never can be freed from its claws, but muft there die of hunger. Secondly, in giving it fuch a moving afpect, when it looks at any man who fhould be tempted to hurt it, that it is impoffible not to be touched with compaffion; befides, that at the fame time it fheds tears, and upon the whole perfuades one, that a creature fo defencelefs, and of fo unhappy a body, ought not to be tormented. To make an experiment of this, the above-mentioned father procured one of thefe animals to be brought to our college at Carthagena. He put a long pole under its feet, which it feized upon very firmly, and would not let go again. The animal therefore thus voluntarily fufpended, was placed between two beams along with the pole, and there it remained without meat, drink, or fleep, 40 days; its eyes being always fixed on people that looked at it, who were fo touched, that they could not forbear pitying it. At laft being taken down, they let loofe a dog on it, which after a little while the floth feized with his feet, and held him four days, till he died of hunger. This was taken from the mouth of the father. They add (continues Kircher), that this creature makes no noife but at night, but that very extraordinary. For by interruptions, that laft about the length of a figh or femi-paufe, it goes through the fix vulgar intervals of mufic, Ut, re, mi, fa, fol, la, La, fol, fa, mi, re, ut, afcending and defcending, and thefe perfectly in tune. So that the Spaniards, when they firft got poffeffion of this coaft, and heard thefe notes, imagined that fome people brought up to our mufic were finging. This animal is called by the natives *haut*; certainly becaufe, going through thefe mufical intervals, it repeats, Ha, ha, ha, ha, ha, &c." To this account Linnæus feems, in his *Syftema Naturæ*, to give credit. For he fays, in his fhort way of defcription, among other things, "It utters an afcending hexachord: its noife is horrible; its tears are pitcous." He quotes Mufgrave, Claufius, Gefner, and other writers. 2. The *didactylus* has two toes on each foot, and no tail; the head is round; the ears are large; and it has two mammæ on the breaft; the body is covered with afh-coloured hair, and it is a native of Ceylon.

BRAE-mar, a mountainous territory of Scotland, in the fhire of Aberdeen, where the laft earl of Mar began to raife a rebellion in 1715. It is 27 miles North-weft of Aberdeen.

Brae-*Murray*, a mountainous and woody tract of land, lying in the fhires of Elgin and Nairn in Scotland.

BRAG, an ingenious and pleafant, though not very fafhionable game at cards, where as many may partake as the cards will fupply; the eldeft hand dealing three to each perfon at one time, and turning up the laft card all round. This done, each gamefter puts down three ftakes, one for each card.—The firft ftake is won by the beft card turned up in the dealing round; beginning from the ace, king, queen, knave, and fo downwards. When cards of the fame value are turned up to two or more of the gamefters, the eldeft hand gains; but it is to be obferved, that the ace of diamonds wins, to whatever hand it be turned up.—The fecond ftake is won by what is called the *brag*, which confifts in one of the gamefters challenging the reft to produce cards equal to his: Now it is to be

obſerved, that a pair of aces is the beſt brag, a pair of kings the next, and ſo on; and a pair of any ſort wins the ſtake from the moſt valuable ſingle card. In this part conſiſts the great diverſion of the game: for, by the artful management of the looks, geſtures, and voice, it frequently happens, that a pair of fives, treys, or even duces, out-brags a much higher pair, and even ſome pairs royal, to the no ſmall merriment of the company. The knave of clubs is here a principal favourite, making a pair with any other card in hand, and with any other two cards a pair royal.—The third ſtake is won by the perſon who firſt makes up the cards in his hand one-and-thirty; each dignified card going for ten, and drawing from the pack, as uſual in this game.

BRAGA, the capital of the province of Entre-minhoduro, in Portugal, ſituated on the river Cavado, in W. long. 8. 40. N. lat. 41. 20.

BRAGANZA, a city of Portugal, and capital of a duchy of the ſame name. It is ſeated on an eminence, by a brook called *Fervença*; and is divided into two parts, the old city, and the town. The former is upon an eminence, and fortified with a double wall. That part next the town has five baſtions, but no ditch: the citadel is on the oppoſite ſide joined to the wall. The town is in a plain, and defended by a fort with four baſtions. It is ſeated near the river Sabor on the frontiers of Galicia, in W. long. 6. 15. N. lat. 41. 27.

BRAGGOT, a kind of drink made of malt, honey, and ſpices, much uſed in Wales.

BRAHE (Tycho), a very noted aſtronomer, deſcended of an illuſtrious family originally of Sweden but ſettled at Denmark, was born December 14th 1546, at Knudſtorp in the county of Schonen. He was taught Latin when ſeven years old, and ſtudied five years under private tutors. His father dying, his uncle ſent him, in April 1559, to ſtudy philoſophy and rhetoric at Copenhagen. The great eclipſe of the ſun on the 21ſt of Auguſt 1560 happening at the preciſe time the aſtronomers had foretold, he began to look upon aſtronomy as ſomething divine; and purchaſing the tables of Stadius, gained ſome notion of the theory of the planets. In 1562 he was ſent by his uncle to Leipſic to ſtudy law; but aſtronomy wholly engroſſed his thoughts, and in purchaſing books on that ſcience he employed all his pocket money. Having procured a ſmall celeſtial globe, he was wont to wait till his tutor was gone to bed, in order to examine the conſtellations, and learn their names; and when the ſky was clear, he ſpent whole nights in viewing the ſtars. In 1565, a difference ariſing between Brahe and a Daniſh nobleman, they fought, and the former had part of his noſe cut off; which defect he ſo artfully ſupplied with one made of gold and ſilver, that it was not perceivable. It was about this time that he began to apply to chemiſtry, propoſing nothing leſs than to obtain the philoſopher's ſtone. In 1571 he returned to Denmark; and was favoured by his mother's brother, Steno Belle, a lover of learning, with a convenient place at his caſtle of Herritzvad near Knudſtorp, for making his obſervations, and building a laboratory. His marrying a country girl beneath his rank occaſioned ſuch a violent quarrel between him and his relations, that the king was obliged to interpoſe to reconcile them. In 1574, by his majeſty's command, he read lectures upon the theory of the comets at Copenhagen. The year following he began his travels through Germany, and proceeded as far as Venice: he then reſolved to remove his family, and ſettle at Baſil; but Frederic II. king of Denmark being informed of his deſign, and unwilling to loſe a man that was capable of being ſuch an ornament to his country, promiſed to enable him to purſue his ſtudies, to beſtow upon him for life the iſland of Huen in the Sound, to erect an obſervatory and laboratory there, and to defray all the expences neceſſary for carrying on his deſigns. Tycho Brahe readily embraced this propoſal; and accordingly the firſt ſtone of the obſervatory was laid Auguſt 8, 1576. The king alſo gave him a penſion of 2000 crowns out of his treaſury, a fee in Norway, and a canonry of Roſhild, which brought him in 1000 more. James VI. of Scotland, afterwards raiſed to the crown of England, going to Denmark in order to marry the princeſs Anne, paid a viſit to our author in his retirement at Uraniaburg, made him ſeveral preſents, and with his own hand wrote a copy of verſes in his praiſe: but, ſoon after the death of king Frederic, he was deprived of his penſion, fee, and canonry; upon which, finding himſelf incapable of bearing the expences of his obſervatory, he went to Copenhagen, whither he brought ſome of his inſtruments, and continued his aſtronomical obſervations in that city, till Valkendorf, chamberlain to the houſehold of Charles IV. commanded him, by the king's order, to diſcontinue them. He then removed his family to Roſtock, and afterwards to Holſtein, in order to ſolicit Henry Ranzou to introduce him to the emperor; and that gentleman complying with his requeſt, he was received by the emperor at Prague with the utmoſt civility and reſpect. That prince gave him a magnificent houſe, till he could procure one for him more fit for aſtronomical obſervations; aſſigned him a penſion of 3000 crowns; and promiſed, upon the firſt opportunity, a fee for him and his deſcendants: but he did not long enjoy this happy ſituation; for upon the 24th of October 1601 he died of a retention of urine, in the 55th year of his age, and was interred in a very magnificent manner in the principal church at Prague, where a noble monument was erected to him.—His ſkill in aſtronomy is univerſally known, and he is famed for being the inventor of a new ſyſtem, which he endeavoured, though without ſucceſs, to eſtabliſh upon the ruins of that of Copernicus. He was very credulous with regard to judicial aſtrology and preſages. If he met an old woman when he went out of doors, or an hare upon the road on a journey, he uſed to turn back immediately, being perſuaded that it was a bad omen. When he lived at Uraniaburg, he had at his houſe a madman, whom he placed at his feet at table, and fed himſelf. As he imagined that every thing ſpoken by mad perſons preſaged ſomething, he carefully obſerved all that this man ſaid; and becauſe it ſometimes proved true, he imagined it might always be depended on. A mere trifle put him in a paſſion; and againſt perſons of the firſt rank, with whom it was his intereſt to keep on good terms, he openly diſcovered his reſentment. He was very apt to rally others, but highly provoked if the ſame liberty was taken with himſelf. He wrote, 1. *Progymnaſmata aſtronomiæ*: 2. *De mundi ætherei recentioribus phænomenis*: 3. *Epiſtolarum aſtronomicarum liber*; which are his principal works.

BRAHMA. See BRAMA.

BRAIDALBIN, or BREADALBANE, a diſtrict of Perthſhire in Scotland, ſtretching 32 miles from eaſt to weſt, and 13 where broadeſt from ſouth to north; is a mountainous country, lying among the Grampian hills, ſuppoſed to be the country anciently known by the name of *Albanii*; whence the highlanders to this day call themſelves *Albanich*. It is bounded on the weſt by Lochaber, Lorn, and Knapdale; on the north and eaſt by part of Lochaber and part of Athol; and on the ſouth by Strathern and Monteith. This diſtrict, which is otherwiſe called *Albany*, gives the title of duke to his majeſty's ſecond ſon, Frederic, who is ſtyled duke of York and Albany.

BRAIL, or BRAILS, in a ſhip, are ſmall ropes made uſe of to furl the ſails acroſs; they belong only to the two courſes and the mizen-ſail; they are reeved through the blocks, ſeized on each ſide the ties, and come down before the ſail, being at the very ſkirt thereof faſtened to the cringles. Their uſe is, when the ſail is furled acroſs, to hale up its bunt, that it may the more eaſily be taken up or let fall. Hale up the brails, or brail up the ſail; that is, hale up the ſail, in order to be furled or bound cloſe to the yard.

BRAILOW, a town of Poland, in the province of Podolia, ſeated on the river Bog, in E. long. 29. 0. N. lat. 43. 50.

BRAIN, in anatomy. See ANATOMY.

Brain le Comte, a town of the Auſtrian Netherlands, in the province of Hainault. E. long. 4. 11. N. lat. 50. 35.

BRAINTREE, a large town of Eſſex in England, ſituated in E. long. 0. 35. N. lat. 51. 50.

BRAKE denotes female fern, or the place where it grows.—Alſo a ſharp bit or ſnaffle for horſes; and a baker's kneading-trough.—Alſo an inſtrument with teeth to bruiſe flax or hemp. See *Flax-Dreſſing*.

BRAKEL, a town of Germany, in the circle of Weſtphalia, and in the biſhopric of Paderborn, ſeated on the rivulet Brught, in E. long. 9. 8. N. lat. 51. 46.

BRAMA, or BRUMA, a pagan deity of the Eaſt Indies. He is the firſt perſon of a kind of trinity in their theology; is the great progenitor of mankind; and has created as many worlds as there are conſiderable parts in his body. See the articles BRACHMANS, and BRAMINS.

BRAMA, in ichthyology, the trivial name of a ſpecies of cyprinus. See BARBEL.

BRAMANT, a town of Savoy, in the valley of Maurich, ſeated on the river Arck, in E. long. 4. 15. N. lat. 45. 0.

BRAMBER, a town of Suſſex in England, formerly of ſome account, but has neither market nor fair; however, it ſends two members to parliament. W. long. 0. 15. N. lat. 50. 50.

BRAMBLE, in botany, the Engliſh name of the RUBUS.

Bramble-Net, or *hallier*, is a net to catch birds in, of ſeveral ſizes. The great meſhes are 4 inches ſquare: thoſe of the leaſt ſize are 3 inches ſquare; and thoſe of the biggeſt 5. In the depth they ſhould not be above 3 or 4 inches: but as for the length, they may be enlarged at pleaſure; the ſhorteſt being 18 feet.

BRAMBLE, or *Brambling*, in ornithology, the trivial name of a ſpecies of FRINGILLA.

BRAMER (Leonard), hiſtory-painter, was born at Delft in 1596; but learned the art of painting in the ſchool of Rembrandt, and imitated the manner of his maſter in a minute way. In the 18th year of his age he went to Rome for his improvement; but although he continued in Italy for ſome years, and acquired ſomewhat in his ſtyle rather more graceful than Rembrandt, yet he could never diveſt himſelf of the Flemiſh gout. He had a fine taſte of deſign; his expreſſion is generally good, and in ſome of his compoſitions truly noble. His pencil is delicate, and his colouring very peculiar in the tints, being alſo remarkably thin in many parts, ſo as barely to cover the pannel; yet, by great ſkill in the management of the chiaro-ſcuro, his colouring is bright, bold, and full of luſtre: particularly in the vaſes, which he was fond of introducing in every ſubject that could admit them, as he knew how to give them a rich and fine relievo. His works are rarely to be met with out of Italy, where he painted moſt; but whenever they are to be purchaſed they are bought at conſiderable prices, if undamaged. One of the moſt capital pictures of Bramer is the *Raiſing of Lazarus*, in which there is a charming oppoſition of light and ſhadow; and another is the *Denial of St. Peter*: they are both painted in his beſt manner; they are bright, tranſparent, and finely pencilled, and are ſtill preſerved at Rome. At the palace of Ryſwick there are alſo ſeveral valuable paintings by this maſter; in which the invention and execution are highly commendable. But none of his works can be more admired than a ſmall picture on copper repreſenting the ſtory of Pyramus and Thiſbe.

BRAMINS, the name of the prieſts among the idolatrous Indians, the ſucceſſors of the ancient Brachmans. See the article BRACHMANS. They are found in Siam, Malabar, China, Coromandel, and moſt other eaſtern nations anywiſe civilized; but their chief ſeat is in Indoſtan, or the Mogul's country. They have a language peculiar to themſelves, which they call *Shanſcbrit*; in which they have ſeveral ancient books, written, as is alleged, by their great prophet Brahma; as the *ſhaſtram*, which is their bible; and *porane*, a hiſtory which they eſteem ſacred, and pretend to have been dictated by God himſelf.

There are ſeveral orders of Bramins. Thoſe who mix in ſociety are for the moſt part very corrupt in their morals: they believe that the water of the Ganges will waſh away all their crimes; and, as they are not ſubject to any civil juriſdiction, live without reſtraint or virtue, excepting that character of compaſſion and charity which is ſo commonly found in the mild climate of India. The others, who live abſtracted from the world, are either weak-minded men or enthuſiaſts; and abandon themſelves to lazineſs, ſuperſtition, and the dreams of metaphyſics. We find in their diſputes the very ſame ideas that occur in the writings of our moſt celebrated metaphyſicians; ſuch as, ſubſtance, accident, priority, poſteriority, immutability, indiviſibility, &c.

Their religion, which was anciently of the allegorical and moral kind, hath degenerated into a heap of extravagant and obſcene ſuperſtitions, owing to their having realized thoſe fictions which were intended merely as ſo many ſymbols and emblems. They own a ſupreme God, who created Brama, and gave him a power to create the world. They have alſo their ſubaltern deities, their pagods or temples, and idols, whom they fan, to defend from flies, dancing before them. They alſo hold a feaſt in honour of the ſun, conſidered as the ſource of light and heat, whereby all nature is fecundified.

Their pagods or temples conſiſt of three parts. The firſt is a vaulted roof, ſupported on ſtone columns: it lies open, and all perſons, without diſtinction, are allowed to enter into it. It is adorned with ſymbolical figures, made of wood, as elephants, oxen, and horſes. The ſecond part is open in the day-time, and ſhut at night. It is filled with grotefque and monſtrous figures, as men with many heads and arms. The third, which is a kind of chancel, is kept always ſhut, with a very ſtrong gate; in this is placed the ſtatue of the deity to whom the pagod is dedicated. A great number of Lamps burn day and night before the idol. The Bramins, before they go into the pagod, pull off their ſhoes.

The Bramins of Siam and Coromandel maintain that the earth will be deſtroyed by fire, and the former aſſert that another will ariſe out of its aſhes, in which there ſhall be no ſea, nor any change of ſeaſons, but an eternal ſpring; and the latter maintain a plurality of worlds, which are alternately deſtroyed and renewed. Robert de Nobili, an Italian Jeſuit, and one of the Indian miſſionaries in the beginning of the 17th century, in order to ſecure ſucceſs to his miſſion, aſſumed the title and appearance of a Bramin, and at length perſuaded the credulous people that he was in reality a member of that venerable order. He forged a deed in the antient Indian characters, ſhowing that the Bramins of Rome were older than thoſe of India, and that the Jeſuits of Rome deſcended in a direct line from the god Brahma. He farther declared on oath, that he derived his origin from this Indian deity. By this impoſture he proſelyted twelve eminent Bramins, whoſe influence proved very favourable to his miſſion. After his death, the Portugueſe Jeſuits carried on the impoſture with very conſiderable ſucceſs. Theſe miſſions, however, were ſuſpended and abandoned in conſequence of a papal mandate, iſſued out in the year 1754 by Benedict XIV. who declared his diſapprobation of the artifices that had been uſed in the converſion of the Indians.

BRAMPOUR, or BRAMPORE, a city of Aſia, in the dominions of the Great Mogul, and capital of Candiſh. It formerly ſtood on as much ground as London: but is now greatly decayed, and chiefly inhabited by Banians. The ſtreets are numerous, but narrow, with low thatched houſes made of earth, though a few are covered with varniſhed tiles. In rainy weather many of the ſtreets are overflowed. In the market-place is the ſtatue of an elephant in red ſtone, as big as the life. On the other ſide of the river they have built a new town, which is

in a better fituation. A great trade is carried on in this town, and throughout all the province, where there is made a prodigious quantity of cotton-cloths, as cotton is in greater plenty here than in any other part of the empire. E. long. 77. 25. N. lat. 21. 10.

BRAMPTON, a town of Cumberland in England, feated not far from the Picts wall, and on the river Irthin. It is a very antient place, but at prefent is very fmall. W. long. 2. 40. N. lat. 54. 50.

BRAN, the fkins or hufks of corn, efpecially wheat ground, feparated from the flour by a fieve or boulter. It contains, befides, a portion of the farinaceous matter; this is lefs glutinous than the finer flour, and is fuppofed to have fome medicinal qualities. An infufion of bran is therefore not unfrequently employed externally as a fomentation, and fometimes likewife taken inwardly as a diluent.—Among the antients, bran was ufed as an erotic, to excite love. Bran boiled purges fcurf, dandreff, and cleanfes the hands, in lieu of foap. The dyers reckon it among the non-colouring drugs; and ufe it for making what they call the *four waters*, with which they prepare their feveral dyes. Bran is alfo ufed as a medicine for horfes.

BRANCH, in botany, an arm of a tree, or a part which, fprouting out from the trunk, helps to form the head or crown of it. Branches do not fpring out of the mere furface of the trunk, but are profoundly rooted therein, fo as not only to penetrate the cortical, but alfo the woody fubftance, and even the pith. The conftituent parts therefore of a *branch* are the fame as of the trunk, viz. fkin, bark, wood, and pith. See BOTANY Part I.

BRANCHES *of a Bridle*, in the manege, are two pieces of iron bended, which, in the interval between the one and the other, bear the bit-mouth, the crofs-chains, and the curb; fo that on one end they anfwer to the head ftall, and on the other to the reins, in order to keep the horfe's head in fubjection. With regard to their form and ftructure, branches are either ftraight, in form of a piftol, for young horfes to form their mouth; or, after the conftable of France's fafhion, proper for a horfe that carries his head well. Some are in form of a gigot or leg, which will prevent horfes from carrying too low: fome are in form of a bent knee, contrived for horfes that arm themfelves againft the operation of the bit; and others after the French fafhion, which is hardly above ⅓ of an inch at the fevile hole, and kneed 1 ⅓ inch at the jarret or ham. It is to be obferved, 1. That the farther the branch is from the horfe's neck, the more effect it will have. 2. That fhort branches, *cæteris paribus*, are ruder, and their effects more fudden, than thofe of longer. 3. That the branch is to be proportioned to the length of a horfe's neck; and we may more eafily err in choofing one too fhort than too long.

BRANCHES *of Ogives*, in architecture, are the arches of Gothic vaults. Thefe arches, traverfing from one angle to another, diagonal-wife, form a crofs between the other arches, which make the fides of the fquare, of which the arches are diagonals.

BRANCH-*Stand*, with falconers, a term ufed to fignify the making a hawk leap from tree to tree, till the dog fprings the game.

BRANCHER, among fportfmen, a young hawk, newly taken out of the neft, that can hop from bough to bough.

BRANCHIÆ, or GILLS, in the anatomy of fifhes, the parts correfponding to the lungs of land-animals. All fifhes, except the cetaceous ones, and the pteromyzum, which have lungs, are furnifhed with thefe organs of refpiration. See COMPARATIVE *Anatomy*.

BRANCHIDÆ, in Grecian antiquity, priefts of the temple of Apollo, which was at Didymus in Ionia, a province of leffer Afia, towards the Ægean fea, upon the frontiers of Caria. They opened to Xerxes the temple of Apollo, the riches whereof he took away. After which, thinking it unfafe to ftay in Greece, they fled to Sogdiana, on the other fide of the Cafpian fea, upon the frontiers of Perfia, where they built a city, called by their own name: but they did not efcape the punifhment of their crime; for Alexander the Great having conquered Darius king of Perfia, and being informed of their treachery, put them all to the fword, and razed their city—thus punifhing the impiety of the fathers in their pofterity.

BRANCHIOSTEGI, in ichthyology, a term ufed to exprefs one of the general claffes of fifhes; the characters of which are, that the rays of the fins are of a bony fubftance; but thefe fifh have no bones or officula at the branchiæ, as the malacopterygious and acanthopterygious fifhes all have.

BRANCHON, a town of the Auftrian Netherlands, in the province of Namur, feated on the river Mehaigne. E. long. 4. 40. N. lat. 50. 32.

BRAND-SUNDAY, *Dimanches des Brandons*, in French ecclefiaftical writers, denotes the firft Sunday in Lent; which is thus called on account of an ancient practice in the Lyonnois, where the peafants in the night of this day walked about their orchards, gardens, &c. with torches lighted, or fire-brands in their hands; in which plight they vifited every tree, and addreffing themfelves to them one after another, threatened that if they did not bear fruit well the enfuing feafon, they fhould be cut down to the ground, and burnt. This is evidently a relict of paganifm; the like of which was practifed by the ancient idolaters in the month of February; hence called *Februarius, à februando*.

BRANDEIS, a town of Bohemia, feated on the river Elbe. E. long. 14. 25. N. lat. 50. 15.

BRANDENBURG (Marquifate of), a large country of Germany, having Mecklenburgh and Pomerania on the north; Poland, on the eaft; Silefia, with the Lufatias, the electorate of Saxony, Anhalt, and duchy of Magdebourg, on the fouth; and part of the fame duchy, and that of Lunenburg, on the weft. Its greateft length is near 200 miles, and its greateft breadth near 100. Its northern fituation makes it very cold for feven or eight months in winter. The foil in general is far from being fruitful, a great part of it confifting of fand: yet there are feveral fruitful fpots in it; and the whole, under the laft and prefent reign, has been greatly improved, and much better peopled. In fome parts there is great plenty of potatoes and turnips; in others of buck-wheat, millet, and flax; in others of tobacco, woad, and other herbs for dyeing. All forts of colour-earths, together with alum, falt-petre, amber, iron-ftone, and medicinal fprings, are found in it. Abundance of cattle, efpecially fheep, are bred here; and the woods not only fupply the inhabitants with fuel, but with timber, charcoal, tar, and wood-afhes, both for domeftic ufes and for exportation. The culture of filk alfo is carried on in this country with great fuccefs. The principal rivers by which it is watered are the Elbe, the Oder, the Prignitz, the Havel, the Warte, and the Spree. Some of the rivers and lakes abound in fifh, and are united by canals, for the benefit of navigation. They reckon in the whole Mark, 120 towns, above 2500 villages, and about 800,000 inhabitants. The ftates here confift of the nobility and towns, whofe affembly-houfe is in the Spandau-ftreet at Berlin, and who ftill enjoy fome fmall remains of their ancient privileges. The hereditary offices of the marquifate are a marfhal, chamberlain, cup-bearer, purveyor, fewer, treafurer, and ranger. The king of Pruffia, who is alfo elector of Brandenburg, with his whole court, are Calvinifts; but the religion of moft of the inhabitants is Lutheranifm. The churches of both perfuafions are well endowed, and the laity jointly employed by the government. The Roman-catholics are alfo tolerated here. In fhort, every inhabitant

enjoys full liberty of conſcience. A great variety of manufactures, moſt of which were introduced by the French refugees, are carried on in the marquiſate, eſpecially at Berlin and Potſdam; where are alſo excellent painters, ſtatuaries, and engravers. By means of theſe manufactures, fabrics, and arts, not only large ſums are kept in the country, but alſo imported from other parts, to which conſiderable quantities of the manufactures, and natural productions, are exported. For the education of youth, and the advancement of learning, beſides Latin ſchools in ſeveral places, and gymnaſia, there is an univerſity at Frankfort on the Oder, and an academy of ſciences at Berlin.

The Brandenburg family is of great antiquity. Some hiſtorians ſay it was founded by the Sclavonians, who gave it the name of *Branber*, which ſignifies the "Guards of the Foreſts;" and the Germans called it *Brandburgh*. Henry I. ſurnamed the Fowler, fortified this place in the year 923, to ſerve as a rampart againſt the Huns, a warlike nation, who were extremely troubleſome by their frequent incurſions. He beſtowed the government on Sifroi, Count of Ringelheim, with the title of Margrave or Marquis, which ſignifies Protector of the Marches or Frontiers, in 923. It deſcended to Geron, Margrave of Luſatia; which, in ſucceſſion of time, paſſed into the families of Staden, Aſcania, Bellenſtadt, and that of Bavaria, till the Emperor Sigiſmund, with the conſent of the ſtates of the empire in 1416, gave perpetual inveſtiture to Frederick VI. of Nurenberg: who alſo, the following year, received from the Emperor, at the diet of Conſtance, the inveſtiture of the country of Brandenburg as Frederick I. having had previouſly conferred upon him the dignity of elector and archchamberlain of the holy Roman empire.

Brandenburg remained long in ſubjection to Poland; and the inveſtiture of Pruſſia was granted by the Poliſh kings to each ſucceeding margrave. Frederick-William, having concluded a treaty with the king of Poland, was acknowledged to be ſovereign of Ducal Pruſſia by an aſſembly of the ſtates at Konigſberg, A. D. 1663. By the treaty of Vienna the Emperor confirmed this title; and Frederick, the ſon of Frederick-William, was proclaimed king of Pruſſia Jan. 18, 1701. He was ſucceeded by his ſon, who performed the greateſt ſervices to his country, and prepared the foundation for the future grandeur of the late ſovereign, Frederick III.

Among the electors he poſſeſſes the ſeventh place. As archchamberlain, he carries the ſceptre before the emperor at his coronation, and brings him water in a ſilver baſon to waſh with. In the college of princes of the empire, he has five voices. His aſſeſſment, as elector, is 60 horſe and 277 foot, or 1828 florins in lieu of them. To the chamber of Wetzlaer his quota is 811 rix-dollars, 58 kruitzers, each term. As to the orders of the knights of the Black Eagle, and of Merit, it is ſufficient here to obſerve, that the former was inſtituted by Frederick I. at his coronation, and the other by the preſent king. For the government of this country, and the adminiſtration of juſtice, there are ſeveral ſupreme colleges and tribunals; particularly for the departments of war, foreign affairs, and the finances, there are diſtinct boards. Here is a ſupreme eccleſiaſtical council and conſiſtory for the Lutherans; a ſupreme directory of the Calviniſt church; a ſupreme medicinal college; a ſupreme mine-office; a college or board of trade, &c. Thoſe of the French nation, ſettled in this country, are allowed particular courts of their own. The amount of the yearly revenues of the Mark, ariſing from the domains, protection-money paid by the Jews, tolls, land-tax, mines, foreſts, duties on ſtamp-paper, ſalt, and various other impoſts and exciſes, is computed at about 2,500,000 crowns; but the money is ſaid to be much inferior in goodneſs to that of Saxony and the dominions of Hanover. During the late continental war it was extremely debaſed. Some eſtimate the whole number of the inhabitants of the royal and electoral dominions at 5,000,000, and the revenues at about 2,000,000 ſterling. Upwards of 100,000 men are kept on foot in time of peace, which are ſaid to coſt more than half of the royal revenue. Theſe troops are under ſtrict diſcipline, very expert at their exerciſe, always in readineſs to march, and always complete. Each regiment has a particular canton or diſtrict allotted it for its quarters and raiſing recruits. The infantry are clothed in blue, and the horſe and dragoons in white; and both are required to hear ſermon twice a day when in quarters or garriſons. In time of peace they are allowed, for ſeveral months in the year, to hire themſelves out, or to follow their buſineſs, either as burghers or peaſants, in the canton where they are quartered; but they are not allowed to marry. A conſiderable part of theſe troops are ſtationed in the Mark, particularly at Berlin and Potſdam. The corps of huſſars alone amounts to about 10,000 men. The Mark of Brandenburg is divided, in general, into the electoral and new Marks. The former is again ſubdivided into the old Mark, the Pregnitz, the middle Mark, and the Ucker Mark. The old Mark, which lies on the weſt ſide of the Elbe, between that river and Lunenburg, is about 50 miles in length, and in breadth about 30.

Brandenburg, a city of Germany, and capital of the marquiſate of that name, ſituated on the river Havel, in E. long. 13. N. lat. 52. 25. It is divided into the old and new town, and was anciently the ſee of a biſhop. The mountain in the neighbourhood, called *Marienberg*, is planted with vines. Here is a ſmall colony of French Calviniſts, with a manufacture of cloth, fuſtian, and canvas; and a pretty good trade is carried on by the Havel. The fort here looks like a ſuburb, and contains a riding-ſchool, with the cathedral church. The greateſt part alſo of the members of the chapter, which ſtill ſubſiſts, and is compoſed of a Lutheran provoſt, dean, ſenior, ſubſenior, and three other canons, reſide in it. They are diſtinguiſhed by a croſs of gold enamelled with violet, terminating in eight points; and have a conſiderable eſtate. Near the town is a lake of ſome extent.

BRANDEUM, in eccleſiaſtical writers, a linen cloth or veil put over the tombs of the apoſtles St. Peter and St. Paul, and left there for ſome time; by which it is ſuppoſed to acquire a degree of ſanctity, ſo as to be worſhipped as a relic; and for that purpoſe frequently ſent by the pope as a preſent to ſome prince. In this ſenſe, Brandeum amounts to the ſame with what was otherwiſe called *ſanctuarium*, *ſudarium*, *orarium*, and *velum*. The uſe of brandea was introduced as a means of diffuſing and propagating the virtues and influence of relics, without moving or any way impairing the ſubſtance of them; the tranſlation of relics in early days being interdicted.

BRANDING, in the face or hand, denotes a puniſhment inflicted by law on various offences, by burning with a hot iron, after the offender hath been once admitted to benefit of clergy.

BRANDON, a town of Suffolk in England, ſeated on the little river Ouſe, over which it has a bridge, and a ferry at a mile's diſtance: whence it is divided into Brandon, and Brandon-ferry; which laſt has the moſt buſineſs, becauſe commodities are brought thither from the iſle of Ely. This place gives the Britiſh title of duke to the family of Hamilton in Scotland. E. long. 0. 55. N. lat. 52. 30.

BRANDRITH denotes a trevet or other iron ſtand, whereon to ſet a veſſel over the fire. Among builders, it denotes a fence or rail about the mouth of a well.

BRANDY, a ſpirituous and inflammable liquor, extracted from wine and other liquors by diſtillation. See Distillation. Wine-brandy, made in France, is eſteemed the beſt in Europe. They make it wherever they make wine, and for

that purpose use wine that is pricked rather than good wine. The chief brandies for foreign trade, and those accounted best, are the brandies of Bourdeaux, Rochelle, Cogniac, Charenton, the isle of Rhé, Orleans, the county of Blasois, Poictou, Touraine, Anjou, Nantz, Burgundy, and Champaign.

BRANK, an instrument used in some parts of Scotland, and in Staffordshire, for correcting scolding women. It is a sort of head-piece, which opens and incloses the head of the woman, while an iron, sharp as a chisel, enters the mouth, and subdues the more dreadful weapon within. Thus harnessed, the offender is led in triumph through the streets. Dr. Plott, in his History of Staffordshire, has favoured the world with a minute description and figure of the instrument, which is there called a *scolding-bridle*; and tells us, he looks upon it "much to be preferred to the ducking-stool, which not only endangers the health of the party, but also gives the tongue liberty betwixt every dip; to neither of which this is at all liable."

BRANLIN, in ichthyology, a species of salmon, with several transverse black streaks, resembling the impression of so many fingers.

BRANSKA, a town of Transilvania, situated on the river Marish, E. long. 23. 15. N. lat. 46. 0.

BRASIDAS, a celebrated general of the Lacedemonians, about 424 years before the birth of Christ. He defeated the Athenians by land and sea, took many places, and rendered his country formidable to all the neighbouring states. He conquered the Athenians on their attempting to surprise Amphipolis, but died of the wounds he received in that engagement.

BRASIDA, an anniversary solemnity at Sparta, in memory of Brasidas, a Lacedemonian captain, famous for his achievements at Methone, Pylos, and Amphipolis. It was celebrated with sacrifices and games, wherein none were permitted to contend but free-born Spartans. Whoever neglected to be present at the solemnity was fined.

BRASIL, a large country of S. America, which gives the title of prince to the heir apparent of the crown of Portugal. It includes the most eastern part of S. America, and lies between the equinoctial line and the tropic of Capricorn, being about 1560 miles in length, and 1000 in breadth; but measuring along the coast, it is near 2000 miles long. It was discovered by chance in 1500; for Alvarez Cabral, a Portuguese, was forced upon it by a tempest. Some time after the revolt of the Netherlands against Spain, the Dutch drove away the Spaniards, to whom Portugal itself was then subject; but, on the subsequent revolution, by which that kingdom was restored to its independency, the Portuguese, in their turn, obliged the Dutch to leave it in 1655. The air of this country, though within the torrid zone, is temperate and wholesome, insomuch that people live there a long while. The soil is fertile, and more sugar comes thence, than from all other parts of the world. It produces tobacco, Indian corn, several sorts of fruit, and medical drugs. The wood brought from Basil, and hence so called, is of great use in dyeing red; and within the country there is gold, and several sorts of precious stones. The cattle, carried over from Europe, increase prodigiously. They have several animals not known in Europe; among the rest, a bird called Colibri, whose body is not much larger than that of a May-bug, yet it sings as harmoniously as a nightingale. It is a perfect beauty, and the neck is of such a lively red that it might be mistaken for a ruby: the belly, and the upper part of the wings, are of the colour of gold; and the thighs are as green as an emerald: the legs and bill are as black as polished ebony, and the eyes resemble two oval diamonds, being of the colour of burnished steel: the head is green, with a mixture of gold, and of a surprising lustre: that of the cock is adorned with a small tuft: it is almost impossible to conceive how so small a bird can have so loud a note. The Portuguese chiefly inhabit the coast; for they have not penetrated far into the country. The inland parts are full of people of different languages; but they all agree in wearing no clothes. They are of a copper colour, with long coarse black hair on their heads, but without any on the other parts of their bodies, like the rest of the Americans. They are strong, lively, and gay, and subject to few diseases. They love to adorn themselves with feathers, and are fond of feasts, at which they dance immoderately. They have no temples, nor any other sign of religion; and they make no manner of scruple to marry their nearest relations. They have huts made of the branches of trees, and covered with palm-tree leaves. Their furniture consists chiefly in their hammocks, and dishes or cups, made of calibashes, painted without of a red colour, and black within. Their knives are made of a sort of stone and split canes; and they have baskets of different sizes, chiefly made of palm-tree leaves. Their arms are bows, arrows, and wooden clubs. When they travel, they fasten their hammocks between two trees, and sleep all night in them. The Portuguese divide Brasil into fifteen governments, eight of which belong to the crown, and the rest to great men, who have peopled them at their own expence. They are all under a viceroy, who resides at St. Salvadore.

Brasil-Wood, or *Brazil-Wood*, an American wood of a red colour, and very heavy. It is denominated variously, according to the places from whence it is brought: thus we have brasil of Fernambucca, Japan, Lamon, &c. For its description, see Cæsalpina.

BRASILETTO, the same with Brasil-wood.

BRASLAW, a considerable town of Poland, in Lithuania, and Palatinate of Wilna, with a castle. It is seated on a small lake, in E. long. 17. 5. N. lat. 55. 45.

BRASS, or, as the French call it, *yellow copper*, is a factitious metal, made of copper and zinc, or lapis calaminaris. The first formation of brass, as we are assured by scripture, was prior to the flood, and discovered even in the seventh generation from Adam. But the use of it was not, as is generally believed, and the Arundelian marbles assert, previous to the knowledge of iron. They were both first known in the same generation, and first wrought by the same discoverer.

The ancient Britons, though acquainted from the remotest periods with both these metals, remained long ignorant that they were to be obtained in the island. Before this discovery they imported all their iron and brass from the continent. And when they had at length detected the former in their own hills, and had ceased to introduce it, they continued to receive the latter. Their want of the metal remained, and no mines of it were opened in the island. In the earliest ages, whose manners have been delineated by history, we find the weapons of their warriors invariably framed of this factitious metal; and the most authentic of all the profane records of antiquity, the Arundelian marbles, for that reason, mistakenly date the first discovery of iron a couple of centuries below the Trojan war. Every military nation, as such, is naturally studious of brightness in its arms; and the Britons, particularly, gloried in the neatness of theirs. For this reason the nations of the world still fabricated their arms of brass, even long after the Arundelian æra for the discovery of iron; and the Britons continued to import it from the continent, though they had found iron to be a native of their country, and could have supplied themselves with a sufficient quantity of it.

In the History of Manchester by Mr. Whitaker, it is remarked, that when the Britons derived their iron and brass from the continent, they purchased the latter at an easier expence than the former. The Gauls had many large brass works carried on in the kingdom, but seem to have had few iron

forges eftablifhed. And this would naturally induce the Belgæ to be lefs diligent in their enquiry after the veins of copper and calamine at home, than for the courfes of iron ore; though the one was equally difcoverable in the ifland as the other, and lay equally within the Belgic regions of it. Brafs being thus cheaper than iron, they neceffarily formed with it fome domeftic as well as military implements. Such were common among the Gauls; and fuch were familiar to the Britons, either imported into the ifland, as fome actually were, or manufactured within it, as others alfo affuredly were. The Britons had certainly brafs foundries erected among them, and minted money, and fabricated weapons of the fame metal.

While the works were in this ftate, the Romans entered the ifland. And feeing fo great a demand among the natives for this article, they would fpeedily inftruct them to difcover the materials of it among themfelves. This muft unavoidably have refulted from the conqueft of the Romans. The power of furprifing their new fubjects with fo unexpected a difcovery would naturally ftimulate the pride of the Roman intellect; and the defire of obliging themfelves with fo cheap a fupply of that ufeful metal, ftationary as they were in that kingdom, would alfo equally actuate the felfifhnefs of the Roman heart. The veins of copper and calamine would be eafily found out by an experienced enquirer after them; and the former metal is therefore diftinguifhed among the Welfh, only by the Roman appellation of *cyprium*, *kopper* or copper. And many foundries of brafs appear to have been eftablifhed in the ifland. Some had been erected before, one perhaps within the confines of every kingdom, and probably in the vicinity of every capital. One at leaft would be neceffary, in order to fupply the armoury of the principality: and one perhaps was fufficient for moft of the Britifh ftates. But feveral appear now to have been fettled in every kingdom, and one perhaps near every ftationary town. Two have been difcovered in the fingle county of Effex, and within a narrow portion of it at Fifield and Danbury. And a third was placed upon Eafterly Moor in Yorkfhire, 12 miles to the north-weft of York, and in the neighbourhood of Ifurium or Aldborough.

Corinthian Brass, famous in antiquity, was a mixture of gold, filver, and copper. L. Mummius having facked and burnt the city of Corinth, 146 years before Chrift, it is faid this metal was formed from the immenfe quantities of gold, filver, and copper, wherewith that city abounded, thus melted and run together by the violence of the flames.

Brass, as employed in the glafs trade.—Thrice-calcined brafs is a preparation which ferves to give many very beautiful colours to glafs. The manner of preparing it is this: Place thin plates of brafs on tiles on the leet of the furnace near the occhis; let it ftand to be calcined there for four days, and it will become a black powder fticking together in lumps. Powder this, fift it fine, and recalcine it four or five days more; it will not then ftick together, but remain a loofe powder of a ruffet colour. This is to be calcined a third time in the fame manner; but great care muft be taken in the third calcination that it be not overdone nor underdone; the way to be certain when it is right is to try it feveral times in glafs while melting. If it makes it, when well purified, to fwell, boil, and rife, it is properly calcined; if not, it requires longer time. This makes, according to the different proportions in which it is ufed, a fea-green, an emerald-green, or tortoife-coloured glafs.

By long calcination alone, and without any mixture, brafs communicates a fine blue or green colour to glafs; but there is a method of calcining it alfo with brimftone, fo as to make it afford a red, a yellow, a chalcedony colour, according to the quantity and other variations in the ufing it. The method of making the calcination is this: cut thin plates of brafs into fmall pieces with fheers, and lay them ftratum fuper ftratum, with alternate beds of powdered fulphur, in a crucible; calcine this for 24 hours in a ftrong fire: then powder and fift the whole; and finally, expofe this powder upon tiles for 12 days to a reverberating furnace; at the end of this time, powder it fine, and keep it for ufe. The glafs-makers have alfo a method of procuring a red powder from brafs, by a more fimple calcination, which ferves them for many colours. The method of preparing it is this: they put fmall and thin plates of brafs into the arches of the glafs furnaces, and leave them there till they are fufficiently calcined, which the heat in that place, not being enough to melt them, does in great perfection. The calcined matter powdered is of a dufky red, and requires no other procefs.

Brass-*Colour*, a coloured metallic powder prepared by the braziers and colour-men to imitate brafs. There are two forts of it; the red brafs or bronze, and the yellow or gilt brafs: the latter is made only of copper filings, the fmalleft and brighteft that can be found; with the former they mix fome red ochre, finely pulverized; they are both ufed with varnifh.—In order to make a fine brafs that will not take any ruft or verdigris, it muft be dried with a chafing-difh of coals as foon as it is applied.—The fineft brafs-colour is made with powder brafs imported from Germany, diluted into a varnifh, made and ufed after the following manner: the varnifh is compofed of one pound four ounces of fpirit of wine, two ounces of gum-lac, and two ounces of fandarac; thefe two laft drugs are pulverized feparately, and afterwards put to diffolve in fpirit of wine, taking care to fill the bottle but half full: the varnifh being made, you mix fuch quantity as you pleafe of it with the pulverized brafs, and apply it with a fmall brufh to what you would brafs over. But you muft not mix too much at once, becaufe the varnifh being very apt to dry, you would not have time to employ it all foon enough; it is therefore better to make the mixture at feveral times. After this manner they brafs over figures of plafter, which look as well as if they were caft of the metal itfelf.

Brass *Leaf*, a kind of gilding leaf made of copper, beaten out into very thin plates, and afterwards rendered yellow. The German artifts, particularly thofe of Nuremberg and Augfburg, are faid to poffefs the beft method of giving to thefe thin plates of copper a fine yellow colour like gold, by fimply expofing them to the fumes of zinc, without any real mixture of it with the metal. Thefe plates are cut into little pieces, and then beaten out fine like leaves of gold; after which they are put into books of coarfe paper, and fold at a low price for the vulgar kinds of gilding. The parings or fhreds of thefe very thin yellow leaves being well ground on a marble plate, are reduced to a powder fimilar to gold; which ferves to cover, by means of gum water or fome other glutinous fluid, the furface of various mouldings or pieces of curious workmanfhip, giving them the appearance of real bronze, and even of fine gold, at a very trifling expence, becaufe the gold colour of this metallic powder may be eafily raifed and improved by ftirring it in a wide earthen bafon over a flow fire.

Brass-*Lumps*, a common name given by miners to the globular pyrites. See Pyrites.

BRASSAW, or Cronstadt, a ftrong town of Tranfilvania in Burezland; feated on the river Buxel, in E. long. 22. 35. N. lat. 46. 30.

BRASSE, in ichthyology, a fpecies of Perca.

BRASSICA, cabbage, in botany; a genus of the filiquofa order, belonging to the tetradynamia clafs of plants; and in the natural method ranking under the 39th order, *Siliquofæ*. The calyx is erect and converging; the feeds are globular; the gland between the fhorter ftamina and the piftillum, and between the longer ones and the calyx. There are 12 fpecies. 1. The orientalis, with heart-fhaped fmooth leaves embracing

the ſtem, and four-cornered capſules. 2. The campeſtris, with a ſlender root and ſtem, the leaves being uniform, heart-ſhaped, and ſeſſile. 3. The arvenſis, with ſcolloped leaves embracing the ſtem; the higheſt heart-ſhaped, and moſt entire. 4. The alpina, with the radical leaves egg-ſhaped, and erect petals. 5. The napus, with the root-ſtem ſpindle-ſhaped. 6. The ruſſa, with the radical ſtem growing orbicular, depreſſed, and fleſhy. 7. The oleracea, with the radical ſtem growing columnar and fleſhy. 8. The chinenſis, with very entire oval leaves; the floral leaves lanceolated and embracing the ſtem; the calyces longer than the claw of the petals. 9. The violacea, with lanceolated, egg-ſhaped, ſmooth, undivided, and dentated leaves. In theſe ſpecies the ſtyle is obtuſe; in the reſt enſiform. 10. The erucaſtrum, with runcinate leaves, a hiſpid ſtem, and poliſhed capſules. 11. The eruca, with lyrated leaves, ſhaggy ſtem, and ſmooth capſules. 12. The veſicaria, with runcinate leaves, and hiſpid capſules, covered with a tumid calyx.

Culture, &c. The ſecond ſort never varies. It grows naturally on the ſea-ſhore near Dover. It hath a perennial branching ſtalk, in which it differs from all the other ſpecies. In very ſevere winters, when the other ſorts are deſtroyed, this is a neceſſary plant, for the moſt ſevere froſts do not injure it. The flower-ſtalks grow from the end of the branches, and ſpread out horizontally; but thoſe which ariſe from the centre of the plants grow erect, and ſeldom put out branches. The cauliflower has been much more improved in Britain than in any other part of Europe. In France they rarely have cauliflowers till Michaelmas, and Holland is generally ſupplied with them from Britain. In many parts of Germany there were none of them cultivated till within a few years paſt, and moſt parts of Europe are ſupplied with ſeeds from Britain. The eighth ſort, which is generally known by the title of *rape* or *cole ſeed,* is much cultivated in the iſle of Ely, and ſome other parts of England, for its ſeed, from which rape-oil is drawn; and it hath alſo been cultivated of late years, in other places, for feeding of cattle, to great advantage. The cole ſeed, when cultivated for feeding of cattle, ſhould be ſown about the middle of June. The ground for this ſhould be prepared for it in the ſame manner as for turnips. The quantity of ſeeds for an acre of land is from ſix to eight pounds; and as the price of the ſeed is not great, ſo it is better to allow eight pounds; for if the plants are too cloſe in any part, they may be eaſily thinned when the ground is hoed, which muſt be performed in the ſame manner as is practiſed for turnips, with this difference only, of leaving theſe much nearer together; for as they have fibrous roots and ſlender ſtalks, ſo they do not require near ſo much room. Theſe plants ſhould have a ſecond hoeing about five or ſix weeks after the firſt, which, if well performed in dry weather, will entirely deſtroy the weeds, ſo they will require no farther culture. Where there is not an immediate want of food, theſe plants had better be kept as a reſerve for hard weather, or ſpring feed, when there may be a ſcarcity of other green food. If the heads are cut off, and the ſtalks left in the ground, they will ſhoot again early in the ſpring, and produce a good ſecond crop in April; which may be either fed off, or permitted to run to ſeed, as is the practice where this is cultivated for the ſeeds: but if the firſt is fed down, there ſhould be care taken that the cattle do not deſtroy their ſtems, or pull them out of the ground. As this plant is ſo hardy as not to be deſtroyed by froſt, ſo it is of great ſervice in hard winters for feeding of ewes; for when the ground is ſo hard frozen as that turnips cannot be taken up, theſe plants may be cut off for a conſtant ſupply. This will afford late food after the turnips are run to ſeed; and if it is afterwards permitted to ſtand for ſeed, one acre will produce as much as, at a moderate computation, will ſell for five pounds, clear of charges. Partridges, pheaſants, turkeys, and moſt other fowl, are very fond of this plant; ſo that wherever it is cultivated, if there are any birds in the neighbourhood, they will conſtantly lie among theſe plants. The ſeeds of this plant are ſown in gardens for winter and ſpring ſallads, this being one of the ſmall ſallad herbs much uſed at our tables.

With regard to the common white, red, flat, and long-ſided cabbages, they are chiefly cultivated for autumn and winter uſe. The ſeeds of theſe ſorts muſt be ſown the beginning or middle of April, in beds of good freſh earth; and when the young plants have about eight leaves, they ſhould be pricked out into ſhady borders, about three or four inches ſquare, that they may acquire ſtrength, and to prevent their growing long-ſhanked. About the middle of June you muſt tranſplant them out, where they are to remain. If they are planted for a full crop in a clear ſpot of ground, the diſtance from row to row ſhould be three feet and a half, and in the rows two feet and a half aſunder: if the ſeaſon ſhould prove dry when they are tranſplanted out, you muſt water them every other evening until they have taken freſh root; and afterwards, as the plants advance in height, you ſhould draw the earth about their ſtems with a hoe, which will keep the earth moiſt about their roots, and greatly ſtrengthen the plants. Theſe cabbages will ſome of them be fit for uſe ſoon after Michaelmas, and will continue until the end of February, if they are not deſtroyed by bad weather; to prevent which, the gardeners near London pull up their cabbages in November, and trench their ground up in ridges, laying their cabbages againſt their ridges as cloſe as poſſible on one ſide, burying their ſtems in the ground: in this manner they let them remain till after Chriſtmas, when they cut them for the market; and although the outer part of the cabbage be decayed (as is often the caſe in very wet or hard winters), yet, if the cabbages were large and hard when laid, the inſide will remain ſound and uninjured.

The Ruſſian cabbage was formerly in much greater eſteem than at preſent, it being now only to be found in particular gentlemen's gardens, who cultivate it for their own uſe. This muſt be ſown late in the ſpring of the year, and managed as thoſe before directed, with this difference only, that theſe muſt be ſooner planted out, and muſt have an open clear ſpot of ground, and require much leſs diſtance every way, for it is but a very ſmall hard cabbage. This ſort will not continue long before they will break and run to ſeed.

The early and ſugar-loaf cabbages are commonly ſown for ſummer uſe, and are what the gardeners about London commonly call *Michaelmas cabbages.* The ſeaſon for ſowing of theſe is about the end of July, or beginning of Auguſt, in an open ſpot of ground; and when the plants have got eight leaves, you muſt prick them into beds at about three or four inches diſtance every way, that the plants may grow ſtrong and ſhort-ſhanked; and toward the end of October you ſhould plant them out: the diſtance that theſe require is, three feet row from row, and two feet and a half aſunder in the rows. The ground muſt be kept clean from weeds, and the earth drawn up about your cabbage plants. In May, if your plants were of the early kind, they will turn in their leaves for cabbaging; at which time the gardeners near London, in order to obtain them a little ſooner, tie in their leaves cloſe with a ſlender oſier-twig to blanch their middle; by which means, they have them at leaſt a fortnight ſooner than they could have if they were not treated in this way.

As the early cabbage is the firſt, we ſhould chooſe to plant the fewer of them, and a greater quantity of the ſugar-loaf kind, which comes after them; for the early kind will not ſupply the kitchen long, generally cabbaging apace when they begin, and as ſoon grow hard and burſt open: but the ſugar-loaf kind is longer before it comes, and is as ſlow in its cabbaging; and being of an hollow kind, will continue for a pretty long time. The ſugar-loaf kind may be planted out in February, and will ſucceed as well as if planted earlier; with this difference only, that they will be later before they cabbage.

You ſhould alſo reſerve ſome plants of the early kind in ſome well-ſheltered ſpot of ground, to ſupply your plantation, in caſe of a defect; for in mild winters many of the plants are apt to run to ſeed, eſpecially when their ſeeds are ſown too early, and in ſevere winters they are often killed.

The gardeners uſually propagate Savoy-cabbages for winter uſe, as being generally eſteemed the better when pinched by froſt. Theſe muſt be ſown about the end of April, and treated after the manner before directed for the common white cabbage; with this difference, that theſe may be planted at a cloſer diſtance than thoſe; two feet and a half ſquare will be ſufficient. Theſe are always much better when planted in an open ſituation, that is clear from trees and hedges; for in cloſe places they are very ſubject to be almoſt eaten up by caterpillars and other vermin, eſpecially if the autumn prove a dry one. The broccoli may alſo be treated in the ſame manner, but need not be planted above one foot aſunder in the rows, and the rows two feet diſtant: theſe are never eaten till the froſt hath rendered them tender; for otherwiſe they are tough and bitter to the taſte.

Of the ſeeds of the broccoli there are ſeveral kinds, viz. the Roman or purple, the Neapolitan or white, and the black broccoli, with ſome others; but the Roman is preferable. Theſe ſhould be ſown about the latter end of May, or beginning of June; and when the plants are grown to have eight leaves, tranſplanted into beds (as was directed for the common cabbage); and toward the latter end of July they will be fit to plant out, which ſhould be done into ſome well-ſheltered ſpot of ground, but not under the drip of trees. The diſtance theſe require is about a foot and a half in the rows, and two feet row from row. The ſoil in which they ſhould be planted ought to be rather light than heavy: if your plants ſucceed well (as there will be little reaſon to doubt, unleſs the winter prove extremely hard), they will begin to ſhow their ſmall heads, which are ſomewhat like a cauliflower, but of a purple colour, about the end of December, and will continue eatable till the middle of April. The brown or black broccoli is by many perſons greatly eſteemed, though it doth not deſerve a place in the kitchen-garden where the Roman broccoli can be obtained, which is much ſweeter, and will continue longer in ſeaſon: indeed the brown ſort is much hardier, ſo that it will thrive in the coldeſt ſituations, where the Roman broccoli is ſometimes deſtroyed in very hard winters. The brown ſort ſhould be ſown in the middle of May, and managed as hath been directed for the common cabbage, and ſhould be planted at the ſame diſtance, which is about two feet and a half aſunder. This kind growing very tall, ſhould have the earth drawn up to their ſtems as they advance in height. This doth not form heads ſo perfect as the Roman broccoli; the ſtems and hearts of the plants are the parts which are eaten. The Roman broccoli (if well managed) will have large heads, which appear in the centre of the plants like cluſters of buds. Theſe heads ſhould be cut before they run up to ſeed, with about four or five inches of the ſtem; the ſkin of theſe ſtems ſhould be ſtripped off before they are boiled. After the firſt heads are cut off, there will be a great number of ſide-ſhoots produced from the ſtems, which will have ſmall heads to them, but are full as well flavoured as the large. The Naples broccoli hath white heads very like thoſe of the cauliflower, and eats ſo like it as not to be diſtinguiſhed from it.—Beſides this firſt crop of broccoli (which is uſually ſown in the end of May), it will be proper to ſow another crop the beginning of July, which will come in to ſupply the table the latter end of March and the beginning of April; and being very young, will be extremely tender and ſweet to the palate.

Thoſe who would ſave good ſeeds of this kind of broccoli, ſhould reſerve a few of the largeſt heads of the firſt crop, which ſhould be let remain to run up to ſeed, and all the under ſhoots ſhould be conſtantly ſtripped off, leaving only the main ſtem to flower and ſeed. If this be duly obſerved, and no other ſort of cabbage permitted to ſeed near them, the ſeeds will be as good as thoſe procured from abroad, and the ſort may be preſerved in perfection for a long time.

The culture of the turnip-rooted cabbage was formerly more common in Britain than at preſent; for ſince other ſorts have been introduced which are much better flavoured, this ſort has been neglected. There are ſome perſons who eſteem this kind for ſoups, but it is too ſtrong for moſt palates; and is ſeldom good but in hard winters, which will render it tender and leſs ſtrong. At the end of June the plants ſhould be tranſplanted out where they are to remain, allowing them two feet diſtance every way, obſerving to water them until they have taken root; and as their ſtems advance, the earth ſhould be drawn up to them with a hoe, which will preſerve a moiſture about their roots, and prevent their ſtems from drying and growing woody, ſo that the plants will grow more freely; but it ſhould not be drawn very high, for as it is the globular part of the ſtalk which is eaten, ſo that ſhould not be covered. In winter they will be fit for uſe, when they ſhould be cut off, and the ſtalks pulled out of the ground and thrown away, being good for nothing after the ſtems are cut off. As food for cattle, however, the cultivation of this ſpecies deſerves particular encouragement. See Husbandry.

The curled colewort or Siberian broccoli is now more generally eſteemed than the former, being extremely hardy, ſo is never injured by cold, but is always ſweeter in ſevere winters than in mild ſeaſons. This may be propagated by ſowing of the ſeeds the beginning of July; and when the plants are ſtrong enough for tranſplanting, they ſhould be planted in rows about a foot and a half aſunder, and ten inches diſtant in the rows. Theſe will be fit for uſe after Chriſtmas, and continue good until April; ſo that they are a very uſeful ſort of vegetable.

The muſk cabbage, and the common colewort or Dorſetſhire kale, are varieties fit for a botanic garden, but are plants of no uſe. They are annual plants, and periſh when they have perfected their ſeeds.

In order to ſave the ſeeds of all the ſorts of cabbages, it is neceſſary, about the end of November, to make choice of ſome of the beſt cabbages, which you ſhould pull up, and carry to ſome ſhed or other covered place, where you ſhould hang them up for three or four days by their ſtalks, that the water may drain from between their leaves; then plant them in ſome border near a hedge or pale, quite down to the middle of the cabbage, leaving only the upper part of the cabbage above ground, obſerving to raiſe the earth above it, ſo that it may ſtand a little above the level of the ground; eſpecially if the ground is wet, they will require to be raiſed pretty much above the ſurface. If the winter ſhould prove very hard, you muſt lay a little ſtraw or peaſe-haulm lightly upon them, to ſecure them from the froſt, taking it off as often as the weather proves mild, leſt by keeping them too cloſe they ſhould rot. In the ſpring of the year theſe cabbages will ſhoot out ſtrongly, and divide into a great number of ſmall branches: you muſt therefore ſupport their ſtems, to prevent their being broken off by the wind; and if the weather ſhould be very hot and dry when they are in flower, you ſhould refreſh them with water once a week all over the branches, which will greatly promote their ſeeding, and preſerve them from mildew. When the pods begin to change brown, you will do well to cut off the extreme part of every ſhoot with the pods, which will ſtrengthen your ſeeds; for it is generally obſerved, that thoſe ſeeds which grow near the top of the ſhoots, are very ſubject to run to ſeed before they cabbage; ſo that by this there will be no loſs, but a great advantage. When your ſeeds begin to ripen, you muſt be particularly careful that the birds do not deſtroy it, for they are very fond of

thefe feeds. The beft method to prevent this, is to get a quantity of birdlime, and dawb over a parcel of flender twigs, which fhould be faftened at each end to ftronger fticks, and placed near the upper part of the feed in different places, fo that the birds may alight upon them. By this means they will be faftened; and there you muft let them remain, if they cannot get off of themfelves: and although there fhould not above two or three birds be caught, yet it will fufficiently terrify the reft, fo that they will not come to that place again, at leaft not for fome time. When your feed is fully ripe, you muft cut it off; and after drying, threfh it out, and preferve it in bags.

In planting cabbages for feed, however, it will be proper never to plant more than one fort in a place, or near one another: for example, never plant red and white cabbages near each other, nor Savoy with white or red cabbages; for they will, by the commixture of their effluvia, produce a mixture of kinds: and it is faid to be owing to this neglect, that the gardeners rarely fave any good red cabbage feed in Britain, but are obliged to procure frefh feeds from abroad; as fuppofing the foil or climate of Britain alters them from red to white, and of a mixed kind betwixt both; whereas, if they fhould plant red cabbages by themfelves for feeds, and not fuffer any other to be near them, they might continue the kind as good in Britain as in any other part of the world.

Cauliflowers have of late years been fo far improved in Britain, as to exceed in goodnefs and magnitude what are produced in moft parts of Europe, and by the fkill of the gardener are continued for feveral months together; but the moft common feafon for the great crops is in May, June, and July. Having procured a parcel of good feed, you muft fow it about the 21ft of Auguft, upon an old cucumber or melon-bed, fifting a little earth over the feeds, about a quarter of an inch thick; and if the weather fhould prove extremely hot and dry, you fhould fhade the beds with mats, to prevent the earth from drying too faft, and give it gentle waterings as you may fee occafion. In about a month's time after fowing, your plants will be fit to prick out: you fhould therefore put fome frefh earth upon your cucumber or melon-beds; or where thefe are not to be had, fome beds fhould be made with a little new dung, which fhould be trodden down clofe, to prevent the worms from getting through it; but it fhould not be hot dung, which would be hurtful to the plants at this feafon, efpecially if it proves hot. Into this bed you fhould prick your young plants at about two inches fquare, obferving to fhade and water them at firft planting; but do not water them too much after they are growing, nor fuffer them to receive too much rain if the feafon fhould prove wet, which would be apt to make them black-fhanked, as the gardeners term it, which is no lefs than a rottennefs in their ftems, and is the deftruction of the plants fo affected. In this bed they fhould continue till about the 30th of October, when they muft be removed into the place where they are to remain during the winter feafon; which, for the firft fowing, is commonly under bell or hand glaffes; to have early cauliflowers, and thefe fhould be of an early kind: but in order to have a fucceffion during the feafon, you fhould be provided with another more late kind, which fhould be fown four or five days after the other, and managed as was directed for them. In order to have very early cauliflowers, you fhould make choice of a good rich fpot of ground that is well defended from the north, eaft and weft winds, with hedges, pales, or walls; but the firft are to be preferred, if made with reeds, becaufe the winds will fall dead in thefe, and not reverberate as by pales or walls. This ground fhould be well trenched, burying therein a good quantity of rotten dung; then level your ground: and if it be naturally a wet foil, you fhould raife it up in beds about two feet and a half, or three feet broad, and four inches above the level of the ground; but if your ground is moderately dry, you need not raife it at all: then plant your plants, allowing about two feet fix inches diftance from glafs to glafs in the rows, always putting two good plants under each glafs, which may be at about four inches from each other; and if you defign them for a full crop, they may be three feet and a half row from row: but if you intend to make ridges for cucumbers between the rows of cauliflower plants (as is generally practifed by the gardeners near London), you muft then make your rows about eight feet afunder; and the ground between the rows of cauliflowers may be planted with cabbage plants, to be drawn off for coleworts in the fpring. When you have planted your plants, if the ground is very dry, you fhould give them a little water, and then fet your glaffes over them, which may remain quite clofe down over them till they have taken root, which will be in about a week or ten days time, unlefs there fhould be a kindly fhower of rain; in which cafe you may fet off the glaffes that the plants may receive the benefit of it; and in about ten days after planting, you fhould be provided with a parcel of forked fticks, or bricks, with which you fhould raife your glaffes about three or four inches on the fide toward the fouth, that your plants may have free air: in this manner your glaffes fhould remain over the plants night and day, unlefs in frofty weather, when you fhould fet them down as clofe as poffible; or if the weather fhould prove very warm, which many times happens in November, and fometimes in December, you fhould not fail to keep your glaffes off in the day-time, and put them on only in the night, left, by keeping the glaffes over them too much, you fhould draw them into flower at that feafon; which is many times the cafe in mild winters, efpecially if unfkilfully managed. Toward the latter end of February, if the weather proves mild, you fhould prepare another good fpot of ground to remove fome of the plants into from under the glaffes, which fhould be well dunged and trenched (as before): then fet off your glaffes; and after making choice of one of the moft promifing plants under each glafs, which fhould remain, take away the other plant, by raifing it up with a trowel, &c. fo as to preferve as much earth to the root as poffible; but take care not to difturb or prejudice the roots of the plants which remain. Then plant the plants which you have taken out at the diftance before directed, *viz.* if for a full crop, three feet and a half, row from row; but if for ridges of cucumbers between them, eight feet, and two feet four inches diftance in the rows: then, with a fmall hoe, draw the earth up to the ftems of the plants which were left under the glaffes, taking great care not to let the earth fall into their hearts; and fet your glaffes over them again, raifing your props an inch or two higher than before, to give them more air, obferving to take them off whenever there may be fome gentle fhowers, which will greatly affift their growth.

Should you foon after find your plants grow fo faft as to fill the glaffes with their leaves, you muft then flightly dig about the plants, and raife the ground about them in a bed broad enough for the glaffes to ftand about four inches high, which will give your plants a great deal of room, by raifing the glaffes fo much higher when they are fet over them; and by this means they might be kept covered until April, which otherwife they could not, without prejudice to the leaves of the plants; and this is a great advantage to them, for many times we have returns of fevere frofts at the latter end of March, which prove very hurtful to thefe plants, if expofed to them, efpecially after having been nurfed up under glaffes.

As foon as your beds are completed, you may fet your glaffes over your plants again, obferving to raife your props pretty high, efpecially if the weather be mild, that they may have free air to ftrengthen them; and in mild foft weather fet off your glaffes, as alfo in gentle fhowers of rain: and now you muft begin to harden them by degrees, to endure the open air;

however, it is advifable to let your glaffes remain over them as long as poffible, if the nights fhould be frofty, which will greatly forward your plants; but you muft not let your glaffes remain upon them in very hot fun-fhine, efpecially if their leaves prefs againft the fides of the glafs; for it hath often been obferved in fuch cafes, that the moifture which hath rifen from the ground, together with the perfpiration of the plants, which, by the glaffes remaining over them, hath been detained upon the leaves of the plants, when the fun hath fhone hot upon the fides of the glaffes, have acquired fuch a powerful heat from the beams thereof, as to fcald all their larger leaves, to the no fmall prejudice of the plants: nay, fometimes large quantities of plants have been fo affected therewith, as never to be of any value afterwards.

If it happens that your plants have fucceeded well, toward the end of April fome of them will begin to fruit: you muft therefore look over them carefully every other day, and when you fee the flower plainly appear, you muft break down fome of the inner leaves over it to guard it from the fun, which would make the flower yellow and unfightly if expofed thereto; and when you find your flower at its full bignefs (which you may know by its outfide parting as if it would run), you muft then draw it out of the ground, and not cut them off, leaving the ftalk in the ground, as is by fome practifed; and if they are defigned for prefent ufe, you may cut them out of their leaves; but if defigned to keep, you fhould preferve their leaves about them, and put them into a cool place; the beft time for pulling them is in a morning, before the fun hath exhaled the moifture; for cauliflowers pulled in the heat of the day, lofe that firmnefs which they naturally have, and become tough and unpleafant when eaten.

But now to return to our fecond crop (the plants being raifed and managed as was directed for the early crop, until the end of October); you muft then prepare fome beds, either to be covered with glafs-frames, or arched over with hoops, to be covered with mats, &c. Thefe beds fhould have fome dung laid at the bottom, about fix inches or a foot thick, according to the fize of your plants; for if they are fmall, the bed fhould be thicker of dung to bring them forward, and fo *vice verfa*; this dung fhould be beat down clofe with a fork, in order to prevent the worms from finding their way through it; then lay fome good frefh earth about four or five inches thick thereon, in which you fhould plant your plants about two inches and a half fquare, obferving to fhade and water them until they have taken new root; but you muft not keep your coverings clofe, for the warmth of the dung will occafion a large damp in the bed, which, if pent in, will greatly injure the plants. When your plants have taken root, you muft give them as much free open air as poffible, by keeping the glaffes off in the day-time as much as the weather will permit; and in the night, or at fuch times as the glaffes require to be kept on, raife them up with props to let in frefh air, unlefs in frofty weather; at which time the glaffes fhould be covered with mats, ftraw, peafe-haulm, &c. but this is not to be done but in very hard frofts; you muft alfo obferve to guard them againft great rain, which in winter time is very hurtful to them; but in mild weather, if the glaffes are kept on, they fhould be propped, to admit frefh air; and if the under leaves grow yellow and decay, be fure to pick them off: for if the weather fhould prove very bad in winter, fo that you fhould be obliged to keep them clofe covered for two or three days together, as it fometimes happens, thefe decayed leaves will render the inclofed air very noxious; and the plants perfpiring pretty much at that time, are often deftroyed in great numbers.

If the weather be mild in the beginning of February, you muft begin to harden your plants by degrees, that they may be prepared for tranfplantation: the ground where you intend to plant your cauliflowers out (which fhould be quite open from trees, &c. and rather moift than dry) having been well dunged and dug, fhould be fown with radifhes a week or fortnight before you intend to plant out your cauliflowers; the fowing of radifhes is particularly mentioned, becaufe if there are not fome radifhes amongft them, and the month of May fhould prove hot and dry, as it fometimes happens, the fly will feize your cauliflowers, and eat their leaves full of holes, to their prejudice, and fometimes their deftruction; whereas, if there are radifhes upon the fpot, the flies will take to them, and never meddle with the cauliflowers fo long as they laft: indeed, the gardeners near London mix fpinach with their radifh-feed, and fo have a double crop; which is an advantage where ground is dear, or where perfons are ftraitened for room; otherwife it is very well to have only one crop amongft the cauliflowers, in order that the ground may be cleared in proper time.

If your ground be ready, and the feafon good, about the middle of February, you may begin to plant out your cauliflowers: the diftance which is generally allowed by the gardeners near London (who plant other crops between their cauliflowers to fucceed them, as cucumbers for pickling, and winter cabbages) is every other row four feet and a half apart, and the intermediate rows two feet and a half, and two feet two inches diftance in the rows; fo that in the latter end of May, or beginning of June (when the radifhes and fpinach are cleared off), they put in feeds of cucumbers for pickling, in the middle of the wide rows, at three feet and a half apart; and in the narrow rows plant cabbages for winter ufe, at two feet two inches diftance, fo that thefe ftand each of them exactly in the middle of the fquare between four cauliflower plants; and thefe, after the cauliflowers are gone off, will have full room to grow, and the crop be continued in a fucceffion through the whole feafon by this means.

Many people are fond of watering cauliflower plants in fummer; but the gardeners near London have almoft wholly laid afide this practice, as finding a deal of trouble and charge to little purpofe; for if the ground be fo very dry as not to produce tolerable good cauliflowers without water, it feldom happens that watering of them makes them much better; and when once they have been watered, if it is not conftantly continued, it had been much better for them if they never had any; as alfo, if it be given them in the middle of the day, it rather helps to fcald them: fo that, upon the whole, if care be taken to keep the earth drawn up to their ftems, and clear them from every thing that grows near them, that they may have free open air, you will find that they will fucceed better without than with water, where any of thefe cautions are not ftrictly attended to.

But if you would have a third crop of cauliflowers, make a flender hot-bed in February, in which fow the feeds, covering them a quarter of an inch thick with light mould, and covering the bed with glafs-frames. When the plants are come up, and have gotten four or five leaves, you fhould prepare another hot-bed to prick them into, which may be about two inches fquare: and in the beginning of April harden them by degrees, to fit them for tranfplanting, which fhould be done the middle of that month, at the diftance directed for the fecond crop, and muft be managed accordingly: thefe (if the foil is moift where they are planted, or the feafon cool and moift) will produce good cauliflowers about a month after the fecond crop is gone, by which their feafon will be greatly lengthened.

There is alfo a fourth crop of cauliflowers, which may be raifed by fowing the feed about the 23d of May; and being tranfplanted, as before directed, will produce good cauliflowers in a kindly feafon and good foil after Michaelmas, and continue through October and November; and, if the feafon permit, often divides a great part of the month of December.

As for the medical and nutritive properties of cabbage, we ſhall only obſerve, that all the ſorts are ſuppoſed to be hard of digeſtion, to afford little nouriſhment, and to produce flatulencies, though probably on no very good foundation. They tend ſtrongly to putrefaction, and run into this ſtate ſooner than almoſt any other vegetable; when putrefied, their ſmell is likewiſe the moſt offenſive, greatly reſembling that of putrefied animal ſubſtances. Of all theſe plants cauliflower is reckoned the eaſieſt of digeſtion. The red cabbage is chiefly uſed for pickling. In ſome countries they bury the white cabbage when full grown in the autumn, and thus preſerve it all winter. The Germans cut them to pieces, and, along with ſome aromatic herbs and ſalt, preſs them cloſe down in a tub, where they ſoon ferment, and are eaten under the name of *Sour-crout*. See that article.

BRASSICAVIT, or Brachicavit, in the manege, is a horſe whoſe fore-legs are naturally bended archwiſe: being ſo called by way of diſtinction from an arched horſe, whoſe legs are bowed by hard labour.

BRAULS, Indian cloths with blue and white ſtripes. They are otherwiſe called *turbants*, becauſe they ſerve to cover thoſe ornaments of the head, particularly on the coaſt of Africa.

BRAUNA, a town in Germany, in Bavaria, ſeated on the river Inn. It has a ſtrong fortreſs: notwithſtanding, it was taken by the Auſtrians in 1743. E. long. 13. 3. N. lat. 48. 10.

BRAUNSBURG, a town of Poland, in Regal Pruſſia, with a very commodious harbour, and belonging to the king of Pruſſia. It is ſeated near the Baltic ſea, E. long. 20. 0. N. lat. 54. 15.

BRAUNSFIELD, a town of Germany, in the circle of the Upper Rhine, and country of Solmes, with a handſome palace or caſtle. E. long. 8. 32. N. lat. 50. 22.

BRAVO, one of the Cape de Verd iſlands on the coaſt of Africa, remarkable for its excellent wines, and inhabited by Portugueſe. The land is very high, and conſiſts of mountains which look like pyramids. It abounds in Indian corn, gourds, water-melons, potatoes, horſes, aſſes, and hogs. There is alſo plenty of fiſh on the coaſt, and the iſland produces nitre. W. long. 25. 35. N. lat. 14. 0.

Bravo, a town of Africa, on the coaſt of Ajan, with a pretty good harbour. It is an independent place, and is about 80 miles diſtant from Magadoxo. E. long. 41. 35. N. lat. 1. 0.

BRAURONIA, in Grecian antiquity, a feſtival in honour of Diana, ſurnamed *Brauronia*, from its having been obſerved at Brauron, an Athenian borough. This feſtival was celebrated once in five years, being managed by ten men, called in Greek *ieropoioi*. The victim offered in ſacrifice was a goat, and it was cuſtomary for certain men to ſing one of Homer's Iliads. The moſt remarkable perſons at this ſolemnity were young virgins, habited in yellow gowns, and conſecrated to Diana. It was unlawful for any of them to be above ten, or under five years of age.

BRAWN, the fleſh of a boar ſouſed or pickled: for which end the boar ſhould be old; becauſe the older he is, the more horny will the brawn be.—The method of preparing brawn is as follows: The boar being killed, it is the flitches only, without the legs, that are made brawn; the bones of which are to be taken out, and then the fleſh ſprinkled with ſalt, and laid in a tray, that the blood may drain off: then it is to be ſalted a little, and rolled up as hard as poſſible. The length of the collar of brawn ſhould be as much as one ſide of the boar will bear, ſo that when rolled up it will be nine or ten inches diameter. The collar being thus rolled up, is to be boiled in a copper, or large kettle, till it is ſo tender, that you can run a ſtraw through it; then ſet it by till it is thoroughly cold, and put it into the following pickle: to every gallon of water put a handful or two of ſalt, and as much wheat-bran: boil them together, then drain the bran as clear as you can from the liquor; and when the liquor is quite cold, put the brawn into it.

BRAY (Sir Reginald), a celebrated architect and politician, was the ſecond ſon of Sir Richard Bray, one of the privy council to king Henry VI. Sir Reginald was inſtrumental in the advancement of king Henry VII. to the throne of England; and was greatly in the favour of that prince, who beſtowed honours and wealth upon him. His ſkill in architecture appears from Henry VII.'s chapel at Weſtminſter, and the chapel of St. George at Windſor, as he had a principal concern and direction in the building of the former, and the finiſhing and bringing to perfection the latter, to which he was alſo a liberal benefactor. In the middle of the ſouth aile of the above chapel is a ſpacious chapel built by him, and ſtill called by his name. He died in 1501; and was interred in the above chapel, probably under the ſtone where lies Dr. Waterland; for on opening the vault for that gentleman, who died in 1740, a leaden coffin of ancient form was found, which, by other appearances, was judged to be that of Sir Reginald, and was, by order of the dean, immediately arched over.

Bray, (Dr Thomas) an eminent, learned, and pious divine, was born at Marton, in Shropſhire, in the year 1656, and educated at Oxford. He was at length preſented to the vicarage of Over-Whitacre, in Warwickſhire; and in 1690 to the rectory of Sheldon, where he compoſed his *Catechetical Lectures*; which procured him ſuch reputation, that Dr. Compton, biſhop of London, pitched upon him as a proper perſon to model the infant church of Maryland, and eſtabliſh it upon a ſolid foundation, and for that purpoſe he was inveſted with the office of commiſſary. He now engaged in ſeveral noble undertakings. He procured ſums to be raiſed for purchaſing ſmall libraries for the uſe of the poor miniſters in the ſeveral parts of our plantations: and the better to promote this deſign, he publiſhed two books; one intitled *Bibliotheca parochialis*, or a ſcheme of ſuch theological and other heads as ſeem requiſite to be peruſed or occaſionally conſulted by the clergy, together with a catalogue of books which may be profitably read on each of thoſe points; the other, Apoſtolical charity, its nature and excellency conſidered. He endeavoured to get a fund eſtabliſhed for the propagation of the goſpel, eſpecially among the uncultivated Indians; and by his means a patent was obtained for erecting the corporation called *The Society for the Propagation of the Goſpel*. He, by his induſtry, procured relief for priſoners; and formed the plan for the ſociety for the reformation of manners, charity-ſcoools, &c. He wrote, 1. his Martyrology, or Papal uſurpation, in one volume folio; 2. *Directorium miſſionarium*; and other works. This excellent man died in 1730, at the age of 73.

Bray, a port town of Ireland, in the county of Wicklow, and province of Leinſter, ſeated on St. George's Channel, eight miles ſouth of Dublin. W. long. 6. 16. N. lat. 53. 8.

BRAYLE, among ſportſmen, a piece of leather ſlit to put upon the hawk's wing, to tie it up.

BRAZED, in heraldry, a term ſerving to deſcribe three cheverons, one claſping another.

BRAZEN, ſomething conſiſting of braſs, or formed out of it. See Brass.

Brazen *Age*. See Age.

Brazen *Diſh*, among miners, is the ſtandard by which the other diſhes are gauged, and is kept in the king's hall.

Brazen *Sea*, in Jewiſh antiquity, one of the ſacred utenſils in the temple of Solomon. It was caſt in the plain of Jordan, and removed from thence into the inner court of the temple: where it was placed upon 12 oxen, three of which looked toward each quarter of the world. It was ten cubits from the

one brim to the other, five cubits in height, and 30 cubits in circumference, and contained 3000 baths. The brim of it was perfectly round, and so it continued in the two upper cubits; but below the brim, in the three lower cubits, it was square. It was a hand-breadth thick, and the brim was wrought like the brim of a cup, with flowers of lilies. About the body of this huge vessel there were two borders of engravings, being the heads of oxen in demi-relief; out of which some suppose the water issued, and that they were made as cocks and conveyances for that purpose.—This brazen or molten sea was designed for the priests to wash themselves in, before they performed the service of the temple. The supply of water was through a pipe out of the well Etam; though some are of opinion, that it was constantly supplied with water by the Gibeonites.

BRAZIER, an artificer who makes and deals in all kinds of brass ware. This trade, as exercised in Britain, may be reckoned a branch of the smithery, though they seldom keep forges, except for brazing or soldering, and tinning the insides of their vessels, which they work up chiefly out of copper and brass prepared rough to their hands. They consist of a working part, and a shopkeeping part, which latter many carry on to a great extent, dealing as well in all sorts of iron and steel, as copper and brass goods for household furniture.

BRAZIL. See Brasil.

BRAZING, the soldering or joining two pieces of iron together by means of thin plates of brass, melted between the pieces that are to be joined. If the work be very fine, as when two leaves of a broken saw are to be brazed together, they cover it with pulverized borax, melted with water, that it may incorporate with the brass powder, which is added to it. The piece is then exposed to the fire without touching the coals, and heated till the brass is seen to run.

Brazing is also the joining two pieces of iron together by heating them hot, the one upon the other, which is used for large pieces by black-smiths, &c.

BRAZZA, a town and island on the coast of Dalmatia, in the gulph of Venice, opposite to Spalatto, and subject to Venice. E. long. 28. 0. N. lat. 43. 0.

BREACH, in a general sense, denotes a break or rupture in some part of a fence or inclosure, whether owing to time or violence.—Inundations or overflowings of lands are frequently owing to breaches in the dikes or sea-banks. Dagenham breach is famous; it was made in 1707, by a failure of the Thames wall in a very high tide. The force wherewith it burst in upon the neighbouring level tore up a large channel or passage for water 100 yards wide, and in some places 20 feet deep, by which a multitude of subterraneous trees that had been buried many ages before were exposed to view.

Breach, in fortification, a gap made in any part of the works of a town by the cannon or mines of the besiegers, in order to make an attack upon the place. To make the attack more difficult, the besieged sow the breach with crow-feet, or stop it with *chevaux de frize*.—A practicable breach signifies that, where the men may mount and make a lodgment, and ought to be 15 or 20 fathoms wide. The besiegers make their way to it, by covering themselves with gabions, earth-bags, &c.

Breach, in a legal sense, is where a person breaks through the condition of a bond or covenant; on an action upon which, the breach must be assigned: and this assignment must not be general, but particular, as, in an action of covenant for not repairing houses, it ought to be assigned particularly what is the want of reparation; and in such certain manner, that the defendant may take an issue.

BREAD, a mass of dough kneaded and baked in an oven. See Baker, Baking, and Barm.

The grains of all vegetables are almost entirely composed of substances very proper for the nourishment of animals; and amongst grains those which contain the largest proportion of farinaceous matter are the most nutritive. Man, who appears to be designed by nature to eat of all substances which are capable of nourishing him, and still more of vegetables than animals, has, from time immemorial, and in all parts of the earth, used farinaceous grains as the principal basis of his food: but as these grains cannot well be eaten in their natural state, means have been gradually found not only to extract the farinaceous part, but also to prepare it so that it becomes a very agreeable and wholesome aliment, such as the bread we now generally eat.

It appears very certain, that for a long time men no otherwise prepared their corn than by boiling and forming compact viscous cakes, not very agreeable to the taste, and of difficult digestion. Before they were able to make bread of good taste and quality, as we do now, it was necessary to invent and complete ingenious machines for grinding corn, and separating the pure flour with little trouble and labour; and that inquiries, or rather some happy chance which some observing person availed himself of, should discover that flour, mixed with a certain quantity of water, is susceptible of a fermentation which almost entirely destroys its viscidity, heightens its taste, and renders it proper to make a light bread, very agreeable to the taste, and of easy digestion. In fact it is to the fortunate invention of raising the paste before baking that we owe the perfection of the art of making bread. This operation consists in keeping some paste or dough, till by fermentation it swells, rarefies, and acquires a quick pungent taste, and smells somewhat sour, and rather disagreeable. This fermented dough is well worked with some fresh dough, by which the whole mass is attenuated, and divided: air is introduced into it, which forms in it small cavities, raises, and swells it. Hence the small quantity of fermented paste which disposes the rest to ferment, is called *leaven*, from the French word *lever* to raise or lighten.

But the invention of beer furnished a matter still more useful in the making of bread. This matter is what we call *barm* or *yeast*. See Barm. By means of this, the finest and lightest bread is made. It often happens, that bread made with leaven dough has a sourish, and not agreeable taste; which may proceed from too great a quantity of leaven, or from leaven in which the fermentation has advanced too far. This inconvenience does not happen to bread made with yeast. Bread well raised and baked differs from unfermented bread, not only in being less compact, lighter, and of a more agreeable taste, but also in being more easily miscible with water, with which it does not form a viscous mass, which circumstance is of great importance to health.

It is remarkable, that no nation lives without bread, or something of a substitute for it. Thus the Laplanders, having no corn of their own, make a sort of bread of their dried fishes, and of the inner rind of the pine, which seems to be used, not so much for their nourishment, as for supplying a dry food. For this, mankind seem to have an universal appetite, rejecting bland, slippery, and mucilaginous foods. This is not commonly accounted for, but seems to depend on very simple principles. The preparation of our food depends on the mixture of the animal fluids in every stage. Among others the saliva is necessary, which requires dry food as a necessary stimulus to draw it forth, as bland, slippery, fluid aliments are too inert, and make too short stay in the mouth, to produce this effect, or to cause a sufficient degree of manducation to emulge that liquor. For this reason we commonly use dry bread along with animal food, which otherwise would be too quickly swallowed. For blending the oil and water of our food nothing is

fo fit as bread, affifted by a previous manducation. For which purpofe, bread is of like neceffity in the ftomach, as it is proper that a fubftance of folid confiftence fhould be long retained there. Now the animal fluids muft be mixed with our aliments, in order to change the acefcency it undergoes. But liquid foods would not attain this end, whereas the folid ftimulate and emulge the glands of the ftomach. The bread then appears to be exceedingly proper, being bulky without too much folidity, and firm without difficulty of folution.

Among the ancients we meet with various denominations of bread; as, 1. *Panis filigineus*, called alfo *mundus, athleticus, ifungia, colipkius*, and *robys*, anfwering to our white bread; being made of the pureft flour of the beft wheat, and only ufed by the richer fort. 2. *Panis fecundus* or *fecundarius*, called alfo *fimilaceus* or *fimilagineus*, the next in purity; being made of fine flour, only all the bran not fifted out. 3. *Autopyrus*, called alfo *fyncomiftus* and *confufaneus*, made of the whole fubftance of the wheat, without either retrenching the finer flour or coarfer bran; anfwering to our houfehold bread. 4. *Cacabaceus*, apparently the fame with what was otherwife denominated *fordidus*, as being given to dogs; *furfuraceus, furfureus*, or *furfurativus*, becaufe made in great part of bran; and, in the middle age, *biffus*, on account of its brownnefs; fometimes alfo *lcibo*. There were other forts of bread, denominated from the manner in which they were made, or the ufes they were applied to; as, 1. The *militaris*, which was prepared by the foldiers and officers in camp with their own hands; for which purpofe fome had hand-mills; others pounded the corn in a mortar, and baked it on the coals. 2. *Clibanites*, that baked in an oven, by way of contradiftinction from that baked on the earth or under the embers. 3. That called *fubcineritius*, or *fub cinere coctus*; fometimes alfo *reverfatus*, becaufe it was to be turned in the baking. 4. *Nauticus*, anfwering to our fea-bifcuit, and denominated accordingly *bis coctus*, becaufe baked feveral times over to make it keep the longer. Other kinds of bread were denominated from their qualities and accidents; as, 1. The *panis ficcus*, that which had been long baked; fuch as were the *bis coctus*, naval and buccellated bread. 2. *Madidus*, a fort made of rye or bear, fometimes alfo made of fine flour, wherewith they fmeared their faces, by way of a cofmetic, to render them fmooth. 3. *Acidus*, or bread acidulated with vinegar. 4. *Azymus*, that which was unleavened or unfermented.

The French have alfo a great variety of breads; as queen's bread, alamode bread, bread de Segopie, de Gentillay, quality-bread, &c. all prepared in peculiar manners by the bakers of Paris. The bread de Goneffe excels all others, on account of the waters at Goneffe, a town three leagues from Paris. It is light, and full of eyes, which are the marks of its goodnefs. *Pain de menage* is that which each family bakes for itfelf. Spice-bread, *pain d'epice*, denotes bread baked and iced over with the fcum taken off fugar in refining houfes; it is fometimes alfo made with honey and other forts of feafoning, and anfwers to what the antients call *panis mellitus*.

Among us, bread is chiefly divided into white, wheaten, and houfehold; differing only in degrees of purity. In the firft, all the bran is feparated; in the fecond, only the coarfer; in the third, none at all: fo that fine bread is made only of flour; wheaten bread, of flour and a mixture of the finer bran; and houfehold, of the whole fubftance of the grain, without taking out either the coarfe bran or fine flour. We alfo meet with fymnel bread, manchet, or roll bread, and French bread: which are only fo many denominations of the fineft and whiteft bread, made of the pureft flour; except that in roll bread there is an addition of milk; and in French bread, of eggs and butter alfo. In Lancafhire, and feveral of the northern counties of England, they have various forts of oaten bread; as, 1. The bannock, which is an oat-cake, kneaded only with water, and baked on the embers. 2. Clap-bread, which is made into thin hard cakes. 3. Bitchinefs-bread, which is compofed of thin batter, and made into thin foft oat-cakes. 4. Riddle-cakes, which are thick and four, have but little leaven, and are kneaded ftiff. And, 5. Jannock, which is oaten-bread made up into loaves. Add to thefe, *peafe-bread*, much ufed in many parts of Scotland; being bread confifting either wholly of the flour of peafe, or of this and oat-meal mixed: the dough, fometimes leavened, fometimes made only with water, is formed either into bannocks or cakes, and baked over the embers; or into what they call *baps*, i. e. a kind of flattifh rolls, and baked in the oven. In the ftatute of affize of bread and ale, 51 Hen. III. mention is made of wafted-bread, cocket-bread, and bread of treet; which anfwer to the three kinds of bread now in ufe, called *white, wheaten*, and *houfehold* bread. In religious houfes, they heretofore diftinguifhed bread by the names Efquire-bread, *panis armigerorum*; monks-bread, *panis conventualis*; boys-bread, *panis puerorum*; and fervants bread, *panis famulorum*, called alfo *panis fervientalis*. A like diftribution obtained in the houfeholds of nobles and princes; where, however, we find fome other denominations; as meffengers bread, *panis nuncius*, that given to meffengers as a reward of their labour; court-bread, *panis curialis*, that allowed by the lord for the maintenance of his houfehold; eleemofynary bread, that diftributed to the poor by way of alms.

It is for the intereft of the community that the food of the poor fhould be as various as poffible, fo that, in times when there is a fcarcity of the ordinary kinds of grain, fuch as we have lately experienced, they may not be without ready and cheap refources. To the difcovery of fuch, feveral have fuccefsfully turned their inquiries, and we fhall lay before the reader fome account of their experiments.

1. Bread *of Potatoes*. Potatoes, previoufly deprived of their fkin, cut into thin flices, and put between paper, will dry in a heat fomewhat lefs than 35° of Reaumur's thermometer; and, when thus dried, will preferve their white colour, and may be reduced to a fine powder, poffeffing the fmell and tafte of wheat. Even when moft finely powdered, it cannot be faid to poffefs either the feel or brightnefs of the flour of wheat; although, on a chemical analyfis, it yields the fame products. Yet it is nutritious, and keeps well for a long time. Trials were made with one fourth, one third, one half, and two thirds, of the potatoe-meal, the remainder being wheat flour. Thefe proportions, with the addition of a little falt and yeaft, yielded bread which was well tafted, but which had fermented little, was brown, and covered with hard brown crufts. Bread made from the meal of potatoes alone, with the addition of falt and yeaft, was eatable, but very heavy, unfermented, and exceedingly brown. This bread, from the meal of potatoes alone, was apt to crumble into powder—a defect which was remedied by mixing with the meal a decoction of bran, or a mixture of honey and water; either of which made it lighter and more fermented. It obtained alfo a cruft of a golden colour, became well tafted, and fufficiently adhefive. Mr. Parmentier, the author of thefe experiments, obtained bread, alfo, well fermented, and of a good colour and tafte, from a mixture of raw potatoe-pulp with meal of wheat, or potatoe-meal, with the addition of yeaft and falt.

Potatoes, when ufed for making bread, are not readily difpofed to ferment; without which, bread is very infipid, and not eafily digefted. But it has been found, that good bread may be made from equal quantities of flour and potatoe-meal. This therefore fhould be recommended in times of fcarcity, inftead of employing rye, barley, or oats, as has frequently been done. In fact, this has been greatly the practice, and

for a long time, in thofe counties moft remarkable for the plentiful culture of potatoes; and their procefs is fimply that of boiling a quantity of potatoes, rubbing them into the dry flour, and afterwards joining the barm, &c. as if the whole were compofed of flour alone. Bread made in this way is remarkably light, and preferves its moifture longer than bread made with flour only.

When grain is altogether wanting, bread may be made from a mixture of the amylaceous powder of potatoes and of their pulp, this mixture being fermented with leaven, yeaft or honey. The meal of this root, when diluted with hot water, acquires a tenacious and gluey confiftence. However fair the meal of potatoes may be, it always gives a grey colour to the bread made by mixing it with the flour of wheat: but a mixture of mafhed potatoes with the flour of wheat does not produce brown-coloured bread.

2. Bread *from different Vegetables not commonly in Ufe.* Although the horfe-chefnut has not hitherto been employed, yet it is certain that wholefome bread, without any bitternefs, may be obtained from it. Mr. Parmentier advifes, that the fruit, after the fkin is taken off, and the juice preffed from it, be made into a pafte, which muft be diluted in water, and ftrained through a fieve. A milky-coloured liquor is thus feparated, which, on ftanding, depofits a fine powder, which is the farina or ftarch. This, being dried, is without either fmell or tafte, and very fit for aliment; the mafs from which it is procured retaining the bitternefs of the fruit. The roots of the bryonia, when treated in the fame manner, yielded a fimilar white powder. By the fame treatment alfo, fine, white, infipid, inodorous powders may be procured from the roots of the iris, gladiolus, ranunculus, fumaria, arum, dracunculus, mandragora, colchicum, filipendula, and helleborus; plants which grow fpontaneoufly, and in great abundance.

Of acorns bread has frequently been made; and to this day, in fome countries, they are for that purpofe commonly ufed. The method of preparation which Mr. Parmentier recommends is, that they be deprived of their cover by boiling, then dried and powdered, and afterwards baked in the fame manner as the flour of wheat. When fully ripe, and made into a pafte, they were deprived of their aftringency by merely preffing their juice from them. The mafs remaining after the preffure, when dried, was eafily reduced to a fine powder, by no means of a difagreeable tafte.

The gramen caninum arvenfe, in its appearance, approaches to corn; and fome naturalifts have confidered it as the original fpecies from which all our grain is produced. Its roots are fweet-tafted; and in the preparation of them for bread it is only neceffary that they fhould be cleanfed, cut fmall, dried, and powdered. This powder diffolves in boiling water, which it renders thick and cloudy, and, upon cooling, the whole mafs obtains a gelatinous confiftence. Upon a chemical analyfis, it yields an acid empyreumatic oil, which poffeffes a fingular odour, refembling that which is perceived on burning the plant. The fpongy refiduum, calcined in the air, gives a fixed alkali. Thefe properties inconteftably prove that it contains an *amylaceous* matter fimilar to that of grain, which appears to be the nutritive part of vegetables. This amylaceous matter, formed into a jelly, and diffufed in water, keeps for a long time without fuffering any change; it then turns acid, and at length putrefies.

The amylaceous matter of acrid and poifonous plants, although innocent and nutritive, cannot be converted into bread without the addition of fome mucilaginous fubftance. In times of great fcarcity, common bran will anfwer the purpofe; but when potatoes are to be had, the addition of a proper proportion of thefe is to be preferred. Though we are not to confider the glutinous matter as the nutritious part of vegetables, yet it is a very neceffary ingredient. It is that which preferves the cohefion of the pafte in fermenting bread: it is that which forms the vifcid pellicle, and ftops the air in fermentation; gives the favoury tafte to bread; occafions it to be light, to ferment, and which forms the fmall cells feen in it. It is found efpecially near the cortical part of grain; and this accounts for its being found in the greateft quantity in coarfe brown meal. It is this gluten which renders wheat a fuperior aliment to the other grains and roots.

Mr. Parmentier gives an account of the bread which he obtained from the amylaceous powders of the different vegetables mentioned above, with the addition of potatoes and a fmall quantity of common leaven of grain. This bread appeared in general to be well fermented; it was of a good white colour, and free from any difagreeable odour: but to the tafte it was fomewhat infipid; which however he imagines might have been corrected by the addition of a proper quantity of falt.

3. Bread, *with the addition of turnips.* From a letter in the *Mufeum Rufticum et Commerciale*, we extract the following account of this procefs: "At the time I tried this method (fays the writer) bread was very dear, infomuch that the poor people in the country where I live could hardly afford themfelves half a meal a day. This put me upon confidering whether fome cheaper method might not be found than making it of wheat-meal. Turnips were at that time very plentiful. I had a number of them pulled, wafhed clean, pared, and boiled; when they were become foft enough to mafh, I had the greateft part of the water preffed out of them, and afterwards had them mixed with an equal quantity in weight of coarfe wheat-meal; the dough was then made in the ufual manner, with yeaft or barm, falt, water, &c. It rofe very well in the trough; and after being well kneaded, was formed into loaves, and put into the oven to be baked. I had at the fame time fome other bread made with common meal in the ordinary way. I baked my turnip-bread rather longer than the other. When they were drawn from the oven, I caufed a loaf of each fort to be cut; and found, on examination, the turnip-bread was fweeter than the other, to the full as light and as white, but had a little tafte (though nothing difagreeable) of the turnip. Twelve hours afterwards I tafted my turnip-bread again, when I found the tafte of the turnip in it fcarce perceivable, and the fmell quite gone off. On examining it when it had been baked 24 hours, had I not known that there were turnips in its compofition, I fhould not have imagined it: it had, it is true, a peculiar fweetifh tafte, but by no means difagreeable; on the contrary, I rather preferred it to the bread made of wheat-meal alone. After it had been baked 48 hours, it underwent another examination, when it appeared to me to be rather fuperior to the other; it ate frefher and moifter, and had not at all abated in its good qualities: to be fhort, it was ftill very good after a week; and, as far as I could fee, kept as well as the bread made of common wheat-meal. In my trials of this bread by the tafte, I was not fatisfied with eating it by itfelf; I had fome of it fpread with butter; I tafted it with cheefe; I ate of it toafted and buttered, and finally in boiled milk and in foup: in all thefe forms it was very palatable and good."

Bread-Tree. See Artocarpus.

Bee-Bread. See Bee.

Caffada-Bread. See Jatropha.

Earth-Bread. We are told in the German Ephemerides for the year 1764, that, "In the lordfhip of Mofcaw, in the Upper Lufatia, a fort of white earth is found, of which the poor, urged by the calamities of the wars which raged in thofe parts, make bread. It is taken out of a hill where they formerly worked at faltpetre. When the fun has fomewhat warmed this earth, it cracks, and fmall white globules proceed

from it as meal; it does not ferment alone, but only when mixed with meal. Mr. Sarlitz, a Saxon gentleman, was pleafed to inform us, that he has feen perfons who in a great meafure lived upon it for fome time. He affures us "that he procured bread to be made of this earth alone, and of different mixtures of earth and meal; and that he even kept fome of this bread by him upwards of fix years; he further fays, a Spaniard told him, that this earth is alfo found near Geronne in Catalonia."

Sacramental BREAD or *Eucharift*, in the Proteftant churches, is common leavened bread, in conformity to the ancient practice. In the Romifh mafs, azymons or unleavened bread is ufed, particularly in the Gallican church, where a fort is provided for this purpofe, called *pain à chanter*, made of the pureft wheaten flour preffed between two iron plates graven like wafer-moulds, being firft rubbed with white wax to prevent the pafte from fticking. The Greeks obferve divers ceremonies in making the eucharift bread. It is neceffary the perfon who bakes it have not lain with his wife the day before; or, if it be a woman, that fhe have not converfed with her hufband. The Abyffinians have an apartment in their churches for this fervice, being a kind of facrifty. F. Sirmond, in his difquifition on azymous bread, fhows, from the council of Toledo, that anciently there were as many ceremonies ufed in the Latin church in the preparation of their unleavened bread as are ftill retained in the eaftern churches. He cites the example of Queen Radegonda, who diftributed with her own hands, in the church, the bread which fhe herfelf had made. It appears alfo, from the difpute of cardinal Humbert againft the Greeks, that in the Latin church no bread was ufed for the eucharift, but what was taken out of the facrifty, and had been made by the deacons, fubdeacons, and even priefts, who rehearfed feveral pfalms during the procefs.

Ecclefiaftical writers enumerate other fpecies of bread allotted for purpofes of religion; as, 1. *Calendarius*, that anciently offered to the prieft at the kalends. 2. *Prebendarius*, the fame with *capitularis*, that diftibuted daily to each prebendary or canon. 3. *Benedictus*, that ufually given to catechumens before baptifm, in lieu of the eucharift bread, which they were incapable of partaking of. The *panis benedictus* was called alfo *panagium* and *eulogium*, being a fort of bread bleffed and confecrated by the prieft, whereby to prepare the catechumens for the reception of the body of Chrift. The fame was ufed afterwards, not only by catechumens, but by believers themfelves, as a token of their mutual communion and friendfhip. Its origin is dated from the 7th century, at the council at Nantz. In the Gallican church we ftill find *panis benedictus*, *pain benit*, ufed for that offered for benediction, and afterwards diftributed to pious perfons who attend divine fervice in chapels. 4. Confecrated bread is a piece of wax, pafte, or even earth, over which feveral ceremonies have been performed with benedictions, &c. to be fent in an *Agnus Dei*, or relic-box, and prefented for veneration. 5. Unleavened bread, *panis azymus*. The Jews eat no other bread during their paffover; and exact fearch was made in every houfe, to fee that no leavened bread was left. The ufage was introduced in memory of their hafty departure from Egypt, when they had not leifure to bake leavened. 6. Shew-bread was that offered to God every Sabbath-day, being placed on the golden table in the holy of holies.

Horfe-BREAD is made of wheat, oats, and beans; to which fometimes are added anifeed, gentian, liquorice, fenugreek, eggs, and ale; and fometimes rye and white wine are ufed. For race-horfes three forts of bread are ufually given with fuccefs, for the fecond, third, and fourth nights feeding. They are all made of beans and wheat worked with barm; the difference confifting chiefly in the proportion of the two former. In the firft kind, three times the quantity of beans is ufed to one of wheat; in the fecond, equal quantities of both; in the third, three times the quantity of wheat to one of beans.

Sago-BREAD. See SAGO.

Affize of BREAD. By act of parliament, the price and weight of bread are directed to be regulated by the magiftrates according to the price of wheat. We have tables of the weights of the loaves both of wheat, wheaten, and houfehold bread, at every price of wheat. If bread want one ounce in 36, the baker formerly was to fuffer the pillory: now, to forfeit 5s. for every ounce wanting; and for every defect lefs than an ounce, 2s. 6d.; fuch bread being complained of and weighed before a magiftrate within 24 hours after it is baked or expofed to fale within the bills of mortality, or within three days in any other place. It is to be obferved, bread lofes weight by keeping: in fome experiments recited by Bartholine, the diminution was near one fourth in fix months. The fame author affures us, that in Norway they make bread which keeps 30 or 40 years; and that they are there fonder of their old hard bread, than elfewhere of new or foft; fince the older it is, the more agreeable it grows. For their great feafts particular care is taken to have the oldeft bread; fo that, at the chriftening of a child, they have ufually bread which had been baked perhaps at the chriftening of his grandfather. It is made of barley and oatmeal baked between two hollow ftones.

BREAD-*Room*, in a fhip, that room or apartment which is deftined to hold the bread or bifket laid in for the ufe of the crew. The boards of the bread-room fhould be jointed and caulked, and even lined with tin plates or mats. It is alfo proper to warm it well with charcoal for feveral days before the bifket is put into it; fince nothing is more injurious to the bread than moifture.

BREADTH, in geometry, one of the three dimenfions of bodies, which multiplied into their length conftitute a furface.

BREAK, in a general fenfe, fignifies to divide a thing into feveral parts with violence. In the art of war, to *break ground* is to open the trenches before a place. Among fportfmen, to *break a horfe* in trotting is to make him light upon the hand in trotting, in order to make him fit for a gallop. To *break* a horfe for hunting is to fupple him, to make him take the habit of running.

BREAKERS, a name given by failors to thofe billows that break violently over rocks lying under the furface of the fea. They are diftinguifhed both by their appearance and found, as they cover that part of the fea with a perpetual foam, and produce a hoarfe and terrible roaring, very different from what the waves ufually have in a deeper bottom. When a fhip is unhappily driven among breakers, it is hardly poffible to fave her, as every billow that heaves her upwards ferves to dafh her down with additional force when it breaks over the rocks or fands beneath it.

BREAKING, in a mercantile fenfe, denotes the becoming bankrupt. See BANKRUPT.

BREAKING-*Bulk*, in the fea-language, is the beginning to unlade part of the cargo.

BREAM, in ichthyology. See BARBEL.

To BREAM, to burn off the filth, fuch as grafs, ooze, fhells, or fea-weed, from a fhip's bottom, that has gathered to it in a voyage, or by lying long in a harbour. This operation is performed by holding kindled furze, faggots, or fuch materials, to the bottom, fo that the flame incorporating with the pitch, fulphur, &c. that had formerly covered it, immediately loofens and throws off whatever filth may have adhered to the planks. After this, the bottom is covered anew with a compofition of fulphur, tallow, &c. which not only makes it fmooth and flippery, fo as to divide the fluid more readily, but alfo poifons

and destroys those worms which eat through the planks in the course of a voyage. Breaming may be performed either when the ship lies aground after the tide has ebbed from her, or by docking, or by careening.

BREAST, in anatomy, denotes the external and fore-parts of the thorax. See Anatomy. Smiting the breast is one of the expressions of penitence. In the Romish church, the priest beats his breast in rehearsing the general confession at the beginning of the mass.

Breasts, or *Mammæ*, in anatomy. See Anatomy. The breasts in females are usually two; though we also meet with accounts of *trimammiæ* or women with three breasts, and even some with four, all yielding milk alike.

Breast-*Hooks*, in ship building, are thick pieces of timber incurvated into the form of knees, and used to strengthen the fore-part of the ship, where they are placed at different heights directly across the stem, so as to unite it with the bows on each side. The breast-hooks are strongly connected to the stem and hawse-pieces by tree-nails, and by bolts driven from without through the planks and hawse-pieces, and the whole thickness of the breast-hooks, upon whose inside those bolts are fore-locked or clinched upon rings. They are usually about one third thicker, and twice as long, as the knees of the decks they support.

Breast-*Plate*, in antiquity, a piece of armour worn to defend the breast, originally believed to be made of hides, or hemp twisted into small cords, but afterwards made of brass, iron, or other metals, which were sometimes so exquisitely hardened, as to be proof against the greatest force.

Breast-*Plate*, in Jewish antiquity, one part of the priestly vestments anciently worn by the high priests. It was a folded piece of the same rich embroidered stuff of which the *ephod* was made; and it was set with twelve precious stones, on each of which was engraven the name of the tribes. They were set in four rows, three in each row; and were divided from each other by the little golden squares or partitions in which they were set. The names of these stones, and that of the tribes engraven on them, as also their disposition on the breast-plate, are as follows:

Sardine. Reuben.	*Emerald.* Judah.	*Ligure.* Gad.	*Beryl.* Zebulun.
Topaz. Simeon.	*Sapphire.* Dan.	*Agate.* Asher.	*Onyx.* Joseph.
Carbuncle. Levi.	*Diamond.* Naphthali	*Amethyst.* Issachar.	*Jasper.* Benjamin.

This breast-plate was fastened at the four corners; those on the top to each shoulder by a golden hook or ring at the end of a wreathed chain; and those below, to the girdle of the ephod, by two strings or ribbons, which had likewise two rings and hooks. This ornament was never to be severed from the priestly garment; and it was called the *memorial*, to put the high-priest in mind how dear those tribes ought to be to him, whose names he wore on his breast. It is also called the *breast-plate of judgment*, because it had the divine oracle of *Urim and Thummim* annexed to it. See Urim and Thummim.

Breast-*Plate*, in the manege, the strap of leather that runs from one side of the saddle to the other, over the horse's breast, in order to keep the saddle tight, and hinder it from sliding backwards.

Breast-*Work*, in fortification, the same with Parapet.

BREATH, the air inspired and expelled again in the action of respiration. The ancients were very watchful over the last breath of dying persons, which the nearest relations, as the mother, father, brother, or the like, received in their mouths.

BRECHIN, a borough of Scotland, in the county of Angus, seated in a plain, on the N. side of the river South Esk. The Gothic cathedral is partly ruinous, though one of its aisles serves for the parish church. Adjoining to this is a curious antique round tower, composed of hewn stone. It tapers from the bottom, and, is very slender in proportion to its height. Similar towers are to be seen in other parts of the country. The purpose to which they were originally destined is unknown. Here is a manufactory of linen and cotton, and a considerable tannery. Brechin is 35 miles N. E. of Edinburgh. Lon. 2. 18. E. Lat. 56. 40. N.

BRECKNOCK, or Brecon, a town of Brecknockshire in Wales, and capital of the county. It is called by the Welch *Aber-Hondey*, and is seated at the confluence of the rivers Hondey and Usk, over which there is a handsome stone bridge. It is an ancient place, containing three churches, one of which is collegiate, and is seated at the west end of the town. The houses are well built. Here was formerly a stately castle, and a strong wall, through which there were three gates, that are all demolished. It sends one member to parliament. It is well inhabited, which is in some measure owing to its being the town where the assizes are kept; and there is here a considerable woollen-manufactory. The markets are well supplied with cattle, corn, and provisions. W. long. 3. 15. N. lat. 52. 0.

BRECKNOCKSHIRE, a county of Wales, bounded by Radnorshire, on the north; Cardiganshire and Caermarthenshire, on the west; Herefordshire and Monmouthshire, on the east; and by Glamorganshire and Monmouthshire, on the south. It is 35 miles in length, 30 in breadth, and about 100 in circumference. It is surrounded with hills, which renders the air in the valleys pretty temperate. The soil on the hills is very stony, but the streams descending from thence into the valleys render them fruitful both in corn and grass. The chief commodities here are corn, cattle, fish, and otter's fur, besides manufactures of cloth and stockings. The principal rivers are the Usk, the Wye, and the Yrvon. The chief towns are Brecknock, Bealt, and Hay. Two miles to the east of Brecknock is a large lake, called *Brecknock Meer*, and by the Welch *Lhyn Savaddan*; it is two miles in length, and nearly the same in breadth. It contains plenty of otters, tench, perch, and eels. The county sends one member to parliament. It is in the diocese of Landaff, contains 61 parishes, and is divided into six hundreds.

BREDA, a handsome town of Dutch Brabant. The fortifications are strengthened by the waters and morasses near it. The papists are more numerous than the protestants, and have the free exercise of their religion. It has a Dutch garrison; but the property and government belong to the prince of Orange. The great church is a noble structure, with a fine spire, 362 feet high. In 1577, the Spanish garrison delivered this city to the States General; but it was recovered in 1581. In 1590, prince Maurice retook it. In 1625, the great marquis of Spinola, after a memorable siege of ten months, once more reduced it; but, in 1637, the prince of Orange retook it. In Feb. 1793, count Byland surrendered it to the French, after a siege of only three days, but it was retaken soon after. It is seated on the river Merk, 22 miles W. by S. of Bois-le-duc, 22 N. E. of Bergen-op-zoom, 25 N. N. E. of Antwerp, and 60 S. of Amsterdam. Lon. 4. 50. E. Lat. 51. 35. N.

BREDA (John Van), painter of history, landscape, and conversations, was born at Antwerp in 1683, the son of Alexander Van Breda, an artist who was much esteemed for landscapes, views of particular scenes in Italy, fairs, and markets, with a variety of animals and figures. He was instructed by

his father; and having the advantage of a good example and a good director, added to his own great application, he continued his ſtudies with his father till he was 18 years of age. Among the variety of capital paintings which were at that time in the poſſeſſion of John de Wit at Antwerp, Breda fixed upon thoſe of Velvet Breugel, which he copied with extraordinary ſucceſs; and he was alſo employed for nine years in copying the pictures of ſeveral other great maſters; which he performed with ſuch incredible exactneſs as ſcarcely to leave it in the power of any judicious perſon to diſtinguiſh the originals from the copies. Having at length eſtabliſhed his reputation in Holland, he went to London with Ryſbrack the ſculptor, and there gradually roſe into ſuch eſteem that he was viſited by perſons of the higheſt rank, and particularly patroniſed by the unfortunate earl of Derwentwater, who was beheaded for rebellion in 1715. He found ſo much encouragement in London, that he was employed by the court and the nobility, and could ſcarcely execute the large demands for his performances. After a reſidence of ſome years in England, he returned to Antwerp loaded with riches, the honourable teſtimonies of Engliſh liberality, as well as of his own merit; and in the year 1746, when Louis XIV. arrived in that city, he ſo far honoured this maſter as to purchaſe four of his pictures. One repreſented Chriſt at the ſea of Tiberias; another, Chriſt performing miracles; and the other two were landſcapes, with a number of figures, ſo exquiſitely drawn and finiſhed that it would be difficult to diſtinguiſh them from thoſe of Velvet Breugel. He certainly approached nearer to thoſe great maſters whoſe manner he imitated, namely Breugel and Wouwermans, than any other artiſt of his time. His landſcapes are in the ſtyle and taſte of the former, and his converſations, hiſtorical figures, fairs, ſkirmiſhes, or battles, are in the manner of the latter. His colouring is good; his touch neat; his ſkies and diſtances natural and beautiful; and his taſte of deſign agreeable. He had as much fire in his compoſition, and perhaps more genius, than Breugel, in thoſe ſubjects which he painted in the ſtyle of that maſter; his figures are generally well placed, his grounds ſkilfully broken; every ſmall figure has its particular character, and occupies its proper place; and, in ſhort, he is a painter of ſuch a rank, that the value and eſtimation of his works muſt always increaſe. He died in 1750.

BREECH of a gun, the end next the touch-hole.

BREECHES, a garment, part of the dreſs of moſt Europeans, worn by males, reaching from the waiſt to the knees, and ſerving to cover the hips, thighs, &c. The ancient Romans had nothing in their dreſs which was anſwerable to our breeches and ſtockings. Inſtead of theſe, under their lower tunics and waiſtcoat they ſometimes bound their thighs and legs round with ſilken ſcarves or faſciæ, called *tibialia* and *femoralia*. Breeches appear to be a habit peculiar to the barbarous nations inhabiting the colder countries of the north; whence Tacitus calls them *barbarum tegmen*. We find mention made of them among the ancient Getæ, Sarmatæ, Gauls, Germans, and Britons; they alſo obtained among the Medes and Perſians, as being a people of Scythian origin: they alſo afterwards got footing in Italy, ſome pretend as early as the time of Auguſtus; but without much foundation, that emperor's breeches, mentioned by Suetonius, being apparently only ſwaths tied over his thighs. However this be, breeches were at laſt received into Italy, and grew ſo highly into faſhion, that it was thought neceſſary, under Honorius and Arcadius, to reſtrain them by law, and expel the *bracarii* or breeches-makers out of the city; it being thought unworthy of a nation that commanded the world, to wear the apparel of barbarians. The Scots are the only inhabitants of Britain that reject this article of our dreſs.

BREECHINGS, in the ſea-language, the ropes with which the great guns are laſhed or faſtened to the ſhip's ſide. They are thus called, becauſe made to paſs round the breech of the gun.

BREEDING, in a general ſenſe, the producing, nouriſhing, and educating, all manner of young animals. In a moral ſenſe, it denotes a perſon's deportment or behaviour in the external offices and decorums of ſocial life. In this ſenſe we ſay *well-bred*, *ill-bred*, *a man of breeding*, &c. Good-breeding, though hard to define, amounts to much the ſame with what among us is otherwiſe called *politeneſs*, and among the ancient Romans, *urbanity*. Good-breeding is near to virtue, and will of itſelf lead a man a great part of the way towards the ſame. It teaches him to rejoice in acts of civility, to ſeek out objects of compaſſion, and to be pleaſed with every occaſion of doing them ſervice.

Breeding *of Horſes*. See the article Barb.

Breeding *of Fiſh*. The neceſſary qualities of a pond, to make it ſerve well for breeding fiſh, are very different from thoſe which are to make it ſerve for the feeding of them, inſomuch that ſome particular ponds ſerve only for one of theſe purpoſes, and others for the other; and ſcarce ever the ſame pond is found to anſwer for both. In general, it is much more rare to find a good breeding pond than a good feeding one. The beſt indications of a good breeding pond are theſe; that there be a good quantity of ruſhes and graſs about its ſides, with gravelly ſhoals, ſuch as horſe-ponds uſually have. The ſpawn of fiſh is prodigious in quantity; and where it ſucceeds, one fiſh is able to produce ſome millions: thus, in one of theſe breeding ponds, two or three melters, and as many ſpawners, will, in a very little time, ſtock the whole country. When theſe ponds are not meant entirely for breeding, but the owner wiſhes to have the fiſh grow to ſome ſize in them, the method is to thin their numbers; for they would otherwiſe ſtarve one another. It may alſo be neceſſary to put in other fiſh that will prey upon the young, and thin them in the quickeſt manner. Eels and perch are the moſt uſeful on this account; becauſe they prey not only upon the ſpawn itſelf, but upon the young fry from the firſt hatching to the time they are of a conſiderable ſize. Some fiſh are obſerved to breed indifferently in all kinds of waters, and that in conſiderable plenty; of this nature are the roach, pike, and perch.

BREENBERG (Bartholomew), an excellent painter, was born in 1620. He is beſt known by the name of *Bartolomeo*, an appellation beſtowed upon him, for diſtinction ſake, by the ſociety of Flemiſh painters at Rome called *Bentvogels*. He was born at Utrecht; but in the early part of his life went to Rome. His ſtudies in the art of painting were attended with ſuch ſucceſs, that his pictures were held in the higheſt eſtimation. He greatly excelled in landſcapes, and theſe he enriched with hiſtorical ſubjects. The figures and animals which he introduced were very ſpirited, and drawn in a maſterly manner; eſpecially when they were not larger than the ſize in which he uſually painted them. He died in 1660, aged 40 years. He alſo etched from his own deſigns a ſet of 24 *Views and Landſcapes, ornamented with Ruins*.

BREEZE, a ſhifting wind that blows from ſea or land for ſome certain hours in the day or night: common in Africa and ſome parts of the Eaſt and Weſt Indies. Breezes differ from *eteſiæ* or trade-winds, as the former are diurnal, or have their periods each day; and the latter are anniverſary, and blow at a diſtance from land. The ſea-breezes rule by day, and the land-breezes by night; ſo that, dividing their empire, they remain conſtant as the ſeaſons of the year, or courſe of the ſun, on which they ſeem to depend: not but that they appear ſooner or later, ſtronger or weaker, in ſome places than in others; and vary the alternative according to the ſeveral lati-

tudes, ſituations and ſoils, &c. of the countries where they are found. See the article WIND.

BREEZE-*Fly*. See TABANUS.

BREGENTZ, or BERGENTZ, a town of Tyrol in Germany, ſituated at the eaſt end of the lake of Conſtance, in E. long. 9. 40. N. lat. 47. 36.

BREGMA, or OS BREGMATIS, in anatomy, one of the bones of the ſkull. See ANATOMY.

BREHAR, one of the Scilly iſlands, lying almoſt directly weſt of the land's end in Cornwall, about the diſtance of 30 miles. It lies between the iſles of Micarlo, Guel, Treſcaw, and Sampſon. It is the rougheſt and moſt mountainous of them all, and not many years ſince, there were only two families in it, but now there are 13. There are a few poor houſes, called the *town of Brebar*; and there are ſeveral BARROWS edged with ſtone, in which they buried conſiderable perſons in ancient times; beſides many monuments of the DRUIDS. Some are of opinion, that this with the reſt made but one iſland, which is the reaſon why ſo many antiquities are now found in moſt of them.

BREHONS, the provincial judges among the ancient Iriſh, by whom juſtice was adminiſtered, and controverſies decided. Theſe ſages were a diſtinct tribe or family, to whom competent lands were allowed in inheritance. In criminal caſes the brehon had the eleventh part of all the fines; which could not but be conſiderable at a time when murders, rapes, robberies, and the like offences, were only ſubject to pecuniary commutations.

BREHON-*Laws*, or *Leges Brehonicæ*, denote the general maxims or rules of law obſerved by the brehons, and having the force of laws throughout all the provinces of Ireland. Several fragments of the *leges brehonicæ* are ſtill extant in public and private libraries. The moſt complete collection is that belonging to the duke of Chandos; containing 22½ ſheets cloſe written, full of abbreviated words, and not very legible. By the ſtatute of Kilkenny, made under Edward III. it is enacted that no Engliſh ſubject ſhall ſubmit to a trial by the *brehon* law, on the penalty of high treaſon. Notwithſtanding which, many were ſtill under a neceſſity of being directed by the Iriſh laws and cuſtoms, till the whole kingdom was ſettled on an Engliſh foundation by king James I.

BREMEGARTON, a handſome and pretty conſiderable town of Swiſſerland, in the territory of Fyen-Aempter, between the cantons of Zurich and Bern. The inhabitants deal chiefly in paper; and their religion is the Roman-catholic. It is divided into the upper and larger towns, and is very advantageouſly ſeated on the river Ruſs. E. long. 8. 25. N. lat. 47. 20.

BREMEN, a large, populous, and very ſtrong town of Germany, capital of a duchy of the ſame name, with an archbiſhop's ſee, ſecularized in favour of the Swedes, but now belonging to the elector of Hanover. The river Weſer runs through the middle, and divides it into the old and new town. In 1739, while the inhabitants were aſleep, the magazine of powder was ſet on fire by lightning; and all the houſes were ſhook, as if there had been a violent earthquake, which threw them into a terrible conſternation. This town is divided into four quarters, each of which has a burgomaſter; and in the middle there is a large market-place, with the ſtatue of Rolando. Bremen carries on a very large trade for iron, flax, hemp, and linen, with France, England, Spain, and Portugal, and in return takes back other proviſions, with which it ſupplies Weſtphalia and the countries about Hanover. It alſo gets a great deal by its fiſheries; the trade for blubber with the ſouth of Germany is very conſiderable. E. long. 8. 45. N. lat. 53. 40.

BREMEN, a duchy of Germany, in the province of Lower Saxony, lying between the rivers Weſer and the Elbe; of which the former ſeparates it from the duchy of Oldenburg, and the other from that of Holſtein. The air is cold; but the country is fertile, and well peopled. It formerly belonged to the Swedes, but was afterwards ſold to the king of Great Britain, as elector of Hanover, in 1716. In the winter it is ſubject to inundations. In 1617, on Chriſtmas-day, ſeveral thouſand cattle were drowned, beſides ſeveral hundred perſons; and the country was ſo covered with water, that it has coſt immenſe ſums to repair the dykes. Bremen is the capital town.

BREMEN-*Veerd*, a town of Germany in the circle of Lower Saxony, and duchy of Bremen. It is an open town, ſeated on the river Ooſt, and was formerly the place of reſidence of the archbiſhop. E. long. 8. 35. N. lat. 53. 58.

BRENNAGE, BRENNAGIUM, in middle-age writers, a kind of tribute paid in lieu of bran, or bran itſelf, which the tenants were obliged to furniſh for the ſupport of the lord's hounds. The word is alſo written *brenage*, *brenagium*, and *brenaige*, *bernagium*, *brenaticum*, and *brennaticum*.

BRENNUS, a celebrated captain among the Gauls, who, about 388 years before the Chriſtian æra, entered Italy with a powerful army; made great conqueſts there; defeated the Romans; and ſacked Rome. The capital alone was defended; and Camillus coming to its relief, drove the Gauls not only out of Rome, but out of all Italy.

BRENT, a town of Devonſhire, with a market on Saturdays, and two fairs, on May 13th and October 10th, for horned cattle. It is but a ſmall place, and lies on the road from Exeter to Plymouth, being 26 miles ſouth-weſt from the former, and 198 weſt-by-ſouth of London. W. long. 5. 7. N. lat. 50. 30.

BRENT *Gooſe*, a ſpecies of gooſe with a black neck, and a white collar round; uſually confounded with the barnacle, though in reality a diſtinct ſpecies. See ANAS.

BRENTFORD, a town of Middleſex, in the great London road to the weſt. It is divided into Old and New Brentford, in which laſt are the church and market-houſe, and where the county elections are held. It is a long place, well ſtocked with public houſes, and is ſeated on the river Thames, in W. long. 0. 10. N. lat. 51. 26.

BRENTWOOD, or BURNTWOOD, a town of Eſſex in England; it ſtands on a riſing ground in the road from London to Colcheſter, and has ſeveral good inns. E. long. 0. 25. N. lat. 51. 38.

BREREWOOD (Edward), a very learned Engliſh mathematician and antiquary, was the ſon of Robert Brerewood a tradeſman, who was thrice mayor of Cheſter; and born in that city in the year 1565. He was educated in grammar learning at the free ſchool in Cheſter; and afterwards admitted, in 1581, of Brazen-noſe-college in Oxford. In the year 1596 he became the firſt profeſſor of aſtronomy in Greſham-college in London; where he led the ſame private and retired courſe of life that he had before done in Oxford. He died there of a fever, upon the 4th of November 1613, much lamented. He was a great ſearcher into antiquity and curious knowledge; but is remarkable for having never publiſhed any thing during his life-time. After his death came out the following works. 1. *De ponderibus et pretiis veterum nummorum.* 2. Inquiries touching the diverſities of languages and religion through the chief parts of the world. 3. *Elementa logicæ in gratiam ſtudioſæ juventutis in Acad. Oxon.* 4. *Tractatus quidam logici.* 5. 6. Two treatiſes on the Sabbath. 7. *Tractatus duo, quorum primus eſt de meteoris, ſecundus de oculo.* 8. *Commentarii in ethica Ariſtotelis.* Mr. Wood tells us, that the original manuſcript of this, written with his own hand, is in the ſmalleſt and neateſt characters that his eyes ever beheld; and that it was finiſhed by him on the 17th of October 1586. 9. Patriarchal government of the ancient church.

BRESCIA, a ſtrong and handſome town of Italy, with a biſhop's ſee and a good citadel. It is the capital of Breſciano in the territory of Venice, and is ſeated in an agreeable plain on the river Garza, in E. long. 10. 5. N. lat. 45. 31.

BRESCIANO, a province of Italy in the territory of Venice; bounded on the north, by the Griſons and the biſhopric of Trent; on the eaſt, by the lake Garda, the Veroneſe, and the duchy of Mantua; on the ſouth, by the duchy of Mantua and the Cremoneſe; and on the weſt, by the Creſmaſco, the Burgomaſco, and the Valtelina. It is watered by ſeveral ſmall rivers, which render it very fertile; and is full of towns and villages, of which Breſcia is the capital.

BRESELLO, a ſmall town in Italy, of the duchy of Modena, ſeated on the river Po, in E. long. 10. 25. N. lat. 44. 55.

BRESCICATE, in commerce, a kind of bays, of which there is ſome trade carried on with the negroes, between the river Gambia and Sierra Leone. The beſt ſorts for that purpoſe are the blue and the red.

BRESLAU, a ſmall duchy of Lower Sileſia, in Germany, lying between thoſe of Wolaw, Olſſe, Brieg, Schwednitz, and Lignitz. It is every where level and flat; is an excellent corn country, yielding alſo good paſture; abounding too with herds of cattle and flocks of ſheep; but deſtitute of wood, except in one diſtrict or circle; and the roads in general are very bad. It is an immediate principality, that is, one of which both the property and juriſdiction belong to the king, forming a part of one of the three bailiwicks into which all the immediate principalities are divided.

Breslau, the chief town of the duchy of that name, and of all Sileſia, is ſituated at the conflux of the Oder and Ohlau, in E. long. 17. 5. N. lat. 51. 4. Including the ſuburbs, it is of great extent; having many large regular ſquares, broad ſtreets, ſtately public and private edifices; but the fortifications are of no great importance. Breſlau is very populous, and much frequented by Hungarian, Bohemian, Poliſh, and other merchants, having ſeveral yearly fairs. The city was taken by the king of Pruſſia in 1741, and retaken by the Auſtrians in 1757; but the king of Pruſſia took it back again the ſame year, and gained a ſignal victory over the Auſtrians at Leuthen, a village not far from the capital.

BRESSE, a late province of France, bounded on the N. by Burgundy and Franche Comté, on the E. by Savoy, on the S. by the Viennois, and on the W. by the Lyonois. It now forms the department of Ain.

BRESSICI, in geography. See Breste.

BREST, a maritime town of France, in the department of Finiſterre and late province of Brittany, with the beſt harbour in France, and a caſtle ſeated on a craggy rock by the ſea-ſide. The ſtreets are narrow, crooked, and all upon a declivity. The quay is above a mile in length. The arſenal was built by Lewis XIV. whoſe ſucceſſor eſtabliſhed a marine academy here in 1752; and, as this is the principal port for the French navy, it has every other accommodation for the marine ſervice. The Engliſh attempted in vain to take this place in 1694. It is 30 miles S. E. of Morlaix, and 325 N. of Paris. Lon. 4. 26. W. Lat. 48. 23. N.

Brest, or *Breaſt*, in architecture, a term ſometimes uſed for the member of a column, more uſually called *torus*. See Torus in plate 25.

Brest-*Summers*, in timber buildings, are pieces in the outward thereof, into which the girders are framed: this, in the ground-floor, is called a *cell*; and, in the garret-floor, a *beam*.—As to their ſize, it is the ſame with that of girders. See Girders.

BRESTE, the palatinate of, is one of the provinces of Cujava, in Poland. It lies between the palatinates of Plocſko, Rava, and Lencici Wiadiſlaw. It is divided into four chatelanies, and Breſte is the capital of the whole.

Breste, or *Breſſici*, the capital of the palatinate of Breſſici, and of Poleſia, in Poland, ſeated on the river Bog, 80 miles eaſt of Warſaw, and ſubject to Poland. It is a fortified town, and has a caſtle built upon a rock. Here is a famous ſynagogue, reſorted to by the Jews from all the countries in Europe. E. long. 24. 0. N. lat. 41. 35.

BRET, a name the people on the coaſts of Lincolnſhire give to the common turbot, a fiſh extremely plentiful with them, and taken in vaſt abundance. The way of catching them is in a net trailed on the ground by two horſes; the one going up to the middle of his body in water, the other on ſhore.

BRETESSE, in heraldry, denotes a line embattled on both ſides.

BRETHREN and sisters *of the free ſpirit*; in Eccleſiaſtical Hiſtory, an appellation aſſumed by a ſect which ſprung up towards the cloſe of the thirteenth century, and gained many adherents in Italy, France, and Germany. They took their denomination from the words of St. Paul, Rom. chap. viii. ver. 2, 14. and maintained, that the true children of God were inveſted with the privilege of a full and perfect freedom from the juriſdiction of the law. They were enthuſiaſts to a degree of diſtraction, both in their principles and practice. They reſembled the *Begbards*, by which name they were ſometimes called, in their aſpect, apparel, and manner of living. Some of their profeſſed principles reſembled thoſe of the Pantheiſts; for they held, that all things flowed by emanation from God; that rational ſouls were portions of the Deity; that the univerſe was God; and that, by the power of contemplation, they were united to the Deity, and acquired hereby a glorious and ſublime liberty, both from the ſinful luſts and the common inſtincts of nature. And hence they conclude, that the perſon, who was thus abſorbed in the abyſs of the Deity, became a part of the Godhead, and was the ſon of God, in the ſame ſenſe and manner that Chriſt was, and that he was freed from the obligation of all laws human and divine. They treated with contempt all Chriſtian ordinances, and all external acts of religion, as unſuitable to the ſtate of perfection at which they were arrived. Some of them were honeſt but deluded enthuſiaſts; and they endured the torments inflicted upon them by the inquiſitors with aſtoniſhing calmneſs and triumph. Others proceeded to the moſt extravagant licentiouſneſs of conduct. They held their ſecret aſſemblies ſtark naked, and lay in the ſame beds with their ſpiritual ſiſters, and indiſcriminately with other women, without the leaſt ſcruple or heſitation: modeſty and decency being, according to their creed, marks of inward corruption. Some of them proceeded ſtill farther, and maintained, that the *divine man*, or believer, could not ſin, let his conduct be ever ſo horrible or atrocious. Many edicts were publiſhed againſt them; but notwithſtanding the ſeverities they ſuffered, they continued till about the middle of the fifteenth century. They were called by ſeveral other names, ſuch as Schweſtriones, Picards, Adamites, and Turlupins.

Brethren *and Clerks of the Common Life*, a denomination aſſumed by a religious fraternity towards the latter end of the fifteenth century. They lived under the rule of St. Auguſtin, and were eminently uſeful in promoting the cauſe of religion and learning. Their ſociety was firſt formed, in the preceding century, by Gerard de Groote, a native of Deventer; but did not flouriſh till about the period above mentioned, when it obtained the approbation of the council of Conſtance, and became very reſpectable in Holland, the Lower Germany, and the adjacent provinces. It was divided into two claſſes; the *lettered brethren* or *clerks*, and the *illiterate*: they lived in ſeparate habitations, but maintained the cloſeſt fraternal union.

The former applied to the ftudy of polite literature, and the education of youth; whilft the latter were employed in manual labour, and the mechanic arts. They were frequently called *Begbards* and *Lollards*, by way of reproach.

White Brethren, *fratres albati*, were the followers of a leader about the beginning of the fifteenth century, who was arrayed in a white garment; and as they were alfo clothed in white linen, they were diftinguifhed by this title. Their leader was a prieft from the Alps, who carried about a crofs, like a ftandard, and whofe apparent fanctity and devotion drew together a number of followers. The deluded enthufiaft practifed many acts of mortification and penance, endeavoured to perfuade the European nations to renew the holy war, and pretended that he was favoured with divine vifions. Boniface IX. ordered him to be apprehended and committed to the flames; upon which his followers made their efcape.

BRETON, or Cape-Breton, an ifland of N. America, between 45 and 47 degrees of N. latitude. It is feparated from Nova Scotia by a narrow ftrait, called Canfo, and is about 100 miles in length, and 50 in breadth. It is a barren country, producing little corn or grafs, and fubject to fogs throughout the year. It is covered with fnow in the winter, and is exceffively cold. There is an excellent fifhery on this coaft. It was taken by the Englifh in 1745, and reftored to the French in 1748. It was again taken by the Englifh in 1758, and was confirmed to England by treaty in 1763. The capital is *Louifburg*.

BRETTIGAW, a territory or valley of the Grifons, lying between the Rhine and the county of Tyrol, and along the river Lanquet. The fortrefs of Caftels is the principal town.

BREVE, in law, is any writ directed to the chancellor, judges, fheriffs, or other officers, whereby a perfon is fummoned, or attached, to anfwer in the king's court, &c.

Breve *Perquirere*, the purchafing of a writ or licence for trial in the king's courts; whence comes the prefent ufe of paying 6s. 8d. fine to the king in fuit, for money due on bond, where the debt is 40l., and of 10s. where it is 100l., &c.

Breve *de Recto* is a writ of right, or licence, for a perfon ejected, to fue for the poffeffion of the eftate detained from him.

Breve, in mufic, a note or character of time, in the form of a diamond or fquare, without any tail, and equivalent to two meafures or minims.

BREVET, in the former French cuftoms, denoted the grant of fome favour or donation from the king: in this fenfe it was partly anfwerable to our warrant, and partly to letters-patent.

Brevet more particularly denotes the commiffion of a fubaltern officer, being only written on parchment, and without feal. A brevet officer is one whofe rank in the army is above his pay: for inftance, a brevet-major, though he ranks as a field officer in the army, ferves only as a captain in his own regiment, and receives pay as fuch.

BREUGEL (Peter), an eminent painter, commonly called *Old Breugel*, to diftinguifh him from his fon, was born at a village of the fame name near Breda, in the year 1565; and was the firft pupil of Peter Cock, whofe daughter he married. It was cuftomary with him to drefs like a countryman, in order to be more eafily admitted into the company of country people, and be allowed to join in their frolics, by which means he became perfectly acquainted with their manners and geftures, of which he made excellent ufe in his pictures. He travelled to France and Italy, and for a long time ftudied landfcapes on the mountains of Tyrol. His humourous turn of mind difplayed itfelf in all his pictures, which generally confifted of country dances, marriages, fports, and diverfion; though he fometimes painted the hiftorical parts of the holy Scriptures. On his return from Italy, he fettled at Antwerp, and in his laft illnefs caufed his wife to gather together all the immodeft pieces which his licentious fancy had led him to paint, and burn them before his face. He died at Antwerp about the year 1750. Of the works of old Breugel, the great duke of Tufcany has, Chrift carrying his crofs, with a great number of figures; and a country feaft. The emperor has the tower of Babel, the maffacre of the Innocents, and the converfion of St. Paul, of his painting: the elector Palatine, a landfcape, with St. Philip baptizing queen Candace's eunuch; and St. John preaching in the wildernefs, with a great many figures. Old Breugel alfo, for his amufement, is faid to have engraved fome few plates of landfcapes and grotefque fubjects.

Breugel (Peter), the younger, was the fon of the above-mentioned artift, and named *Hellifh Breugel*, from the horrible fubjects he delighted to reprefent. He engraved alfo, according to M. Heineken; but his works are not fpecified. He died in 1642.

Breugel (John), commonly called *Velvet Breugel*, from his generally wearing velvet clothes, was the fon of Peter Breugel, and born about the year 1575. He firft applied himfelf to painting flowers and fruit, in which he excelled; and afterwards had great fuccefs in drawing landfcapes, and views of the fea, fet off with fmall figures. He lived long at Cologne, where he acquired great reputation. He travelled to Italy, where his fame had got before him; and where his fine landfcapes, adorned with fmall figures fuperior to thofe of his father, gave very great fatisfaction. If a good judgment may be formed from the great number of pictures he left behind him, all highly finifhed, he muft have been exceedingly induftrious. Nor did he fatisfy himfelf with embellifhing his own works only, but was very ufeful in this refpect to his friends. Even Rubens made ufe of Breugel's hand in the landfcape-part of feveral of his fmall pictures, fuch as his Vertumnus and Pomona: the fatyr viewing the fleeping nymph; and the terreftrial paradife, which is looked upon as his mafter-piece. He died in 1642.—Several of his works are to be feen in the archbifhop's gallery at Milan; particularly a hunting-piece with a vaft many figures: a landfcape reprefenting a defert, with the picture of St. Hierom painted by Cerano, alias Gro Baptifta Crefpi. In the Ambrofian library are 20 pieces of this mafterly hand; particularly Daniel in the lion's den, the infide of the great church at Antwerp, the four feafons on copper, and the burning of Gomorrha. In the poffeffion of the elector Palatine at Dufleldorp, Chrift preaching on the fea-fhore; a country dance; a fea-port, with a great many figures, a coach and two chariots, with a multitude of figures and animals; a landfcape, wherein Flora is crowned by a nymph; St. John preaching in the wildernefs; a fmall fea-landfcape, and feveral other pieces. In the poffeffion of the king of France, a woman playing with a dog, the battle between Alexander and Darius, both in wood; Orpheus in hell, &c.

BREVIARY, a daily office, or book of divine fervice, in the Romifh church. It is compofed of matins, lauds, firft, third, fixth, and ninth vefpers, and the compline or poft-communio. The breviary of Rome is general, and may be ufed in all places; but on the model of this various others have been built, appropriated to each diocefe, and each order of religious. The breviary of the Greeks is the fame in almoft all churches and monafteries that follow the Greek rites: the Greeks divide the pfalter into 20 parts. In general, the Greek breviary confifts of two parts; the one containing the office for the evening, the other that of the morning, divided into matins, lauds, firft, third, fixth, and ninth vefpers, and the compline; that is, of feven different hours, on account of that faying of David, *Septies in die laudem dixi tibi*.

The inftitution of the breviary is not of very ancient date. There have been inferted in it the lives of the faints, full of ridiculous and ill-attefted ftories, which gave occafion to feveral reformations of it by feveral councils, particularly thofe of Trent and Cologne; by feveral popes, particularly Pius V. Clement VIII. and Urban VIII.; and alfo by feveral cardinals and bifhops, each lopping off fome extravagances, and bringing it nearer to the fimplicity of the primitive offices. Originally, every body was obliged to recite the breviary every day; but by degrees the obligation was reduced to the clergy only, who are enjoined, under penalty of mortal fin and ecclefiaftical cenfures, to recite it at home, when they cannot attend in public. In the 14th century, there was particular referve granted in favour of bifhops, who were allowed, on extraordinary occafions, to pafs three days without rehearfing the breviary.

This office was originally called *curfus*; and afterwards, the *breviarium*; which latter name imports that the old office was abridged; or rather, that this collection is a kind of abridgement of all the prayers. The breviaries now in ufe are innumerable; the difference between them confifts principally in the number and order of pfalms, hymns, paternofters, ave-Maries, creeds, magnificates, &c. &c.

Breviary, in Roman antiquity, a book firft introduced by Auguftus, containing an account of the application of the public money.

BREVIATOR, an officer under the eaftern empire, whofe bufinefs it was to write and tranflate briefs.—At Rome thofe are ftyled *breviators*, or *abbreviators*, who dictate and draw up the pope's briefs.

BREVIBUS, a rotulis liberandis, a writ or command to a fheriff to deliver to his fucceffor, the county, with the appurtenances, and the rolls, writs, and other things belonging to his office.

BREVIER, among printers, a fmall kind of type or letter between bourgeois and minion.

This line is a Specimen.

BREVITY, in a general fenfe, that which denominates a thing brief or fhort. In fpeaking of the ftyle or compofition of a difcourfe, brevity is by fome called *brachylogia* and *breviloquentia*; fometimes *laconifmus*. Tacitus and Perfius are remarkable for the brevity of their ftyle. There are two kinds of brevity, one arifing from drynefs, poverty, and narrownefs of genius; the other from judgment and reflection; which latter alone is laudable. Brevity is fo effential to a tale, a fong, and an epigram, that without it they neceffarily languifh, and become dull. Rhetoricians make brevity one of the principal marks or conditions of eloquence; but the rules they prefcribe for attaining it are difficult to apply, fo as ftill to keep the due medium between too much and too little. A juft brevity is attained by ufing all the words which are neceffary, and none but thofe which are neceffary. Sometimes it may alfo be had, by choofing a word which has the force of feveral. It is this laft kind which Quintilian admires fo much in Salluft; and the imitation of which, by other writers, has caufed fo much obfcurity.

BREVIUM Custos. See Custos.

BREVORDT, a town of Guelderland, in the United Netherlands, fituated in E. long. 6. 35. N. lat. 52. 0.

BREWER (Anthony), a dramatic poet who flourifhed in the reign of king Charles I. and appears to have been held in high eftimation by the wits of that time, as may be more particularly gathered from an elegant compliment paid to him in a poem, called *Steps to Parnaffus*, wherein he is fuppofed to have a magic power to call the mufes to his affiftance, and is even fet on an equality with the immortal Shakefpeare himfelf. There are, however, great difputes among the feveral writers as to the number of his works. Thofe which have been afcribed to him with any certainty are, 1. The country girl, a comedy. 2. The love-fick king, a comedy. And, 3. *Lingua*: a piece in regard to which Winftanley records a remarkable anecdote, which points it out to have been in fome meafure the innocent caufe of thofe troubles that difturbed the peace of thefe realms in the middle of the 17th century. He tells us, that when this play was acted at Cambridge, Oliver Cromwell (then a youth) acted a part in it. The fubftance of the piece is a contention among the Senfes for a crown which Lingua had laid for them to find. The part allotted to young Cromwell was that of *Tactus* or Touch; who having obtained the contefted coronet, makes this fpirited declamation:

> Rofes and bays, pack hence! this crown and robe
> My brows and body circles and invefts:
> How gallantly it fits me! fure the flave
> Meafur'd my head who wrought this coronet.—
> They lie that fay complexions cannot change!
> My blood's ennobled, and I am transform'd
> Unto the facred temper of a king.
> Methinks I hear my noble parafites
> Styling me *Cæfar*, or Great *Alexander*,
> Licking my feet, &c.

It is faid that he felt the whole part fo warmly, and more efpecially the above-quoted fpeech, that it was what firft fired his foul with ambition, and excited him from the profeffion of an imaginary crown to ftretch his views to that of a real one.

Brewer, a perfon who profeffes the art of brewing. There are companies of brewers in moft capital cities; that of London was incorporated in 1427 by Henry VI. The apparatus and utenfils of a brewhoufe are, A furnace made clofe and hollow for faving fuel, and for difcharging the fmoke left it taint the liquor; a copper; a mafh-vat near the head; a cooler near the mafh-vat; and a guile-vat under the cooler. Adjoining to all feveral clean tubs, to receive the worts and liquor, are required.

Brewers-Haven, a good harbour at the north end of the ifland of Chiloe on the coaft of Chili, in South America, and in the South Sea. The Dutch landed forces here in 1643, defigning to get poffeffion of fome part of Chili; but they were driven from thence by the Spaniards and the natives. W. long. 82. S. lat. 42.

BREWING, the operation of preparing ale or beer from Malt. Though the art of brewing is a part of chemiftry, and certainly depends on fixed and invariable principles, as well as every other branch of that fcience, thefe principles have never yet been thoroughly inveftigated. For want of a fettled theory, therefore, the practice of this art is found to fucceed with fome, whilft with others it is unfuccefsful. Some few hints, however, to eftablifh a regular theory of brewing, we fhall here detail for the information of thofe who are unacquainted with the fubject.

The ufual procefs of brewing is as follows: A quantity of water being boiled, is left to cool till the height of the fteam be over; when fo much is poured to a quantity of malt in the mafhing-tub, as makes it of a confiftence ftiff enough to be juft well rowed up. After ftanding thus for a quarter of an hour, a fecond quantity of water is added, and rowed up as before. Laftly, the full quantity of water is added; and that in proportion as the liquor is intended to be ftrong or weak.—This part of the operation is called *mafhing*.—The whole now ftands two or three hours, more or lefs, according to the ftrength of the wort or the difference of weather, and is then drawn off into a receiver; and the mafhing repeated for a fecond wort, in the fame manner as for the firft, only the water muft be cooler than before, and muft not ftand above half the

time. The two worts are then to be mixed, the intended quantity of hops added, and the liquor close covered up, and gently boiled in a copper for the space of an hour or two; then let into the receiver, and the hops strained from it into the coolers. When cool, the barm or yeast is applied; and it is left to work or ferment till it be fit to tun up. For small beer there is a third mashing with the water nearly cold, and not left to stand above three quarters of an hour; to be then hopped and boiled at discretion. For double beer or ale, the liquors resulting from the two first mashings must be used as liquor for a third mashing of fresh malt.

From considering this process, and the multiplicity of circumstances to be attended to in it, we cannot but see that it must be a very precarious one. The success of the operation, *i. e.* the goodness of the beer, must depend upon the quality of the malt from which it is made; on that of the water with which it is infused; on the degree of heat applied in the infusion; on the length of time the infusion is continued; on the proper degree of boiling; on the quantity and quality of the hops employed; on the proper degree of fermentation, &c.: all which, as was just now observed, have never yet been thoroughly made out.

"The process of making malt (says Mr. Richardson in his Theoretic Hints on Brewing, &c.) is an artificial or forced vegetation, in which the nearer we approach the footsteps of nature in her ordinary progress, the more certainly shall we arrive at that perfection of which the subject is capable. The farmer prefers a dry season to sow his corn in, that the common moisture of the earth may but gently insinuate itself into the pores of the grain, and thence gradually dispose it for the reception of the future shower, and the action of vegetation. The maltster cannot proceed by such slow degrees, but makes an immersion in water a substitute for the moisture of the earth, where a few hours infusion is equal to many days employed in the ordinary course of vegetation; and the corn is accordingly removed as soon as it appears fully saturated, lest a solution, and consequently a destruction of some of its parts, should be the effect of a longer continuance in water, instead of that separation which is begun by this introduction of aqueous particles into the body of the grain.

"Were it to be spread thin after this removal, it would become dry, and no vegetation would ensue; but being thrown into the couch, a kind of vegetative fermentation commences, which generates heat, and produces the first appearance of germination. This state of the barley is nearly the same with that of many days continuance in the earth after sowing: but being in so large a body, it requires occasionally to be turned over, and spread thinner; the former, to give the outward parts of the heap their share of the required warmth and moisture, both of which are lessened by exposure to the air; the latter, to prevent the progress of the vegetative to the putrefactive fermentation, which would be the consequence of suffering it to proceed beyond a certain degree.

"To supply the moisture thus continually decreasing by evaporation and consumption, an occasional but sparing sprinkling of water should be given to the flour, to recruit the languishing powers of vegetation, and imitate the shower upon the cornfield. But this should not be too often repeated; for, as in the field, too much rain, and too little sun, produce rank stems and thin ears, so here would too much water, and of course too little dry warmth, accelerate the growth of the malt, so as to occasion the extraction and loss of such of its valuable parts, as by a slower process would have been duly separated, and left behind.

"By the slow mode of conducting vegetation here recommended, an actual and minute separation of the parts takes place. The germination of the radicles and acrospire carries off the cohesive properties of the barley, thereby contributing to the preparation of the saccharine matter, which it has no tendency to extract or otherwise injure, but to increase and meliorate, so long as the acrospire is confined within the husk; and by how much it is wanting of the end of the grain, by so much does the malt fall short of perfection; and in proportion as it has advanced beyond, is that purpose defeated.

"This is very evident to the most common observation, on examining a kernel of malt in the different stages of its progress. When the acrospire has shot but half the length of the grain, the lower part only is converted into that yellow saccharine flour we are solicitous about, whilst the other half affords no other signs of it than the whole kernel did at its first germination. Let it advance to two thirds of the length, and the lower end will not only have increased its saccharine flavour, but will have proportionally extended its bulk, so as to have left only a third part unmalted. This, or even less than this, is contended for by many maltsters, as a sufficient advance of the acrospire, which they say has done its business as soon as it has passed the middle of the kernel. But we need seek no further for their conviction of error, than the examination here alluded to.

"Let the kernel be slit down the middle, and tasted at either end, whilst green; or let the effects of mastication be tried when it is dried off; when the former will be found to exhibit the appearances just mentioned, the latter to discover the unwrought parts of the grain, in a body of stony hardness, which has no other effect in the mash-tun than that of imbibing a large portion of the liquor, and contributing to the retention of those saccharine parts of the malt which are in contact with it; whence it is a rational inference, that three bushels of malt, imperfect in this proportion, are but equal to two of that which is carried to its utmost perfection. By this is meant the farthest advance of the acrospire, when it is just bursting from its confinement, before it has effected its enlargement. The kernel is then uniform in its internal appearance, and of a rich sweetness in flavour, equal to any thing we can conceive obtainable from imperfect vegetation. If the acrospire be suffered to proceed, the mealy substance melts into a liquid sweet, which soon passes into the blade, and leaves the husk entirely exhausted.

"The sweet thus produced by the infant efforts of vegetation, and lost by its more powerful action, revives, and makes a second appearance in the stem, but is then too much dispersed and altered in its form to answer any of the purposes of art.

"Were we to inquire, by what means the same barley, with the same treatment, produces unequal portions of the saccharine matter in different situations, we should perhaps find it principally owing to the different qualities of the water used in malting. Hard water is very unfit for every purpose of vegetation, and soft will vary its effects according to the predominating qualities of its impregnations. Pure elementary water is in itself supposed to be only the vehicle of the nutriment of plants, entering at the capillary tubes of the roots, rising into the body, and there dispersing its acquired virtues, perspiring by innumerable fine pores at the surface, and thence evaporating, by the purest distillation, into the open atmosphere, where it begins anew its round of collecting fresh properties, in order to its preparation for fresh service.

"This theory leads us to the consideration of an attempt to increase the natural quantity of the saccharum of malt by adventitious means; but it must be observed on this occasion, that no addition to water will rise into the vessels of plants, but such as will pass the filter; the pores of which appearing somewhat similar to the fine strainers or absorbing vessels employed by nature in her nicer operations, we, by analogy, conclude, that properties so intimately blended with water as to pass the

one, will enter and unite with the œconomy of the other, and *vice verſa*.

"Suppoſing the malt to have obtained its utmoſt perfection, according to the criterion here inculcated; to prevent its farther progreſs, and ſecure it in that ſtate, we are to call in the aſſiſtance of a heat ſufficient to deſtroy the action of vegetation, by evaporating every particle of water, and thence leaving it in a ſtate of preſervation, fit for the preſent or future purpoſe of the brewer.

"Thus having all its moiſture extracted, and being by the previous proceſs deprived of its coheſive property, the body of the grain is left a mere lump of flour, ſo eaſily diviſible, that the huſk being taken off, a mark may be made with the kernel, as with a piece of ſoft chalk. The extractible qualities of this flour are, a ſaccharum cloſely united with a large quantity of the farinaceous mucilage peculiar to bread-corn, and a ſmall portion of oil enveloped by a fine earthy ſubſtance, the whole readily yielding to the impreſſion of water applied at different times and different degrees of heat, and each part predominating in proportion to the time and manner of its application.

"In the curing of malt, as nothing more is requiſite than a total extrication of every aqueous particle; if we had in the ſeaſon proper for malting, a ſolar heat ſufficient to produce perfect dryneſs, it were practicable to reduce beers nearly colourleſs; but that being wanting, and the force of cuſtom having made it neceſſary to give our beers various tinctures and qualities reſulting from fire, for the accommodation of various taſtes, we are neceſſitated to apply ſuch heats in the drying as ſhall not only anſwer the purpoſe of preſervation, but give the complexion and property required.

"To effect this with certainty and preciſion, the introduction of the thermometer is neceſſary; but the real advantages of its application are only to be known by experiment, on account of the different conſtruction of different kilns, the irregularity of the heat in different parts of the ſame kiln, the depth of the malt, the diſtance of the bulb of the thermometer from the floor, &c. &c.; for though ſimilar heats will produce ſimilar effects in the ſame ſituation, yet is the diſperſion of heat in every kiln ſo irregular, that the medium ſpot muſt be found for the local ſituation of the thermometer ere a ſtandard can be fixed for aſcertaining effects upon the whole. That done, the ſeveral degrees neceſſary for the purpoſes of porter, amber, pale beers, &c. are eaſily diſcovered to the utmoſt exactneſs, and become the certain rule of future practice.

"Though cuſtom has laid this arbitrary injunction of variety in our malt liquors, it may not be amiſs to imitate the loſſes we often ſuſtain, and the inconveniences we combat, in obedience to her mandate.

"The further we purſue the deeper tints of colour by an increaſe of heat beyond that which ſimple preſervation requires, the more we injure the valuable qualities of the malt. It is well known that ſcorched oils turn black, and that calcined ſugar aſſumes the ſame complexion. Similar effects are producible in malts, in proportion to the increaſe of heat, or the time of their continuing expoſed to it. The parts of the whole being ſo united by nature, an injury cannot be done to the one, without affecting the other; accordingly we find, that ſuch parts of the ſubject, as might have been ſeverally extracted for the purpoſes of a more intimate union by fermentation, are, by great heat in curing, burnt and blended ſo effectually together, that all diſcrimination is loſt; the unfermentable are extracted with the fermentable, the integrant with the conſtituent, to a very great loſs both of ſpirituoſity and tranſparency. In paler malts, the extracting liquor produces a ſeparation which cannot be effected in brown, where the parts are ſo incorporated, that, unleſs the brewer is very well acquainted with their ſeveral qualities and attachments, he will bring over, with the burnt mixture of ſaccharine and mucilaginous principles, ſuch an abundance of the ſcorched oils, as no fermentation can attenuate, no precipitants remove; for being in themſelves impediments to the action of fermentation, they leſſen its efficacy; and being of the ſame ſpecific gravity with the beer, they remain ſuſpended in, and incorporated with the body of it, an offence to the eye, and a nauſea to the palate to the lateſt period."

From this account it is evident that the drying of malt is an article of the utmoſt conſequence. Concerning the proper degrees of heat to be employed for this purpoſe, M. Combrune has related ſome experiments made in an earthen pan, of about two feet diameter, and three inches deep, in which was put as much of the paleſt malts, very unequally grown, as filled it on a level to the brim. This being placed over a little charcoal in a ſmall ſtove, and kept continually ſtirred from bottom to top, exhibited different changes according to the degree of heat employed. On the whole he concludes, that "true germinated malts are charred in heats between 175 and 180 degrees; and that, as theſe correſpond to the degrees in which pure alcohol, or the fineſt ſpirit of the grain itſelf boils, or diſengages itſelf therefrom, they may point out to us the reaſon of barley being the fitteſt grain for the purpoſes of brewing."

From theſe experiments, our author has alſo conſtructed a kind of table of the different degrees of the dryneſs of malt, with the colour occaſioned by the difference of heat. Thus malt expoſed to 119 deg. is White; to 124, Cream colour; 129, Light yellow; 134, Amber colour; 138, High amber; 143, Pale brown; 148, Brown; 152, High brown; 157, Brown inclining to black; 162, High brown ſpeckled with black; 167, Blackiſh brown with black ſpecks; 171, Colour of burnt coffee; 176, Black. This account not only ſhews us how to judge of the dryneſs of malt from its colour, but alſo, when a griſt is compoſed of ſeveral ſorts of malt, what effect the whole will have when blended together by extraction. Experience proves, that the leſs heat we employ in drying malt, the ſhorter time will be required before the beer which is brewed from it is fit to be uſed; and of this our author has given the following table:

Deg.		Deg.		Deg.	
119	2 weeks.	138	6 months.	152	15 months.
124	1 month.	143	6 months.	157	20 months.
129	3 months.	148	10 months.	162	2 years.
134	4 months.				

Mr. Combrune has alſo given a table, which ſhews the comparative tendency beers have to become fine, when properly brewed from malts of different degrees of dryneſs.

The next conſideration in brewing is the *quality of the water* to be employed; and here ſoft water is univerſally allowed to be preferable to hard, both for the purpoſes of maſhing and fermentation. Tranſparency is however more eaſily obtained by the uſe of hard than ſoft water; firſt, from its inaptitude to extract ſuch an abundance of that light mucilaginous matter, which, floating in the beer for a long time, occaſions it to be turbid; ſecondly, from its greater tendency to a ſtate of quietude after the vinous fermentation is finiſhed, by which thoſe floating particles are more diſpoſed to ſubſide; and, laſtly, from the mutual aggregation of the earthy particles of the water with thoſe of the materials, which, by their greater ſpecific gravity thus aggregated, not only precipitate themſelves, but carry down alſo that lighter mucilage juſt mentioned. For theſe reaſons, hard water is not well adapted to the brewing of porter, or ſuch beers as require a fulneſs of palate, as in the London brewery, and ſome country ſituations.

The purity of water is determined by its lightnefs; and in this refpect, diftilled water only can claim any material degree of perfection. Rain water is the pureft of all naturally produced: but having once defcended to the furface of the earth, it is liable to a variety of intermixtures unfavourable to the purpofes of brewing. With regard to others, though a matter of confiderable importance, no precife rule can be laid down. Where there is liberty of choice, a preference fhould doubtlefs be given to that water which, from natural purity, equally free from the aufterity of faline fubftances and the ranknefs of vegetable putrefaction, has a foft fulnefs upon the palate, is totally flavourlefs, inodorous, and colourlefs; whence it is the better prepared for the reception and retention of fuch qualities as the procefs of brewing is to communicate.

The next to be confidered is the proper *degree of heat* to be employed in making the infufion: and here it is evident, that though this muft be very material to the fuccefs of the operation, it is extremely difficult, perhaps impoffible, to fix upon a precife ftandard that fhall at all times fully anfwer the purpofe. On this fubject Mr. Richardfon fays: "The quality of the faccharine part of malt refembles that of common fugar, to which it is practicable to reduce it; and its characteriftical properties are entirely owing to its intimate connection with the other parts of the malt, from which fuch diftinguifhing flavours of beers are derived as are not the immediate refult of the hop. Were it not for thefe properties, the brewer might adopt the ufe of fugar, molaffes, honey, or the fweet of any vegetable, to equal advantage; which cannot now be done, unlefs an eligible fuccedaneum be found to anfwer that purpofe. As we are at prefent circumftanced, a fearch on the other fide would turn more to the brewer's account. We have in malt a fuberabundance of the groffer principles; and would government permit the introduction of a foreign addition to the faccharine, which is too deficient, many valuable improvements might be made from it; as we could, by a judicious application of fuch adventitious principle, produce a fecond and third wort, of quality very little inferior to the firft.

"But in thefe experiments a very particular attention would be neceffary to the folvent powers of the water at different degrees of heat, and to the inquiry how far a menftruum faturated with one principal may be capable of diffolving another. Such a confideration is the more neceffary on this occafion to direct us clear of two extremes equally difagreeable; the firft is, that of applying the menftruum pure, and at fuch a heat as to bring off an over proportion of the oleaginous and earthy principles, which would occafion in the beer, thus wanting its natural fhare of faccharum, a harfhnefs and aufterity which fcarce any time the brewer could allow would be able to diffipate; the other is, that of previoufly loading the menftruum with the adopted fweet in fuch abundance as to deftroy its folvent force upon the characteriftical qualities we wifh to unite with it, and thereby leave it a mere folution of fugar. The requifite mean is that of confidering what portion of the faccharine quality has been extracted in the firft wort, according to the quantity of water, and degree of heat applied; and then to make fuch a previous addition of artificial fweet as will juft ferve to counterbalance the deficiency, and affimilate with that portion of the remaining principles we are taught to expect will be extracted with the fucceeding wort.

"From the nature of the conftituent principles of malt, it is eafy to conceive, that the former, or faccharine or mucilaginous parts, yield moft readily to the impreffion of water, and that at fo low a degree of heat as would have no vifible effect upon the latter. If therefore we are to have a certain proportion of every part, it is a rational inference, that the means of obtaining it reft in a judicious variation of the extracting heat according to the feveral proportions required.

2

"A low degree of heat, acting principally upon the faccharum, produces a wort replete with a rich foft fweet, fully impregnated with its attendant mucilage, and in quantity much exceeding that obtainable from increafed heat; which, by its more powerful infinuation into the body of the malt acting upon all the parts together, extracts a confiderable portion of the oleaginous and earthy principles, but falls fhort in foftnefs, fulnefs, fweetnefs, and quantity. This is occafioned by the coagulating property of the mucilage, which, partaking of the nature of flour, has a tendency to run into pafte in proportion to the increafe of heat applied; by which means it not only locks up a confiderable part of the faccharum contained therein, but retains with it a proportionate quantity of the extracting liquor, which would otherwife have drawn out the imprifoned fweet, thence leffening both the quantity and quality of the worts. And this has fometimes been known to have had fo powerful an effect, as to have occafioned the *fetting of the goods*, or the uniting the whole into a pafty mafs; for though heat increafes the folvent powers of water in moft inftances, there are fome in which it totally deftroys them. Such is the prefence of flour, which it converts into pafte; befides thofe of blood, eggs, and fome other animal fubftances, which it invariably tends to harden.

"From a knowledge of thefe effects, we form our ideas of the variations neceffary in the heat of the extracting liquor; which are of more extenfive utility than has yet been intimated, though exceedingly limited in their extent from one extreme to the other.

"The moft common effects of too low a heat, befides fometimes producing immediate acidity, are an infipidity of the flavour of the beer, and a want of early tranfparency, from the fuperabundance of mucilaginous matter extracted by fuch heats, which, after the utmoft efforts of fermentation, will leave the beer turbid with fuch a cloud of its lighter feculencies as will require the feparation and precipitation of many months to difperfe.

"The contrary application of too much heat, at the fame time that it leffens the mucilage, has, as we have feen before, the effect of diminifhing the faccharum alfo; whence that lean thin quality obfervable in fome beers; and, by extracting an over proportion of oleaginous and earthy particles, renders the bufinefs of fermentation difficult and precarious, and impreffes an aufterity on the flavour of the liquor which will not eafily be effaced.

"Yet the true medium heat for each extract cannot be univerfally afcertained. An attention not only to the quality of the malt, but to the quantity wetted, is abfolutely neceffary to the obtaining every due advantage; nor muft the period at which the beer is intended for ufe be omitted in the account. The quality of the water alfo claims a fhare in the confideration, in order to fupply that deficient thinnefs and want of folvent force in hard, and to allow for the natural fulnefs and fermentative quality of foft—a particular to which London in a great meafure owes the peculiar mucilaginous and nutritious quality of its malt liquors.

"Although the variations above alluded to are indifpenfable, it is eafy to conceive, from the fmall extent of the utmoft variety, that they cannot be far diftant. If therefore we know that a certain degree extracts the firft principles in a certain proportion, we need not much confideration to fix upon another degree that fhall produce the required proportion of the remaining qualities, and effect that equal diftribution of parts in the extract which it is the bufinefs of fermentation to form into a confiftent whole."

The principal ufe of *boiling the worts* is to feparate the groffer parts of the extract, preparatory to that more minute feparation which is to be affected in the guile tun. The eye is

a very competent judge of this effect; for the concretions into which the continued action of boiling forms those parts are obvious to the slightest inspection, whilst the perfect transparency of the interstices of the worts points out its utility in promoting that desirable quality in the beer. These coagulable parts are formed from the superabundant mucilage already mentioned; and hence they are found in greater proportion in the first worts than in those that come after; at the same time, they are in these last so mingled with a quantity of oleaginous matter, that they become much more difficultly coagulable in the weak worts than in such as are stronger; and hence these require to be much longer boiled than the others.

During this operation the *hops* are generally added, which are found to be absolutely necessary for preventing the too great tendency of beer to acidity. The fine essential oil of hops being most volatile, and soonest extracted, we are thence taught the advantage of boiling the first wort no longer than is sufficient to form the extract, without exposing it to the action of the fire so long as to dissipate the finer parts of this most valuable principle, and defeat the purposes of it. To the subsequent worts we can afford a larger allowance, and pursue the means of preservation so long as we can keep in view those of flavour; to which no rules can positively direct, the process varying with every variety of beer, and differing as essentially in the production of porter and pale ale as the modes of producing wine and vinegar.

The effects of not allowing a sufficient time for the due separation of the parts of the wort, and extraction of the requisite qualities of the hop, must be obvious. If we proceed to the other extreme, we have every thing to apprehend from the introduction of too large a quantity of the grosser principles of the hop, which are very inimical to fermentation; and from impairing the fermentative quality of the worts themselves, by suffering their too long exposure to the action of the fire, whereby they are reduced to a more dense consistence, and their parts too intimately blended to yield to the separating force of fermentation.

The last step in the process of brewing is to *ferment the liquor* properly; for if this is not done, whatever care and pains have been taken in the other parts, they will be found altogether insufficient to produce the beverage we desire. The first thing to be done here is to procure a proper ferment. There are only two kinds of artificial ferments procurable in large quantity, and at a low price, viz. beer-yeast, and wine-lees. Brewers have always found it a considerable difficulty to procure these ferments in sufficient quantities, and preserve them constantly ready for use; and this has been so great a discouragement to the business, that some have endeavoured to produce other ferments, or to form mixtures or compounds of particular fermentable ingredients: for some account of these, see the article BARM.

The greatest circumspection and care are necessary in regard to the quality of the ferment. It must be chosen perfectly sweet and fresh; for all ferments are liable to grow musty. If the ferment is sour, it must by no means be used for any liquor; for it will communicate its flavour to the whole, and give it an *acetous*, instead of a vinous tendency. When the proper quantity is got ready, it must be put to the liquor in a state barely tepid. The whole intended quantity being loosely mixed in some of the luke-warm liquor, and kept covered, and in a warm situation, more of the insensibly warm liquor ought, at proper intervals, to be added, till thus by degrees the whole quantity is put together. When the whole is thus set at work, secured in a proper degree of warmth, and kept from a too free intercourse with the external air, it becomes as it were the business of nature to finish the process.

In the operation of fermentation, however, the degree of heat employed is of the utmost consequence. In forming the extracts of the malt, the variation of a few degrees of heat produces an important difference in the effect. In the heat of fermentation, similar consequences are the result. Under a certain regulation of the process, we can retain in the beer the finer mucilage, and thereby preserve that fulness upon the palate which is by many so much admired. On the other hand, by a slight alteration, we can throw it off, and produce that evenness and uniformity of flavour which has scarce any characteristical property, and is preferred by some only for want of that heaviness which they complain of in full beers. If a more vinous racy ale be required, we can, by collecting and confining the operation within the body of the wort, cause the separation of such an abundant portion of the oleaginous principle, as to produce a liquor in a perfect state at the earliest period, and so highly flavoured as to create a suspicion of an adventitious mixture. But though all this may be done, and often has been done, the proper management of fermenting liquors depends so much upon a multiplicity of slight and seemingly unimportant circumstances, that it has never yet been laid down in an intelligible manner; and no rules, drawn from any thing hitherto published on the subject of brewing, can be rendered at all sufficient to direct any person in this matter, unless he has had considerable opportunities of observing the practice of a brewhouse.

BREY, a town of Germany, on the frontiers of Brabant, seated on a rivulet, in E. lon. 5. 35. N. lat. 51. 6.

BREYNIA, in botany, a synonime of the capparis. See CAPPARIS.

BRIANCON, a town of France, in the late province of Dauphiny. E. long. 6. 45. N. lat. 44. 46.

BRIANCONNOIS, a territory of France, in Dauphiny, bounded by Grenoblois, Gapenzois, Ambrunois, Piedmont, and Savoy. It comprehends several valleys, which lie among the mountains of the Alps; and though it is extremely cold, yet it is fertile in corn and pastures. The inhabitants have a great deal of wood; yet they choose to be in the stables with their cattle six months in the year, to keep themselves warm. Briancon is the capital town.

BRIAR, in botany, the English name of a species of rosa. See ROSA.

BRIARE, a town of France, in the department of Loiret and late province of Orleanois. It has a long street full of inns and farriers, being on the great road to Lyons; and the canal of Briare, which is 33 miles in length, and maintains a communication between the Loire and the Seine, by means of the Loing. E. long. 2. 45. N. lat. 47. 40.

BRIAREUS, in fabulous history, a giant; the son of Æther, Titan or Cœlus, and Terra. This was his name in heaven; on earth he was called *Ægeon*. He was of singular service to Jupiter, when Juno, Pallas, Neptune, and the rest of the gods, endeavoured to bind him in chains, and dethrone him. Afterwards however he conspired with the rest of his gigantic brethren to dethrone Jupiter. Virgil, on this occasion, describes him as having 100 hands, 50 heads, and breathing out fire. The fable says that Jupiter, to punish him, threw him under mount Ætna, which, as often as he moves, belches out fire and smoke.

BRIBE, a reward given to pervert the judgment: see the next article. The word is French, *bribe*, which originally denotes a bit, fragment, or relic of meat taken off the table; on which footing, bribe imports as much as *panis mendicatus*, and still keeps up the idea of the matter whereof bribes anciently consisted. Hence also the Spaniards use *bribar*, and *brivar*, for *begging*; and *brivia*, *brivoneria*, and *brivonismo*, for *beggary*. In middle-age writers, a bribe given a judge is called *quota litis*; and the receiver, *campi particeps*, or *cambi particeps*; be-

caufe the fpoils of the field, i. e. the profits of the caufe, were thus fhared with the donor.

BRIBERY, in law, is a high offence, where a perfon in a judicial place takes any fee, gift, reward, or brockage, for doing his office, of any other but the king. But, taken largely, it fignifies the receiving or offering any undue reward to or by any perfon concerned in the adminiftration of public juftice, whether judge, officer, &c. to act contrary to his duty; and fometimes it fignifies the taking or giving a reward for a public office.

In the Eaft it is the cuftom never to petition any fuperior for juftice, not excepting their kings, without a prefent. This is calculated for the genius of defpotic countries; where the true principles of government are never underftood, and it is imagined that there is no obligation due from the fuperior to the inferior, no relative duty owing from the governor to the governed. The Roman law, though it contained many fevere injunctions againft bribery, as well for felling a man's vote in the fenate or other public affembly, as for the bartering of common juftice; yet, by a ftrange indulgence in one inftance, it tacitly encouraged this practice; allowing the magiftrate to receive fmall prefents, provided they did not on the whole exceed 100 crowns a-year: not confidering the infinuating nature and gigantic progrefs of this vice when once admitted. Plato, therefore, in his ideal republic, orders thofe who take prefents for doing their duty to be punifhed in the fevereft manner: and, by the laws of Athens, he that offered a bribe was alfo profecuted, as well as he that received a bribe. In England this offence of taking bribes is punifhed, in inferior officers, with fine and imprifonment; and in thofe that offer a bribe, though not taken, the fame. But in judges, efpecially the fuperior ones, it has been always looked upon as fo heinous an offence, that the chief juftice Thorpe was hanged for it in the reign of Edward III. By a ftatute 11 Henry IV. all judges and officers of the king convicted of bribery fhall forfeit treble the bribe, be punifhed at the king's will, and be difcharged from his fervice for ever. And fome notable examples have been made in parliament of perfons in the higheft ftations, and otherwife very eminent and able, but contaminated with this fordid vice. Thus in the reign of king James I. the earl of M—— lord treafurer of England, being impeached by the commons for refufing to hear petitions referred to him by the king till he had received bribes, &c. was, by fentence of the lords, deprived of all his offices, and difabled to hold any for the future, or to fit in parliament; he was alfo fined 50,000l. and imprifoned during the king's pleafure. In the 11th year of king George I. the lord chancellor M—— had a fomewhat milder punifhment: he was impeached by the commons, with great zeal, for bribery, in felling the places of mafters in chancery for exorbitant fums, and other corrupt practices, tending to the great lofs and ruin of the fuitors of that court; and the charge being made good againft him, being before divefted of his office, he was fentenced to pay a fine of 30,000l. and imprifoned till it was paid. It is faid that one of the peers, if not two, who voted againft him, had been poffeffed of the office of chancellor, and fold the places of mafters in chancery whenever vacant.

Bribery *in Elections*. See Elections.

BRICIANI, thofe of the order of that name. This was a military order, inftituted by St. Bridget, queen of Sweden, who gave them the rules and conftitutions of thofe of Malta and St. Auguftin. This order was approved by pope Urban V. They were to fight for the burying of the dead, to relieve and affift widows, orphans, the lame, fick, &c.

BRICK, a fat reddifh clay, formed into long fquares, four inches broad, and eight or nine long, by means of a wooden mould, and then baked or burnt in a kiln, to ferve the purpofes of building. Bricks are of great antiquity, as appears by the facred writings, the tower and walls of Babylon being built with them.

Bricks are commonly red; though there are fome alfo of a white colour, for which fort Walpit in Suffolk is famous. Bricks may be made of any earth that is clear of ftones, even fea-oufe; but all will not burn red—a property peculiar to earths which contain ferruginous particles. In England, bricks are chiefly made of a hazely, yellowifh-coloured, fatty earth, fomewhat red, vulgarly called *loam*. The earth according to Leibourn, ought to be dug before winter, but not made into bricks before fpring. For the making of fuch bricks as will ftand the fierceft fires, Sturbridge clay or Windfor loam are efteemed the beft. In general, the earth whereof bricks are made ought not to be too fandy, which would render them heavy and brittle; nor too fat, which would make them fwell and crack in the drying.

The firft ftep in the procefs of brick-making is cafting the clay, or earth. The next ftep is to tread or temper it, which ought to be performed doubly of what is ufually done; fince the goodnefs of the bricks depends chiefly upon this firft preparation. The earth itfelf, before it is wrought, is generally brittle and dufty; but adding fmall quantities of water gradually to it, and working and incorporating it together, it opens its body, and tinges the whole with a tough gluey band or fubftance. If, in the tempering, you overwater them, as the ufual method is, they become dry and brittle, almoft as the earth they are made of: whereas, if duly tempered, they become fmooth and folid, hard and durable. A brick of this laft fort takes up near as much earth as a brick and a half made the contrary way; in which the bricks are fpongy, light, and full of cracks, partly through want of due working, and partly by mixing of afhes and light fandy earth, to make it work eafy and with greater difpatch; as alfo to fave culm or coals in the burning. We may add, that for bricks made of good earth, and well tempered, as they become folid and ponderous, fo they take up a longer time in drying and burning than the common ones; and that the well drying of bricks before they are burned, prevents their cracking and crumbling when fubmitted to the procefs of burning.

Bricks are burnt either in a kiln or clamp. Thofe that are burnt in a kiln, are firft fet or placed in it; and then the kiln being covered with pieces of bricks, they put in fome wood to dry them with a gentle fire; and this they continue till the bricks are pretty dry, which is known by the fmoke's turning from a darkifh colour to tranfparent fmoke: they then leave off putting in wood, and proceed to make ready for burning; which is performed by putting in brufh, furze, fpray, heath, brake, or fern faggots: but before they put in any faggots, they dam up the mouth or mouths of the kiln with pieces of bricks (which they call *fhinlog*) piled up one upon another, and clofe it up with wet brick-earth inftead of mortar. The fhinlog they make fo high, that there is but juft room above it to thruft in a faggot; then they proceed to put in more faggots, till the kiln and its arches look white, and the fire appears at the top of the kiln; upon which they flacken the fire for an hour, and let all cool by degrees. This they continue to do, alternately heating and flacking, till the ware be thoroughly burnt, which is ufually effected in about 48 hours.

In the vicinity of London they chiefly burn in *clamps*, built of the bricks themfelves, after the manner of arches in kilns, with a vacancy between each brick, for the fire to play through; but with this difference, that inftead of arching, they fpan it over by making the bricks project one over another on both fides of the place, for the wood and coals to lie in till they meet, and are bounded by the bricks at the top, which clofe all up. The place for the fuel is carried up ftraight on both

fides, till about three feet high; then they almoft fill it with wood, and over that lay a covering of fea-coal, and then overfpan the arch; but they ftrew fea-coal alfo over the clamp, betwixt all the rows of bricks; laftly, they kindle the wood, which gives fire to the coal; and when all is confumed, then they conclude the bricks are fufficiently burnt. Bricks burnt in fuch an heat as is juft fufficient to vitrify or glaze their outer furface, would be infinitely more durable than the common brick. In many country towns we fee glazed bricks chequered with the common fort, fo that it is to be prefumed there is no difficulty in the procefs.

In volume 1ft, p. 302, of Dr. Percival's Effays, we have the following experiment of the effects of bricks on water: "Two or three pieces of common brick were fteeped four days in a bafon full of diftilled water. The water was then decanted off, and examined by various chemical tefts. It was immifcible with foap, ftruck a lively green with fyrup of violets, was rendered flightly lactefcent by the volatile alcali, and quite milky by the fixed alcali, and by a folution of faccharum faturni. The infufion of tormentil root produced no change in it." This experiment, he obferves, affords a ftriking proof of the impropriety of lining wells with brick—a practice very common in many places, and which cannot fail of rendering the water hard and unwholefome. Clay generally contains a variety of heterogeneous matters. The coloured loams often participate of bitumen, and the ochre of iron. Sand and calcareous earth are ftill more common ingredients in their compofition; and the experiments of Mr. Geoffry and Mr. Pott prove, that the earth of alum alfo may in large quantity be extracted from clay. Now, as clay is expofed to the open air for a long fpace of time, is then moulded into bricks, and burnt; this procefs refembles in many refpects that by which the alum-ftone is prepared. And it is probable that the white efflorefcence which is frequently obferved on the furface of new bricks, is of an aluminous nature. The long expofure of clay to the air before it is moulded into bricks, the fulphureous exhalations of the pit-coal ufed for burning it, together with the fuffocating and bituminous vapour which arifes from the ignited clay itfelf, fufficiently account for the combination of vitriolic acid with the earth of alum.

Worlidge, and others after him, have endeavoured to excite brick-makers to try their fkill in making a new kind of brick, or a compofition of clay and fand, whereof to form window-frames, chimney-pieces, door-cafes, and the like. It is to be made in pieces fafhioned in moulds, which, when burnt, may be fet together with a fine red cement, and feem as one entire piece, by which may be imitated all manner of ftone-work. The thing fhould feem feafible, by the earthen pipes made fine, thin, and durable, to carry water under-ground at Portfmouth; and by the earthen backs and grates for chimneys, formerly made by Sir John Winter, of a confiderable fize and thicknefs.

Before we conclude this article, we fhall lay before our readers an account of Mr. Cartwright's patent bricks, as ftated in the fpecification, dated April 14, 1795. The principle of this invention will readily be comprehended, by fuppofing the two oppofite fides of a common brick to have a groove or rabbet down the middle, which groove muft be a little more than half the width of the fide of the brick in which it is made; there will then be left a fhoulder on each fide of the groove, each of which fhoulders will be nearly equal to one quarter of the width of the fide of the brick, or to one half of the groove or rabbet. See plate 59, fig. 1. A courfe of thefe bricks being laid fhoulder to fhoulder, as in fig. 5, they will form an indented line, of nearly equal divifions; the grooves or rabbets being fomewhat wider than the two adjoining fhoulders, to allow for mortar, &c. When the next courfe comes on, the fhoulders of the bricks which compofe it will fall into the grooves of the firft courfe; and the fhoulders of the firft courfe will fit into the grooves or rabbets of the fecond; and fo on, as is clearly fhewn in the plate. This mode of fhaping the bricks is to be preferred, as being perfectly fimple; the principle, however, will be preferved, in whatever manner they may be made to lock into or cramp each other, by whatever form of indenture, or whether by one groove, or more. But it muft be obferved, in whatever manner the variation from the fimple form fig. 1. is made, except by ftraight line, the two fides of the brick, &c. muft proportionally vary, fo that, when they come together in work, they may correfpond and fit each other; an example of which is exhibited in fig. 2, where *a* and *b* fhew the oppofite fides of a brick. It may make fome fmall faving in the expence, though perhaps not a prudent one, if the bricks, &c. were of fuch a width as to admit a common brick, or piece of plain ftone, between the fhoulders of each of thefe bricks; in that cafe, the groove muft be made proportionably wider. For the purpofe of turning the angles, it may be expedient to have bricks or ftones of fuch fize and fhape as to correfpond with each wall refpectively; this however is not abfolutely neceffary, as the groove in the bricks, &c. of each wall, where they crofs or meet each other, may be levelled, and the bricks lap over, as in the common mode. For the purpofe of breaking the joints in the depth of the walls, bricks will be required of different lengths, though of the fame width. Buildings conftructed with bricks of this principle, will require no bond-timber, one univerfal bond running through, and connecting the whole building together; the walls of which can neither crack nor bulge out, without breaking through the bricks themfelves. When thefe bricks, &c. that is to fay, of the fimple form, fig. 1, are ufed for the conftruction of arches, the fides of the grooves and the fhoulders fhould be radii of the circle, of which the intended arch is to be a fegment. See fig. 3. Though, if the circle be very large, the difference of the width of the bricks, &c. at top and bottom will be fo trifling as to make a minute attention to this particular fcarcely, if at all neceffary. When thefe arches are required to be particularly flat, or are applied in fuch fituations as admit not of end-walls, as in the conftruction of bridges, &c. it may be expedient to have the fhoulders dove-tailed, to prevent the arch cracking acrofs, or giving way endwife. See fig. 4. If the bricks are as wide at the bottom as the top, the manner of putting them together by a dove-tail is obvious; when not fo wide at the bottom as the top, on one fide of the brick, &c. the fides of the fhoulders muft be parallel, and on the other the fides of the grooves or rabbets muft be parallel, fo that the two fides of the bricks, &c. which fall together, may correfpond. See fig. 4. *b*, *c*. In forming an arch, the bricks muft be courfed acrofs the centre on which the arch is turned, and a grooved fide of the bricks muft face the workmen. See fig. 6. It may be expedient, though not abfolutely neceffary, in laying the firft two or three courfes at leaft, to begin at the crown, and work downwards each way. In archwork, the bricks, &c. may be either laid in mortar, or dry, and the interftices afterwards filled and wedged up, by pouring in lime-putty, plafter of Paris, grouting, or any other convenient material, at the difcretion of the workman or builder. It is obvious that arches upon this principle, having no lateral preffure, can neither expand at the foot nor fpring at the crown; confequently they will want no abutments, requiring only perpendicular walls to be let into, or to reft upon; and they will want no fuperincumbent weight upon the crown to prevent their fpringing up—a circumftance of great importance in many inftances in the conftruction of bridges. Another advantage attending this mode of arching is, that the centres may be ftruck immediately; fo that the fame centre (which in no cafe need be many

feet wide, whatever may be the breadth of the arch) may be regularly shifted, as the work proceeds. But the greatest and most striking advantage attending this invention is the absolute security it affords, and at a very reasonable rate, against the possibility of fire; for, from the peculiar properties of this arch, requiring no abutments, it may be laid upon, or let into, common walls no stronger than what are required for timbers, of which it will preclude the necessity, and save the expence."

Oil of Bricks, olive oil imbibed by the substance of bricks, and afterwards distilled from it. This oil was once in great repute for curing many diseases, but is now justly laid aside.

Brick-*Layer*, an artificer, whose business is to build with bricks. The materials used by brick-layers are bricks, tyles, mortar, laths, nails, and tyle-pins. Their tools are a brick trowel, wherewith to take up mortar; a brick-ax, to cut bricks to the determined shape; a saw, for sawing bricks; a rub-stone, on which to rub them; also a square, wherewith to lay the bed or bottom, and face or surface of the brick, to see whether they are at right angles; a bevel, by which to cut the under sides of bricks to the angles required; a small trannel of iron, wherewith to mark the bricks; a float-stone, with which to rub a moulding of brick to the pattern described; a banker, to cut the bricks on; line-pins, to lay their rows or courses by; plumb-rule, whereby to carry their work upright; level, to conduct it horizontal; square, to set off right angles; ten-foot-rod, wherewith to take dimensions; jointer, wherewith to run the long joints; rammer, wherewith to beat the foundation; crow and pick-ax, wherewith to dig through walls. The London brick-layers make a regular company, which was incorporated in 1568; and consists of a master, two wardens, 20 assistants, and 78 on the livery.

Brick-*Laying*, the art of framing edifices of bricks.

Moxon hath an express treatise on the art of brick-laying; in which he describes the materials, tools, and method of working, used by brick-layers.

Great care is to be taken, that bricks be laid joint on joint in the middle of the wall as seldom as may be; and that there be good bond made there, as well as on the outsides. Some brick-layers, in working a brick and half wall, lay the header on one side of the wall perpendicular on the header on the other side, and so all along the whole course; whereas, if the header on one side of the wall were toothed as much as the stretcher on the other side, it would be a stronger toothing, and the joints of the headers of one side would be in the middle of the headers of the course they lie upon of the other side. If bricks be laid in winter, let them be kept as dry as possible; if in summer, it will quit cost to employ boys to wet them, for that they will then unite with the mortar better than if dry, and will make the work stronger. In large buildings, or where it is thought too much trouble to dip all the bricks separately, water may be thrown on each course after they are laid. If bricks are laid in summer, they are to be covered; for if the mortar dries too hastily, it will not bind so firmly to the bricks as when left to dry more gradually. If the bricks be laid in winter, they should also be covered well, to protect them from rain, snow, and frost.

Brick-*Maker*, is he whose employ is the making of bricks.

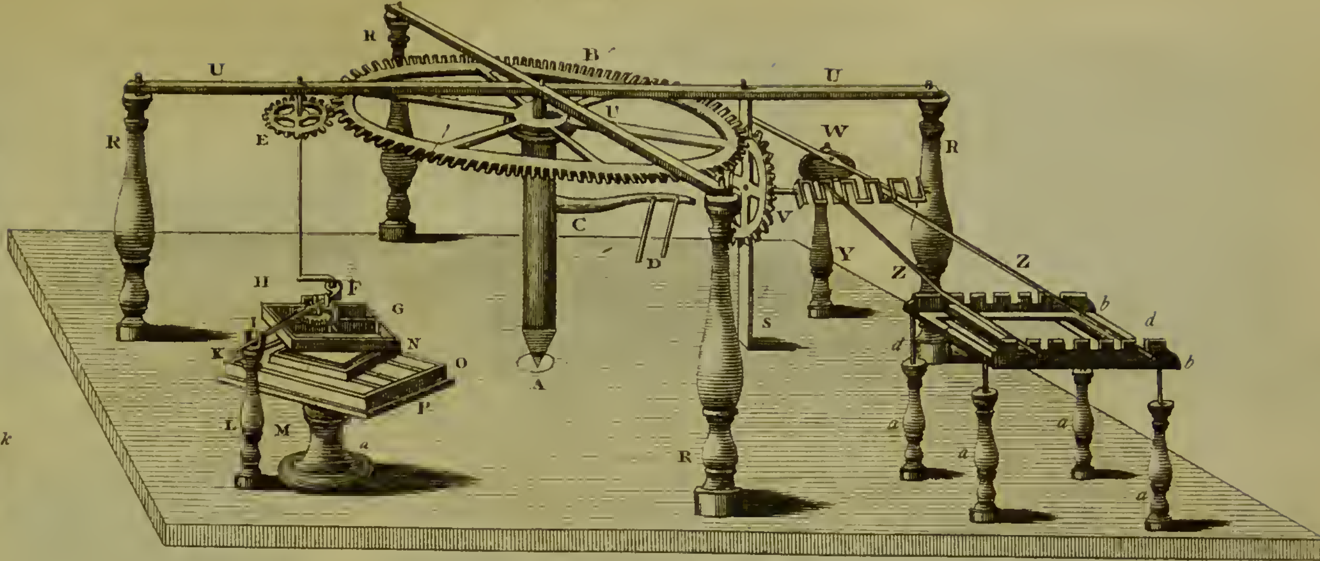
BRICKING, among builders, the counterfeiting of a brick-wall on plaster; which is done by smearing it over with red ochre, and making the joints with an edged tool; these last are afterwards filled with a fine plaster.

BRIDE, a woman newly married. Among the Greeks, it was customary for the bride to be conducted from her father's house to her husband's in a chariot, the evening being chosen for that purpose, to conceal her blushes: she was placed in the middle, her husband sitting on one side, and one of her most intimate friends on the other; torches were carried before her, and she was entertained in the passage with a song suitable to the occasion. When they arrived at the journey's end, the axle-tree of the coach they rode in was burnt, to signify that the bride was never to return to her father's house.—Among the Romans, the bride was to seem to be ravished by force from her mother, in memory of the rape of the Sabines under Romulus; she was to be carried home in the night-time to the bridegroom's house, accompanied by three boys, one whereof carried a torch, and the other two led the bride; a spindle and a distaff being carried with her: she brought three pieces of money, called *asses*, in her hand to the bridegroom, whose doors on this occasion were adorned with flowers and branches of trees: being here interrogated who she was, she was to answer *Caia*, in memory of Caia Cecilia, wife of Tarquin the Elder, who was an excellent *lanifica* or spinstress; for the like reason, before her entrance, she lined the door-posts with wool, and smeared them with grease. Fire and water being set on the threshold, she touched both; but starting back from the door, refused to enter, till at length she passed the threshold, being careful to step over without touching it: here the keys were given her; a nuptial supper was prepared for her, and minstrels to divert her; she was seated on the figure of a priapus, and here the attendant boys resigned her to the *pronubæ*, who brought her to the nuptial chamber, and put her to bed. This office was to be performed by matrons who had only been once married, to denote that the marriage was to be for perpetuity.

BRIDEGROOM, a man newly married, the spouse of the bride. The Spartan bridegrooms committed a kind of rape upon their brides. For matters being agreed on between them two, the woman that contrived and managed the match having shaved the bride's hair close to her skin, dressed her up in man's clothes, and left her upon a mattrass: this done, in came the bridegroom, in his usual dress, having supped as ordinary, and stealing as privately as he could to the room where the bride lay, and untying her virgin girdle, took her to his embraces; and having stayed a short time with her, returned to his companions, with whom he continued to spend his life, remaining with them by night as well as by day, unless he stole a short visit to his bride, which could not be done without a great deal of circumspection, and fear of being discovered. Among the Romans, the bridegroom was decked to receive his bride; his hair was combed and cut in a particular form; he had a coronet or chaplet on his head, and was dressed in a white garment.—By the ancient canons, the bridegroom was to forbear the enjoyment of his bride the first night, in honour of the nuptial benediction given by the priest on that day. In Scotland, and also it is thought in some parts of England, a scandalous feudal custom, called *marchet*, obtained; by which the lord of the manor was intitled to the first night's cohabitation with his tenants' brides.

BRIDEWELL, a work-house, or place of correction for vagrants, strumpets, and other disorderly persons.—These are made to work, being maintained with clothing and diet; and when it seems good to their governors, they are sent by passes into their native countries; however, while they remain here, they are not only made to work, but, according to their crimes, receive once a-fortnight such a number of stripes as the governor may direct. Several new buildings intended to correct the morals of the vicious and dishonest part of the community, have been erected near the metropolis, and in different parts of the kingdom, on the improved plan suggested by the late benevolent Mr. Howard. In these the culprit is confined in a small but wholesome cell, and entirely shut out from all communication with external objects; in which state the mind is *forced* into reflection; and from this mode of punishment the most happy effects have already resulted, and are likely to re-

Burrows's Machine.



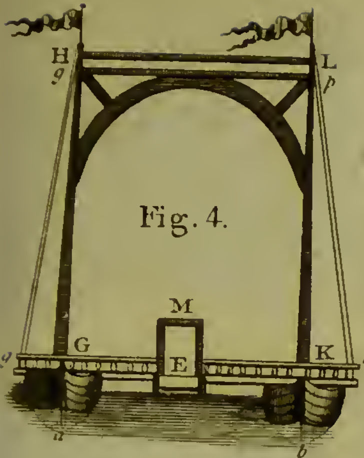


Fig. 4.

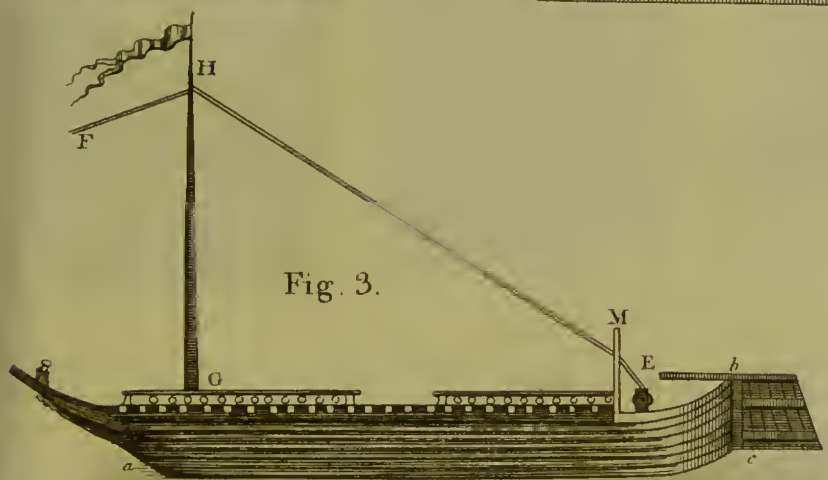
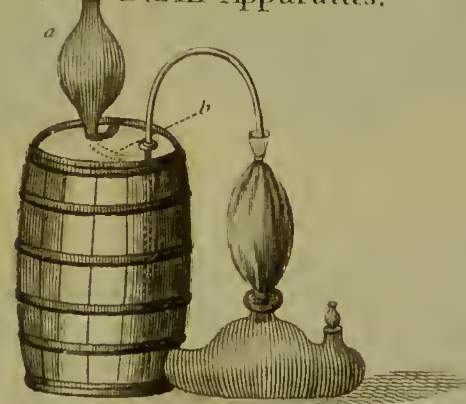
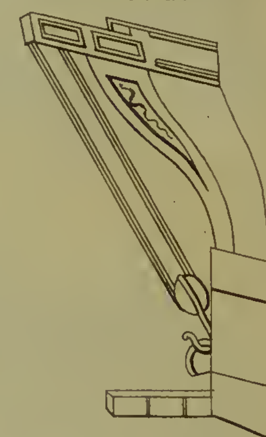


Fig. 3.

Artificial Barm Apparatus.



Cat Head.



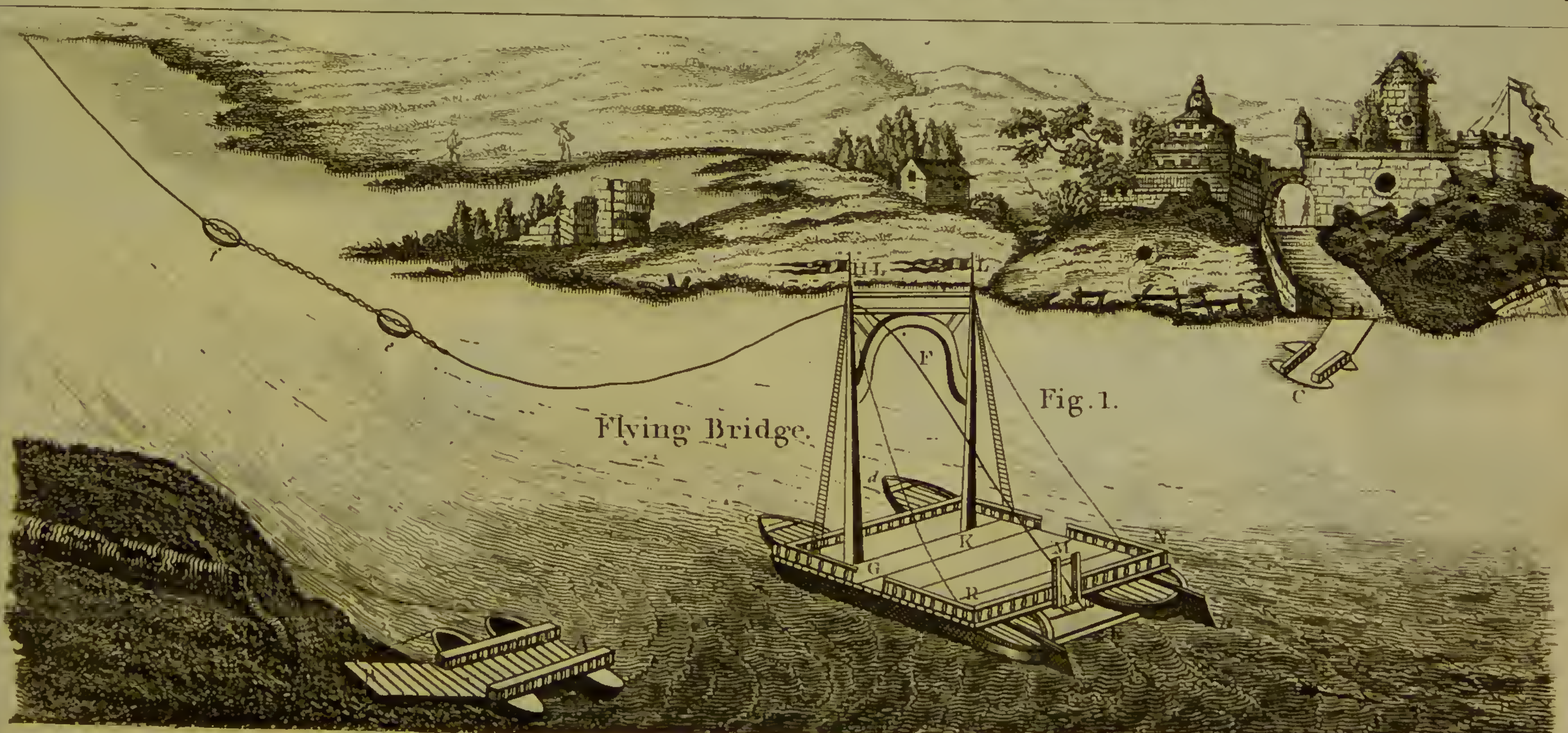


Fig. 1.

Flying Bridge.

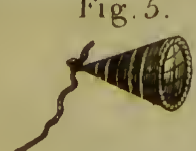


Fig. 5.

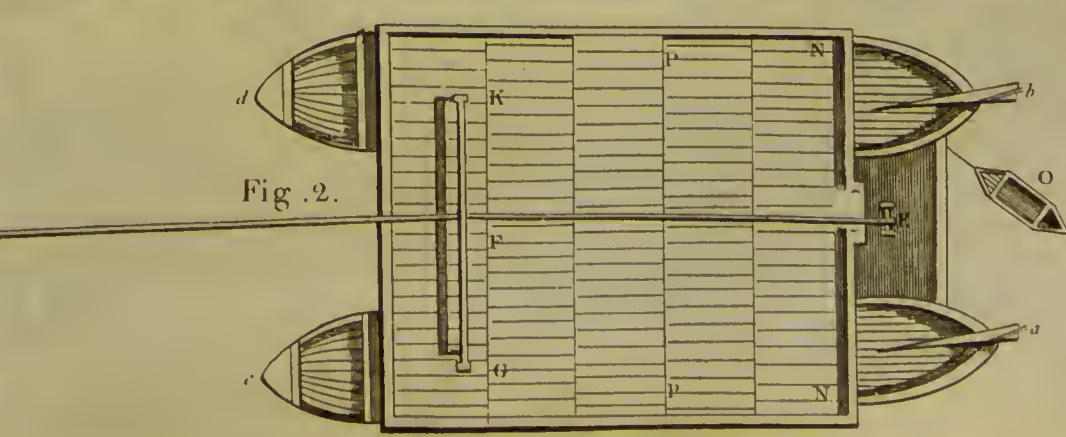


Fig. 2.

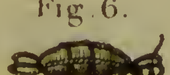
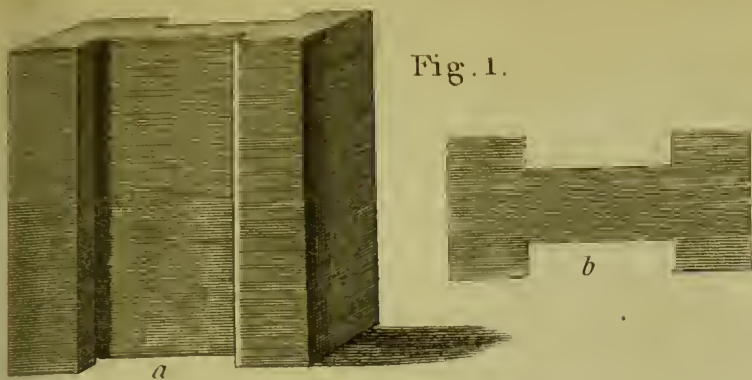


Fig. 6.

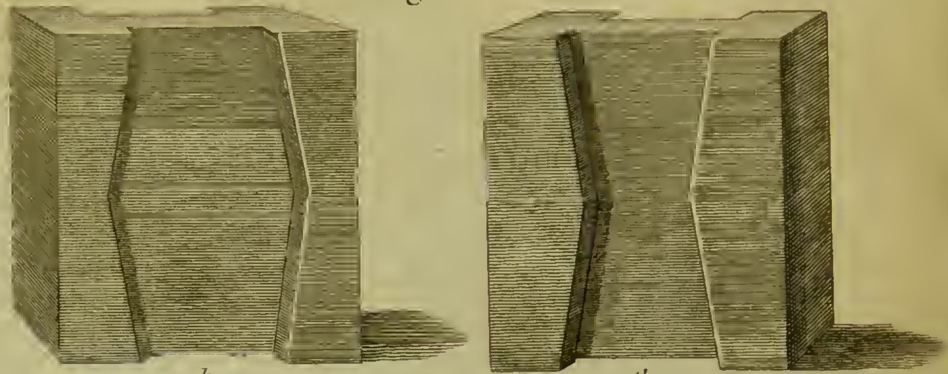
BRICKS.

Fig. 1.



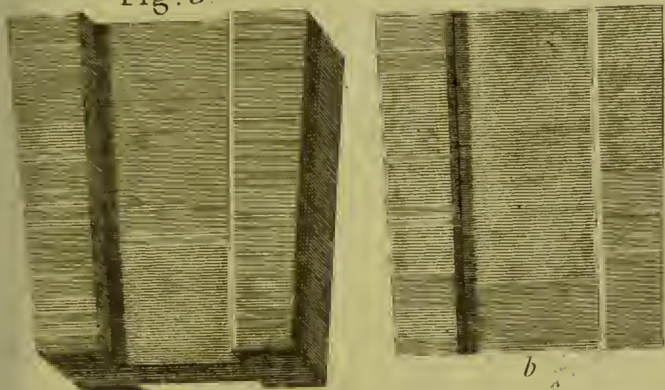
a b

Fig. 2.



b a

Fig. 3.



b

Fig. 5.

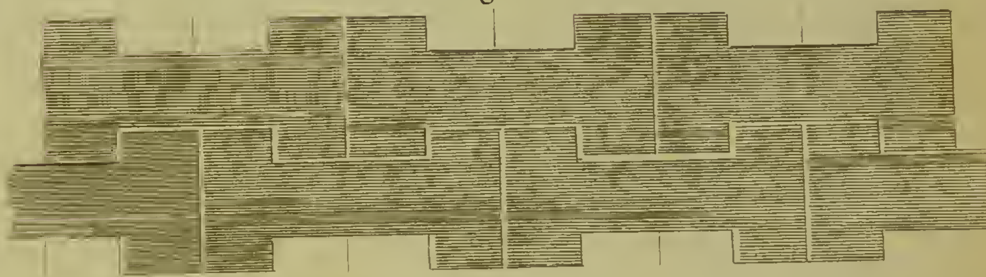


Fig. 6.

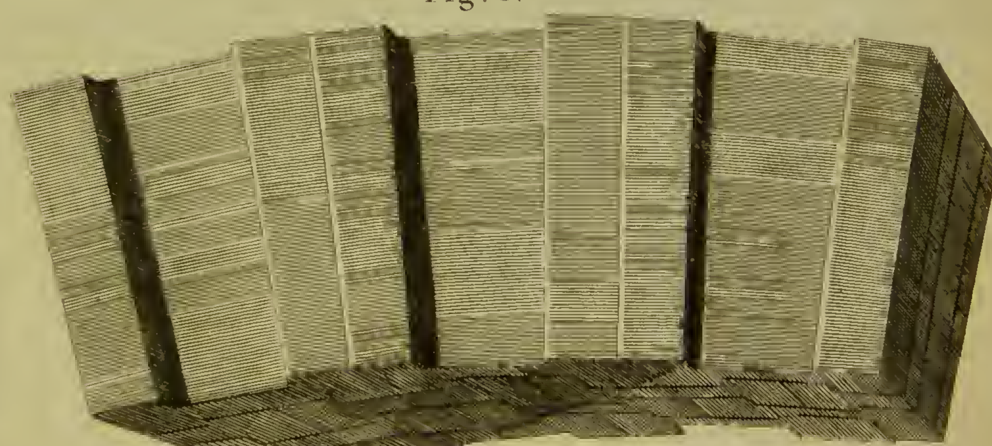
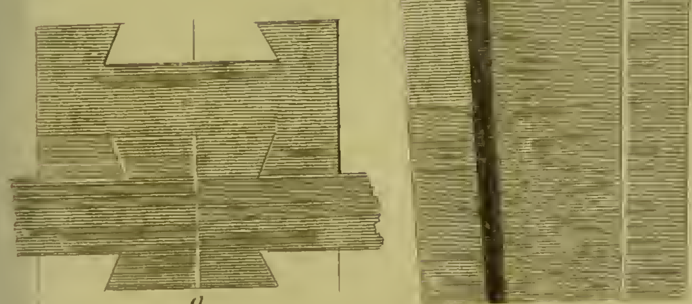
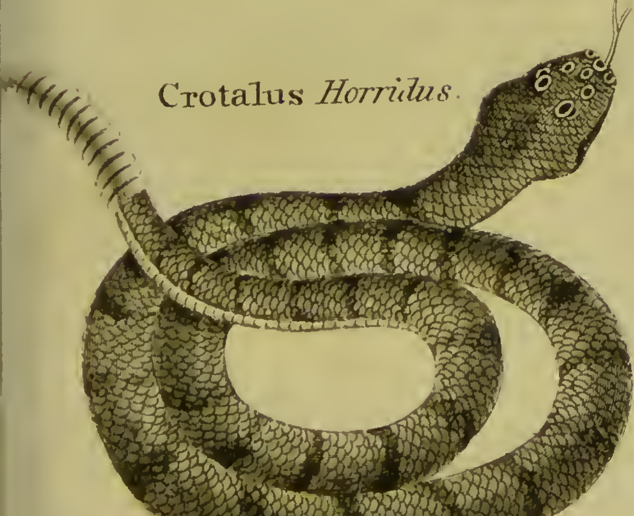


Fig. 4.

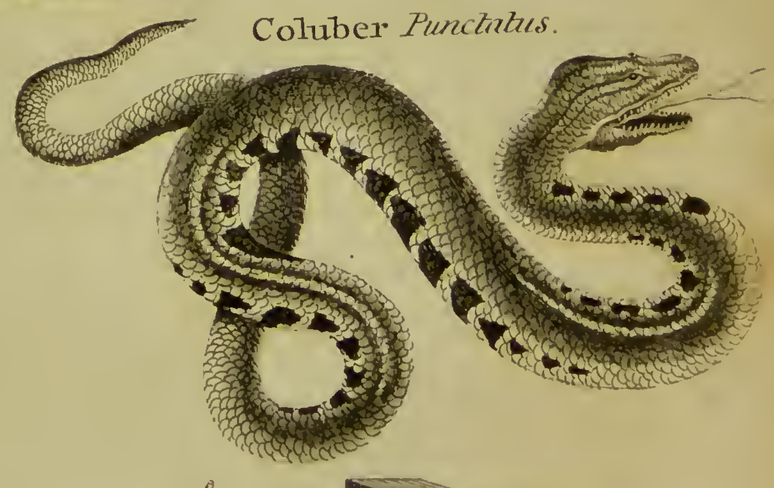


a c

Crotalus *Horridus*.



Coluber *Punctatus*.



CATAPULTA.

Fig. 2.

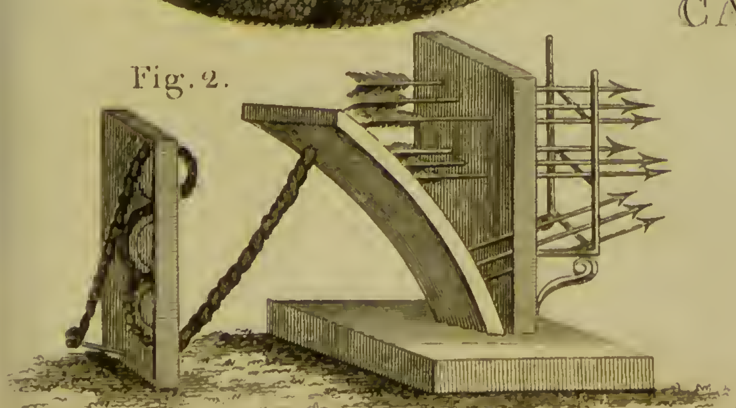
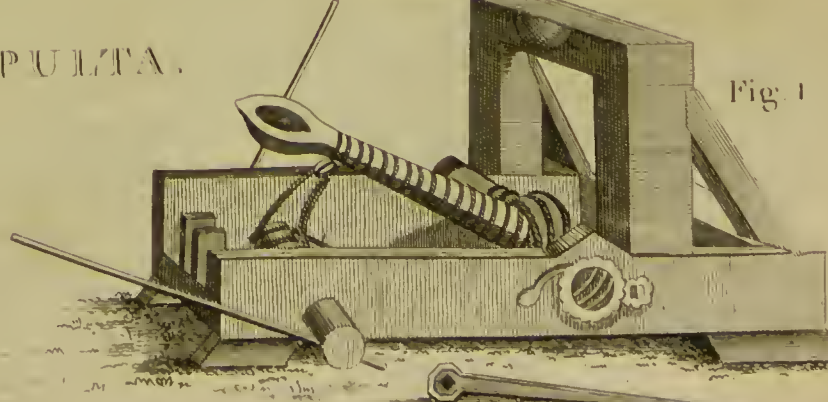


Fig. 1



Barlow sculp

fult fo long as thefe inftitutions are conducted, as they are at prefent, under the manngement of the moft refpectable gentlemen and magiftrates in the different counties of England.

BRIDEWELL, near Fleet-ftreet, is a foundation of a mixed and fingular nature, partaking of the hofpital, the prifon, and the workhoufe. It was founded in 1553, by Edward VI. who gave the place where king John had formerly kept his court, and which had been repaired by Henry VIII. to the city of London, with 700 merks of land, bedding, and other furniture. Several youths are fent to this hofpital as apprentices to manufacturers, who refide there; they are clothed in blue doublets and breeches, with white hats. Having faithfully ferved their time of feven years, they have their freedom, and a donation of 10l. each, for carrying on their refpective employments.

BRIDGE, a work of mafonry or timber, confifting of one or more arches built over a river, canal, or the like, for the conveniency of paffengers. See ARCHITECTURE, Part IV. and CANAL. Bridges are a fort of edifices very difficult to execute on account of the inconvenience of laying foundations and walling under water. The parts of a bridge are, the piers; the arches; the pavement, or way over for cattle and carriages; the foot-way on each fide, for foot-paffengers; the rail or parapet, which inclofes the whole; and the butments or ends of the bridge on the bank. The neceffary requifites in a bridge are, that it be well-defigned, commodious, durable, and fuitably decorated. The piers of ftone-bridges fhould be equal in number, that there may be one arch in the middle, where commonly the current is ftrongeft; their thicknefs is not to be lefs than a fixth part of the fpan of the arch, nor more than a fourth; they are commonly guarded in the front with angular fterlings, to break the force of the current: the ftrongeft arches are thofe whofe fweep is a whole femicircle. As the piers of bridges always diminifh the bed of a river, in cafe of inundations, the bed muft be funk or hollowed in proportion to the fpace taken up by the piers, fo that the waters fhall gain in depth what they lofe in breadth, otherwife they may wafh away the foundation and endanger the piers. To prevent this, they fometimes diminifh the current, either by lengthening its courfe, or by making it more winding; or by ftopping the bottom with rows of planks, ftakes, or piles, which break the force of the current.

Among the Romans, the building and repairing of bridges was firft committed to the pontifices or priefts; then to the cenfors, or curators of the roads; laftly, the emperors took the care of bridges into their own hands. Thus Antoninus Pius built the Pons Janiculenfis of marble; Gordian reftored the Pons Ceftius; and Adrian built a new one denominated from him. In the middle-age, bridge-building was reckoned among the acts of religion; and a regular order of Hofpitallers was founded by St. Benezet, towards the end of the 12th century, under the denomination of *pontifices*, or bridge-builders, whofe office it was to be affiftant to travellers, by making bridges, fettling ferries, and receiving ftrangers in hofpitals, or houfes built on the banks of rivers. Of all the bridges of antiquity, that built by Trajan over the Danube is allowed to be the moft magnificent.

Among modern bridges, that of Weftminfter, built over the river Thames, may be accounted one of the fineft in the world. It confifts of 13 large and 2 fmall arches, together with 14 intermediate piers. Each pier terminates with a faliant right angle againft either ftream: the two middle piers are each 17 feet in thicknefs at the fpringing of the arches, and contain 3000 cubic feet, or near 200 tons, of folid ftone; and the others decreafe in width equally on each fide by one foot. All the arches of this bridge are femicircular; they all fpring from about two feet above low-water mark; the middle arch is 76 feet wide, and the others decreafe in breadth equally on each fide by 4 feet.

London-bridge confifts of 20 locks or arches, 19 of which are open, and one filled up or obfcured. It is 900 feet long, 60 high, and 74 broad, with almoft 20 feet aperture in each arch. It is fupported by 18 piers, from 25 to 34 feet thick; fo that the greateft water-way when the tide is above the fterlings is 450 feet, fcarce half the width of the river; and below the fterlings, the water-way is reduced to 194 feet. Thus a river 900 feet wide is here forced through a channel of 194 feet, which renders the fall of the water on the recefs of the tide fo confiderable as to be both inconvenient and dangerous to thofe who pafs through the arches. London-bridge was firft built of timber, fome time before the year 994, by a college of priefts, to whom the profits of the ferry of St. Mary Overy's had defcended; it was repaired, or rather new built of timber, in 1163. The ftone-bridge was begun by king Henry in 1176, and finifhed by king John in 1209. The architect was Peter of Colechurch, a prieft. For the keeping it in repair, a large houfe is allotted, with a great number of offices, and a vaft revenue in land, &c. The chief officers are two bridge-mafters, chofen yearly out of the body of the livery.

Blackfriars-bridge, fituated near the centre of the city, and built according to a plan drawn by Mr. Robert Mylne, is an exceeding light and elegant ftructure. The arches are only 9 in number; but very large, and of an elliptical form. The centre-arch is 100 feet wide; thofe on the fides decreafe in a regular gradation; and the width of that near the abutment at each end is 70 feet. It has an open baluftrade at the top, and a foot-way on each fide, with room for three carriages abreaft in the middle. It has alfo receffes on the fides for the foot-paffengers, each fupported by two lofty Ionic columns.

Poulet mentions a bridge of a fingle arch in the city of Munfter in Bothnia, much bolder than that of the noted Rialto at Venice. But thefe are nothing to a bridge in China, built from one mountain to another, confifting of a fingle arch 400 cubits long and 500 in height, whence it is called the *flying-bridge*: a figure of it is given in the Philofophical Tranfactions. Kircher alfo fpeaks of a bridge in the fame country 360 perches long, fupported by 300 pillars.

Rufhen BRIDGE, *Pont de jonc*, is made of large fheaves of rufhes growing in marfhy grounds, which they cover with boards or planks; they ferve for croffing ground that is boggy, miry, or rotten. The Romans had alfo a fort of fubitaneous bridges made by the foldiers, of boats, or fometimes of cafks, leathern bottles, or bags, or even of bullocks bladders blown up and faftened together, called *afcogafri*. M. Couplet gives the figure of a portable bridge 200 feet long, eafily taken afunder and put together again, and which 40 men may carry. Frezier fpeaks of a wonderful kind of bridge at Apurima in Lima, made of ropes, formed of the bark of a tree.

Pendent or Hanging BRIDGES, called alfo *Philofophical Bridges*, are thofe not fupported either by pofts or pillars, but hung at large in the air, only fupported at the two ends or butments. Inftances of fuch bridges are given by Palladio and others. Dr. Wallis gives the defign of a timber-bridge 70 feet long, without any pillars, which may be ufeful in fome places where pillars cannot be conveniently erected. Dr. Plot affures us, that there was formerly a large bridge over the caftleditch at Tutbury in Staffordfhire, made of pieces of timber, none much above a yard long, and yet not fupported underneath either with pillars or archwork, or any fort of prop whatever.

Draw-BRIDGE, one that is faftened with hinges at one end only, fo that the other may be drawn up; in which cafe, the bridge ftands upright, to hinder the paffage of a ditch or moat,

Flying-Bridge, or *Pons ductorius*, an appellation given to a bridge made of pontoons, leather boats, hollow beams, casks, or the like, laid on a river, and covered with planks, for the passage of an army.

Flying-Bridge *(pont volant)* more particularly denotes a bridge composed of one or two boats joined together by a sort of flooring, and surrounded with a rail or balustrade; having also one or more masts, to which is fastened a cable, supported, at proper distances, by boats, and extended to an anchor, to which the other end is fastened, in the middle of the water: by which contrivance, the bridge becomes moveable, like a pendulum from one side of the river to the other, without any other help than the rudder.—Such bridges sometimes also consist of two stories, for the quicker passage of a great number of men, or that both infantry and cavalry may pass at the same time.

In plate 57 is represented a flying-bridge of this kind. Fig. 1. is a perspective view of the course of a river and its two banks. *a*, *b*, *c*, *d*, Two long-boats or batteaux, which support the flying-bridge. G H, K L, two masts joined at their tops by two transverse pieces, or beams, and a central arch, and supported in a vertical position by two pair of shrouds and two chains L N, H R. M, a horse, or cross piece, over which the rope or cable M, F, *e*, *f*, that rides or holds the bridge against the current, passes. E, a roll or windlass round which the rope M, F, *e*, *f*, is wound. *a*, *b*, The rudders. A B, and C D, two portions of bridges of boats fastened to the bank on each side, and between which the flying-bridge moves in passing from one side of the river to the other. *e*, *f*, Chains supported by two punts, or small flat-bottomed boats: there are five or six of these punts at about 40 fathoms from one another. The first, or farthest from the bridge, is moored with anchors in the middle of the bed of the river.

Fig. 2. Is a plan of the same bridge. *a*, *b*, *c*, *d*, The two boats that support it. K and G, the two masts. K F G, the transverse piece or beam over which the cable passes. E, the roll, or windlass round which the rope or cable is wound. *a*, *b*, The rudders. O, a boat. *e*, One of the punts, or small flat-bottomed boats that support the chain. N, N, pumps for extracting the water out of the boats. P, P, capstans.

Fig. 3. A lateral elevation of the bridge. *a*, *c*, One of the boats. *b*, The rudder. E, The roll, or windlass. M, The horse, or cross-piece. G, H, One of the masts. E, M, H, F, The cable. In this view the balustrade running along the side of the bridge is plainly exhibited.

Fig. 4. Elevation of the hinder or stern part of the bridge. *a*, *b*, The two boats. G H, K L, The two masts. H L, The upper transverse beam. *p*, *q*, The lower transverse beam, or that over which the cable passes, and on which it slides from one mast to the other; this beam is therefore always kept well greased. *p*, *k*, *q*, *g*, Shrouds extending from the sides of the bridge to the tops of the masts. M, The horse or cross-piece over which the cable passes to the roll or windlass E.

Bridges *of Boats*, are either made of copper or wooden boats, fastened with stakes or anchors, and laid over with planks. One of the most notable exploits of Julius Cæsar was the expeditious making a bridge of boats over the Rhine. Modern armies carry copper or tin boats, called *pontoons*, to be in readiness for making bridges: several of these being joined side by side till they reach across the river, and planks laid over them, make a plane for the men to march on. There are fine bridges of boats at Beaucaire and Rouen, which rise and fall with the water; and that at Seville is said to exceed them both. The bridge of boats at Rouen, built in lieu of the stately stone-bridge erected there by the Romans, is represented by a modern writer as the wonder of the present age. It always floats, and rises and falls with the tide, or as the land-waters fill the river. It is near 300 yards long, and is paved with stone, just as the streets are; carriages with the greatest burdens go over it with ease, and men and horses with safety, though there are no rails on either hand. The boats are very firm, and well moored with strong chains, and the whole well looked after and constantly repaired, though now very old.

Floating-Bridge, is ordinarily made of two small bridges, laid one over the other, in such manner as that the uppermost stretches and runs out, by the help of certain cords running through pullies placed along the sides of the under-bridge, which push it forwards till the end of it joins the place it is designed to be fixed on. When these two bridges are stretched out to their full length, so that the two middle ends meet, they are not to be above four or five fathoms long; because, if longer, they will break. Their chief use is for surprising outworks, or posts that have but narrow moats. In the memoirs of the royal academy of sciences we find an ingenious contrivance of a floating bridge, which lays itself on the other side of the river.

Natural Bridge, implies a bridge not constructed by art, but the result of some operation of nature. A most wonderful bridge of this kind is described by Mr. Jefferson in his *State of Virginia*. It is on the ascent of a hill, which seems to have been cloven through its length by some great convulsion. The fissure, just at the bridge, is by some deemed 270 feet deep, by others only 205. It is about 45 feet wide at the bottom, and 90 feet at the top; this of course determines the length of the bridge, and its height from the water. Its breadth in the middle is about 60 feet, but more at the ends, and the thickness of the mass at the summit of the arch about 40 feet. A part of this thickness is constituted by a coat of earth, which gives growth to many large trees. The residue, with the hill on both sides, is one solid rock of limestone. The arch approaches the semi-elliptical form; but the larger axis of the ellipsis, which would be the cord of the arch, is many times longer than the transverse. Though the sides of this bridge are provided in some parts with a parapet of fixed rock, yet few have resolution to look over them into the abyss. If the view from the top however be intolerable, that from below is delightful in an equal degree. It is impossible for the emotions arising from the sublime to be felt beyond what they are here: so beautiful an arch, so elevated, so light, and springing as it were up to heaven, the rapture of the spectator is really indescribable! The fissure continuing narrow, deep, and straight for a considerable distance above and below the bridge, opens a short but very pleasing view of the North-mountain on one side and Blue-ridge on the other, at the distance each of them of about five miles. This bridge is in the county of Rockbridge, to which it has given name, and affords a public and commodious passage over a valley, which cannot be crossed elsewhere for a considerable distance. The stream passing under it is called *Cedar-creek*. It is a water of James River, and sufficient in the driest seasons to turn a grist-mill, though its fountain is not more than two miles above. Don Ulloa mentions a break, similar to this, in the province of Angaraez, in South America.

Bridge, in gunnery, the two pieces of timber which go between the two transoms of a gun-carriage, on which the bed rests.

Bridge, in music, a term for that part of a stringed instrument over which the strings are stretched. The bridge of a violin is about one inch and a quarter high, and near an inch and a half long.

BRIDGE-TOWN, the capital of the island of Barbadoes, situated in the inmost part of Carlisle Bay. It contains 1500

houſes, and would make a figure in any kingdom of Europe. The ſtreets are broad, the houſes high, and the rents dear. The wharfs and quays are neat and convenient, and the forts are very ſtrong. The church is as large as ſome cathedrals, and it has a fine organ. Here alſo is a free ſchool, an hoſpital, and a college; the latter erected by the ſociety for propagating the goſpel, purſuant to the will of colonel Codrington, who endowed it with 2000l. a year, for the maintenance of profeſſors and ſcholars in divinity, phyſic, and ſurgery. Lon. 50. 36. W. Lat. 13. 5. N.

BRIDGENORTH, a borough in Shropſhire, with a market on Saturday. It is ſeated on the Severn, which divides it into two parts, joined by a handſome ſtone bridge. They are called the Upper and Lower Town. The ſtreets are broad and paved, and it has two churches. It was formerly fortified with walls, and had a caſtle, ſeated on a rock, but now in ruins. It is 20 miles W. by N. of Birmingham, and 139 N. W. of London. Lon. 2. 28. W. Lat. 52. 36. N.

BRIDGEWATER, a large borough of Somerſetſhire, with two markets on Thurſday and Saturday. It is ſeated on the river Parret, over which is a ſtone bridge, and near it ſhips of 100 tons burden may ride. It carries on a conſiderable coaſting trade, and trades likewiſe with Ireland and Norway. The tide here ruſhes in with great violence, and riſes to a vaſt height. It is eight miles S. of the Briſtol Channel, 31 S. S. W. of Briſtol, and 137 W. by S. of London. Lon. 3. 10. W. Lat. 51. 7. N.

BRIDLE, in the manege, a contrivance made of ſtraps or thongs of leather and pieces of iron, in order to keep a horſe in ſubjection and direct his courſe. The ſeveral parts of a bridle are the bit, or ſnaffle; the head-ſtall, or leathers from the top of the head to the rings of the bit; the fillet, over the fore-head and under the fore-top; the throat-band, which buttons from the head-band under the throat; the reins, or long thongs of leather that come from the rings of the bit, and being caſt over the horſe's head, the rider holds them in his hand; the noſe-band, going through loops at the back of the head-ſtall, and buckled under the cheeks; the trench; the caveſan; the martingal; and the chaff halter.

Pliny aſſures us that one Pelethronius firſt invented the bridle and ſaddle; though Virgil aſcribes the invention to the Lapithæ, to whom he gives the epithet *Pelethronii*, from a mountain in Theſſaly named *Pelethronium*, where horſes were firſt begun to be broken. The firſt horſemen, not being acquainted with the art of governing horſes with bridles, managed them only with a rope or a ſwitch, and the accent of the voice. This was the practice of the Numidians, Getulians, Libyans, and Maſſilians. The Roman youth alſo learned the art of fighting without bridles, which was an exerciſe or leſſon in the manege; and hence it is, that on the Trajan column, ſoldiers are repreſented riding at full ſpeed without any bridles on.

Scolding-Bridle. See Brank.

BRIDON, or Snaffle, after the Engliſh faſhion, is a very ſlender mouth-bit without any branches. The Engliſh make much uſe of them, and ſcarcely uſe any true bridles except in the ſervice of war. The French call them *bridons*, by way of diſtinction from bridles.

BRIDLINGTON, a ſea-port town in the eaſt riding of Yorkſhire in England. It is ſituated on a creek of the ſea near Flamborough-head, having a commodious quay for ſhips to take in their lading. It has a ſafe harbour, and is a place of good trade. It is more generally known by the name of *Burlington*, as it once gave title to an earl of that name. E. long. 0. 10. N. lat. 54. 15.

BRIDPORT, a town of Dorſetſhire in England. It has a low dirty ſituation between two rivers, which, at a little diſtance, joining a ſmall ſtream, formerly made a convenient harbour; but is now quite choked up with ſand. It ſends two members to parliament, who are choſen by the inhabitant houſeholders. It is noted for the manufacture of ropes and cables for ſhipping. W. long. 3. 0. N. lat. 50. 40.

BRIEF, in law, an abridgment of the client's caſe, made out for the inſtruction of counſel on a trial at law; wherein the caſe of the plaintiff, &c. is to be briefly but fully ſtated: the proofs muſt be placed in due order, and proper anſwers made to whatever may be objected to the client's cauſe by the oppoſite ſide; and herein great care is requiſite, that nothing be omitted, to endanger the cauſe.

In Scots law, it ſignifies a writ iſſued from the chancery, directed to any judge ordinary, commanding him to call a jury to inquire into the caſe mentioned in the brief, and upon their verdict to pronounce ſentence.

Apoſtolical Briefs, letters which the pope diſpatches to princes, or other magiſtrates, relating to any public affair.—Theſe briefs are diſtinguiſhed from bulls, in regard the latter are more ample, and always written on parchment, and ſealed with lead or green wax; whereas briefs are very conciſe, written on paper, ſealed with red wax, and with the ſeal of the fiſherman, or St. Peter in a boat.

BRIEG, a town of Sileſia in Germany, ſituated in E. long. 17. 35. N. lat. 50. 40.

BRIEL, a maritime town of the United Provinces, and capital of the iſland of Voorn. It was one of the cautionary towns which was delivered into the hands of queen Elizabeth, and garriſoned by the Engliſh during her reign and part of the next. The Dutch took it from the Spaniards in 1572, which was the foundation of their republic. It is ſeated at the mouth of the river Meuſe, in E. long. 3. 56. N. lat. 51. 53.

BRIESCIA, a palatinate in the duchy of Lithuania, in Poland. The name given to it by ſome is *Poleſia*. It is bounded on the north, by Novogrode and Troki; on the weſt, by thoſe of Bielſko and Lublin; on the ſouth, by that of Chelm and Upper Volhinia; and on the eaſt, by the territory of Rziczica. This province is of conſiderable extent from eaſt to weſt, and is watered by the rivers Bug and Pripeſe: it is full of woods and marſhes; and there are lakes that yield large quantities of fiſh, that are ſalted by the inhabitants, and ſent into the neighbouring provinces.

BRIEUX (St.), a conſiderable town of France, in the department of Finiſterre and late province of Brittany. It is ſeated in a bottom, ſurrounded with mountains, which deprive it of a proſpect of the ſea, though it is not above a mile and a quarter from it, and there forms a ſmall port. The churches, ſtreets, and ſquares, are tolerably handſome; but the town is without walls and ditches. The church of Michael is in the ſuburb of the ſame name, and is the largeſt in the place. The college is maintained by the town for the inſtruction of youth. W. long. 2. 58. N. lat. 48. 33.

BRIG, or Brigantine, a merchant-ſhip with two maſts. This term is not univerſally confined to veſſels of a particular conſtruction, or which are maſted and rigged in a manner different from all others. It is variouſly applied, by the mariners of different European nations, to a peculiar ſort of veſſel of their own marine. Amongſt Britiſh ſeamen, this veſſel is diſtinguiſhed by having her mainſails ſet nearly in the plane of her keel; whereas the mainſails of larger ſhips are hung athwart, or at right angles with the ſhip's length, and faſtened to a yard which hangs parallel to the deck: but in a brig, the foremoſt edge of the mainſail is faſtened in different places to hoops which encircle the mainmaſt, and ſlide up and down it as the ſail is hoiſted or lowered: it is extended by a gaff above and a boom below.

BRIGADE, in the military art, a party or diviſion of a body of ſoldiers, whether horſe or foot, under the command of

a brigadier.—An army is divided into brigades of horſe and brigades of foot: a brigade of horſe is a body of eight or ten ſquadrons; a brigade of foot conſiſts of four, five, or ſix battalions. The eldeſt brigade has the right of the firſt line, and the ſecond the right of the ſecond; the two next take the left of the two lines, and the youngeſt ſtand in the centre.

Brigade *Major*, is an officer appointed by the brigadier, to aſſiſt him in the management and ordering of his brigade.

BRIGADIER, is the general officer who has the command of a brigade. The eldeſt colonels are generally advanced to this poſt. He that is upon duty is brigadier of the day. They march at the head of their own brigades, and are allowed a ſerjeant and ten men of their own brigade for their guard. But the rank of brigadier general in the Britiſh ſervice is now aboliſhed.

BRIGANDINE, a coat of mail, a kind of ancient defenſive armour, conſiſting of thin jointed ſcales of plate, pliant and eaſy to the body.

BRIGANTINE. See Brig.

BRIGG, by ſome called *Glamford Bridges*, a town of England, in Lincolnſhire, ſeated on the river Ankam. W. long. 0 20. N. lat. 53. 40.

BRIGGS (Henry), one of the greateſt mathematicians in the 16th century, was born at Warley Wood in the pariſh of Halifax in Yorkſhire, in 1556. In 1592, he was made examiner and lecturer in mathematics, and ſoon after reader of the phyſic lecture founded by Dr. Linacer. When Greſham college in London was eſtabliſhed, he was choſen the firſt profeſſor of geometry there, about the beginning of March 1596. In 1609, Mr. Briggs contracted an intimacy with the learned Mr. James Uſher, afterwards archbiſhop of Armagh, which continued many years by letters, two of which, written by our author, are yet extant. In one of theſe letters, dated in Auguſt 1610, he tells his friend he was engaged on the ſubject of eclipſes; and in the other, dated March 10th, 1615, he acquaints him with his being wholly employed about the noble invention of logarithms, then lately diſcovered, in the improvement of which he had afterwards a great ſhare. In 1619, he was made Savilian profeſſor of geometry at Oxford; and reſigned his profeſſorſhip of Greſham college on the 25th of July 1620. Soon after his going to Oxford, he was incorporated maſter of arts in that univerſity; where he continued till his death, which happened on the 26th of January 1630. Dr. Smith gives him the character of a man of great probity; a contemner of riches, and contented with his own ſtation; preferring a ſtudious retirement to all the ſplendid circumſtances of life. He wrote, 1. *Logarithmorum chilias prima.* 2. *Arithmetica logarithmica.* 3. *Trigonometria Britannica.* 4. A ſmall tract on the north-weſt paſſage; and ſome other works.

BRIGHTHELMSTONE, a ſea-port town of Suſſex in England. It is rather a large and populous town, though ill built, and has a pretty good harbour. W. long. 0. 10. N. lat. 50. 50. It was at this place king Charles II. embarked for France, 1651, after the battle of Worceſter. It has of late years been conſiderably extended and embelliſhed, in conſequence of its having become a place of great reſort for ſea-bathing, and the uſual ſummer retreat of the Prince of Wales, who has a handſome pavilion there.

BRIGITTINS, or Bridgetins, more properly *Brigittins*, a religious order denominated from their founder St. Bridget or *Brigit*, a Swediſh lady in the 14th century. The rule of this order differs little from that of St. Auguſtin; only with certain additions ſuppoſed to have been revealed by Chriſt, whence they alſo denominate it the *Rule of our Saviour*.—The firſt monaſtery of the Bridgetin order was erected by the foundreſs about the year 1344, in the dioceſe of Lincopen; on the model of which all the reſt were formed. The Bridgetins profeſs great mortification, poverty, and ſelf-denial, as well as devotion; and they are not to poſſeſs any thing they can call their own, not ſo much as an halfpenny; nor even to touch money on any account. This order ſpread much through Sweden, Germany, the Netherlands, &c. In England we read but of one monaſtery of Brigittins, and this built by Henry V. in 1413, oppoſite to Richmond, now called *Sion-houſe*, the ancient inhabitants of which, ſince the diſſolution, are ſettled at Liſbon. The revenues were reckoned at 1495l. per annum.

BRIGNOLLES, a town of France, in the department of Var, and late province of Provence, famous for its prunes. It is ſeated among mountains, in a pleaſant country, 275 miles S. S. E. of Paris. E. long. 6. 15. N. lat. 43, 24.

BRIHUEGA, a town of Spain, in New Caſtile, where general Stanhope with the Engliſh army were taken priſoners, after they had ſeparated themſelves from that commanded by count Staremberg. It is ſeated at the foot of the mountain Tajuna, 43 miles north-eaſt of Madrid. W. long. 3. 20. N. lat. 41. 0.

BRIL (Matthew and Paul), natives of Antwerp, and good painters.—Matthew was born in the year 1550, and ſtudied for the moſt part at Rome. He was eminent for his performances in hiſtory and landſcape, in the galleries of the Vatican; where he was employed by Pope Gregory XIII. He died in 1584, being no more than 34 years of age.—Paul was born in 1554; followed his brother Matthew to Rome; painted ſeveral things in conjunction with him; and, after his deceaſe, brought himſelf into credit by his landſcapes, but eſpecially by thoſe which he compoſed in his latter time. The invention of them was more pleaſant, the diſpoſition more noble, all the parts more agreeable, and painted with a better guſto, than his earlier productions in this way; which was owing to his having ſtudied the manner of Hannibal Carrache, and copied ſome of Titian's works in the ſame kind. He was much in favour with Pope Sixtus V.; and for his ſucceſſor Clement VIII. painted the famous piece, about 68 feet long, wherein the ſaint of that name is repreſented caſt into the ſea with an anchor about his neck. He died at Rome in the year 1626, aged 72.

BRILLIANT, in a general ſenſe, is ſomething that has a bright and lucid appearance. In the manege, a briſk, high-mettled, ſtately horſe is called *brilliant*, as having a raiſed neck; a fine motion; and excellent haunches, upon which he riſes, though ever ſo little put on.

Brilliants, a name given to diamonds of the fineſt cut. See Diamond.

BRIM, denotes the outmoſt verge or edge, eſpecially of round things. The brims of veſſels are made to project a little over, to hinder liquors, in pouring out, from running down the ſide of the veſſel. The brimming of veſſels was contrived by the ancient potters, in imitation of the ſupercilium or drip of the cornices of columns: it is done by turning over ſome of the double matter when the work is on the wheel.

Brim, in country affairs. A ſow is ſaid to *brim*, or *to go to brim*, when ſhe is ready to take the boar.

BRIMSTONE. See Sulphur.

Brimstone *Medals*, *Figures*, &c. may be caſt in the following manner. Melt half a pound of brimſtone over a gentle fire: with this mix half a pound of fine vermilion; and when you have cleared the top, take it off the fire, ſtir it well together, and caſt it into the mould, which ſhould be firſt anointed with oil. When cool, the figure may be taken out.

BRIN, a ſtrong town of Bohemia, in Moravia. It is pretty large, and well built: the aſſembly of the ſtates is held alternately there and at Olmutz. The caſtle of Spilberg is on an eminence, out of the town, and is its principal defence. It was inveſted by the king of Pruſſia in 1742, but he was obliged

to raiſe the ſiege. It is near the river Swart, in E. long. 7. 8. N. lat. 49. 8.

BRINDISI, an ancient and celebrated town of the kingdom of Naples, with an archbiſhop's ſee, a fortreſs, and a harbour, which has been partly ſpoiled by the Venetians. It is ſeated on the gulf of Venice, 32 miles E. of Tarento. Lon. 18. 15. E. Lat. 40. 45. N.

BRINLEY (James), a moſt uncommon genius for mechanical inventions, and particularly excellent in planning and conducting inland navigations, was born, 1716, at Tunſted in Derbyſhire. Through the miſmanagement of his father (for there was ſome little property in the family) his education was totally neglected; and, at ſeventeen, he bound himſelf apprentice to a mill-wright, near Macclesfield, in Cheſhire. He ſerved his apprenticeſhip; and, afterwards, ſetting up for himſelf, advanced the mill-wright buſineſs, by inventions and contrivances of his own, to a degree of perfection which it had not attained before. His fame, as a moſt ingenious mechanic, ſpreading widely, his genius was no longer confined to the buſineſs of his profeſſion: for his abilities were exerciſed in undertakings of great public importance, no leſs than in the projecting and executing inland navigations, by which the expence of carriage is leſſened, communications are opened from one part of the kingdom to another, and from each of theſe parts to the ſea: whence produce and manufactures are afforded at a more moderate price. The duke of Bridgwater, in his vaſt undertakings, was particularly indebted to the talents of Brinley, who, in his ſervice, executed many arduous performances, of which none are more deſerving of admiration perhaps than the bold yet ſucceſsful ſcheme of carrying the canal from Worſley to Mancheſter over the river Irwell. When the canal was completed as far as Barton, where the Irwell is navigable for large veſſels, he found means to carry it over that river, by an aqueduct of thirty-nine feet above the ſurface of the water; a project by every one treated as wild and chimerical till it was actually accompliſhed in 1761. Brinley was engaged in a great number of ſimilar undertakings, for a full account of which we refer the reader to a curious pamphlet, publiſhed ſome years ſince, and intituled, "The Hiſtory of Inland-Navigations, particularly that of the Duke of Bridgwater." He died at Turnhurſt in Staffordſhire, Sept. 27th, 1772, in his 56th year; having, it is ſuppoſed, ſhortened his days by too intenſe application, which brought on a hectic fever, that continued for ſome years before it conſumed him. When any extraordinary difficulty occurred to him in the execution of his works, he generally retired to bed; and has been known to lie there one, two, or three days, till he has ſurmounted it. He would then get up, and execute his deſign without any drawing or model: for he had a prodigious memory, and carried every thing in his head. As his ſtation in life was low, and his education totally neglected, ſo his exterior accompliſhments were ſuitable to them. He could indeed read and write, but both very indifferently; and he was perhaps, in his way, as *abnormis ſapiens*—" of mother-wit, and wiſe without the ſchools"—as any man that ever lived.

BRINE, or Pickle: water replete with ſaline particles. Brine taken out of brine-pits, or brine-pans, uſed by ſome for curing or pickling of fiſh, without boiling the ſame into ſalt; and rock-ſalt, without refining it into white-ſalt; are prohibited by 1 Ann. cap. 21. Brine is either native, as the ſea-water, which by coction yields ſalt; or factitious, formed by diſſolving ſalt in water. In the ſalt-works at Upwick in Worceſterſhire, there are found at the ſame time, and in the ſame pit, three ſorts of brine, each of a different ſtrength. They are drawn by a pump; and that in the bottom, firſt brought up, is called *firſt man*; the next, *middle man*; and the third, *laſt man*.

Leach Brine, a name given to what drops from the corned ſalt in draining and drying, which they preſerve and boil again; being ſtronger than any brine in the pit. There is ſand found in all the Staffordſhire brines after boiling; but naturaliſts obſerve, it did not pre-exiſt in the water, but rather is the product of the operation.

Brine alſo denotes a pickle pregnant with ſalt, wherein things are ſteeped to keep.

Brine-*pans*, the pits wherein the ſalt-water is retained, and ſuffered to ſtand, to bear the action of the ſun, whereby it is converted into ſalt. There are divers ſorts of ſalt-pans, as the water-pan, ſecond pan, ſun-pan; the water being transferred ſucceſſively from one to another.

Brine-*pit*, in ſalt-making, the ſalt ſpring from whence the water to be boiled into ſalt is taken. There are of theſe ſprings in many places; that at Namptwich, in Cheſhire, is alone ſufficient, according to the account of the people of the place, to yield ſalt for the whole kingdom: but it is under the government of certain lords and regulators, who, that the market may not be overſtocked, will not ſuffer more than a certain quantity of the ſalt to be made yearly. See the next article.

Brine-*Springs*, are fountains which flow with ſalt-water inſtead of freſh. Of theſe there are many in South Britain, but though not peculiar to this iſland, they are far from being common in the countries on the continent. The moſt remarkable brine-ſprings are, one at Eaſt-Chennock in Somerſetſhire, about 20 miles from the ſea. Another at Leamington in Warwickſhire, very near the river Learn; which, however, is but weak. Such a ſpring likewiſe runs into the river Cherwell in Oxfordſhire, and ſeveral more in Weſtmoreland and Yorkſhire: but as they are but poor, and the fuel in moſt of thoſe countries ſcarce and dear, no ſalt is prepared from them. At Barrowdale near Grange, three miles from Keſwick in Cumberland, a pretty ſtrong ſpring riſes in a level near a moſs, 16 gallons of the water of which yield one of pure ſalt; which is the more remarkable, when it is conſidered that the ſame quantity of ſalt cannot be obtained from leſs than 22 gallons of the waters of the German ocean. At a place called *Salt-water Haugh*, near Butterpy, in the biſhopric of Durham, there are a multitude of ſalt ſprings which riſe in the middle of the river Weare, for the ſpace of about 40 yards in length, and ten in breadth; but particularly one out of a rock, which is ſo ſtrong that in a hot ſummer's day the ſurface will be covered with a pure white ſalt. Brine-ſprings are alſo found at Weſton, in Staffordſhire; at Namptwich, and Northwich, at the confluence of the Weever and the Dan; and in many other parts of England, ſo as to render it probable that there is an immenſe body of foſſile ſalt in the bowels of the earth, in ſome of the counties where theſe ſprings exiſt. At Middlewich, which ſtands at the confluence of the Croke and the Dan, there are ſalt-ſprings with a freſh brook running between them. The brines from theſe pits are of unequal ſtrength; but, when mixed, they commonly obtain four ounces of ſalt from a pound of brine. Experience ſhows, that in theſe ſprings the water is ſtrongeſt neareſt the bottom, richer in dry weather than in wet, and when long drawn than when firſt wrought. But theſe changes do not occur in other ſalt-ſprings, ſince in thoſe of the ci-devant Franche Comté the brine is ſtrongeſt in wet weather. There are ſeveral other bodies diſſolved in theſe brines beſides ſalt: in ſome a ſulphureous ſubſtance, which ſublimes as the brine heats: a ſort of dirty ochre which diſcolours the brine, but, if ſuffered to ſtand, ſpeedily ſubſides; and in moſt brines a ſelenitic earth, which ſettles to the bottom of the pans. See Salt and Spring.

To BRING to, in navigation, to check the courſe of a ſhip when ſhe is advancing, by arranging the ſails in ſuch a manner that they ſhall counteract each other, and prevent her either

from retreating or moving forward. In this situation the ship is said to lie-by, or lie-to; having, according to the sea-phrase, some of her sails *aback*, to oppose the force of those which are full; or having them otherwise shortened by being *furled*, or *hauled up in the brails*.

Bringing-*to*, is generally used to detain a ship in any particular station, in order to wait the approach of some other that may be advancing towards her; or to retard her course occasionally near any port in the course of a voyage.

Bringing-*in a Horse*, in the manege, the same as to say, keep down the nose of a horse that boars and tosses his nose in the wind: this is done by means of a branch.

BRINING of corn, in husbandry, an operation performed on the wheat seed, in order to prevent the smut. A liquor is to be prepared for this purpose, by putting into 70 gallons of water, in a tub, a corn-bushel of unslaked lime. Thus about a hogshead of strong lime-water will be obtained, to which must be added three pecks of salt. The wheat steeped in this pickle will be fit for sowing in two hours after the brining.

Brining *of hay-ricks*, a practice common in America, of mixing salt with the hay as it is stacked.

BRIONNE, a town of France, in Normandy, seated on the river Rille. E. long. 0. 51. N. lat. 49. 51.

BRIOUDE, in the department of Upper Loire, and late province of Velay in France, is the name of two towns, about a mile from each other; the one called *Church Brioude*, the other *Old Brioude*. Near the Old Town is a stone bridge on the river Allier, which consists of one arch, esteemed a stupendous structure, and thought to be a work of the Romans. The inhabitants have no manufactures. It is situated in E. long. 3. 25. N. lat. 45. 14.

BRIQUERAS, a town in Piedmont, seated in the valley of Lucern, three miles from the town of that name, and four south of Pignerol. E. long. 7. 24. N. lat. 44. 41.

BRISACH, a town of Germany, and capital of Brisgaw. It was once a very strong place, but the fortifications have been demolished. It is seated on the Rhine, where there is a bridge of boats. E. long. 7. 49. N. lat. 48. 5.

Brisach (New), a handsome town of France, in the department of the Upper Rhine, and late province of Alsace, built by order of Louis XIV. opposite to Old Brisach, and fortified by Vauban. It is 32 miles south of Strasburg. E. long. 7. 46. N. lat. 48. 5.

BRISEIS, or Hippodamia, in fabulous history, the wife of Mynes king of Lyrnessa. After Achilles had taken that city, and killed her husband, she became his captive. That hero loved her tenderly; but Agamemnon taking her from him, she became the accidental cause of numberless disorders in the Grecian army. Achilles, enraged, retired to his tent; and, till the death of Patroclus, refused to fight against the Trojans. The resentment of this prince is finely painted in the Iliad.

BRISGAW, a territory of Germany, in the circle of Suabia, on the eastern banks of the Rhine, about 50 miles in length, and 30 in breadth. The principal places are Old Brisach, New Brisach, Freyburgh, Rhinmarck, and an island in the Rhine.

BRISTLE, a rigid glossy kind of hair found on swine, and much used by brush-makers, &c.

BRISTOL, a city and sea-port of England, situated partly in Gloucestershire and partly in Somersetshire; to which last county it was accounted to belong, before it formed a separate jurisdiction. In wealth, trade, and population, it was long reckoned the second sea-port in this kingdom; but the custom-house receipts for Liverpool now greatly exceed those of Bristol, which no longer has pre-eminence with respect to the opulence and number of its inhabitants. It is seated at the confluence of the Avon with the small river Frome, about ten miles from the place where the Avon empties itself into the Severn. The tide rising to a great height in these narrow rivers, brings vessels of considerable burden to the quay, which extends along the inner shores of the Frome and Avon; but, at low water, they lie aground in the mud. Bristol has 18 churches, besides its cathedral, and several meetings for protestant dissenters, among whom the Quakers are a large body. The most remarkable church is St. Mary Radcliff, one of the finest in the kingdom. There is a bridge over the Avon, and an exchange. They have a considerable trade; for it is reckoned they send 2000 ships yearly to different parts of the world. Here are no less than 15 glass-houses, they having plenty of coal from King's-wood and Mendip-hills; and the sugar-refinery is one of its principal manufactures. The hot wells are much resorted to: they are of great purity, have obtained a high reputation in the treatment of consumptive cases, and are about a mile from the town, on the side of the Avon. In St. Vincent's Rock, above this well, are found those native crystals, so well known under the name of Bristol stones. Beside this well, there is a cold spring, which gushes out of a rock on the side of the river, that supplies the cold bath. In the college-green, stands a stately high cross of Gothic structure, decorated with the effigies of several of the kings of England. Near Queen's-square, which is adorned with rows of trees, and an equestrian statue of king William III. stands the custom-house. The walls have been demolished long ago; but there are several gates yet standing. They use sledges instead of carts, because the vaults of the common sewers will not admit them. Bristol has three markets, on Wednesday, Friday, and Saturday, and sends two members to parliament. It is 40 miles S. of Hereford, 60 N. E. of Exeter, 34 S. W. by S. of Gloucester, 50 S. S. W. of Worcester, 12 W. N. W. of Bath, and 124 W. of London. Long. 2. 36. W. Lat. 51. 28. N.

New Bristol, the capital of the county of Bucks in Pennsylvania, situated on the river Delawar, about 20 miles north of Philadelphia, in W. long. 75. N. lat. 40. 45.

Bristol *Water*. Of the four principal warm waters naturally produced in England this is the least so. It is held good in Phthisis pulmonalis, and its spring is of course much frequented by the consumptive class of invalids, though, it must be confessed, with success in very few instances. The hotter months are reckoned the best time for using it. It is said, the Bristol and Matlock waters are of exactly the same qualities. Doctors Mead and Lane first established the reputation of Bristol waters, by recommending them in diseases of the kidneys and bladder, though their efficacy in such cases cannot but be trivial.

BRITAIN, Britannia, also called Albion, from the white rocks on its coast, extends near 700 miles in length, and 300 miles in its greatest breadth; between 50 and 60 north lat. The Romans considered it as a distinct world by itself, *Et penitus toto divisos orbe Britannos*, Virg. ecl. i. 67. They divided it into two parts, *Romana* and *Barbara*, of different extent at different times, according to the progress of their conquests. *Britannia Romana* was divided into *Superior*, answering to Wales, and *Inferior*, comprehending the rest of it: likewise into *Britannia prima*, *secunda*; *Valentia*; *Maxima Cæsariensis*, and *Flavia Cæsariensis*; but the limits of these are not known.

The principal rivers of Britain are, *Tamesis*, Thames; *Sabrina*, the Severn; *Abus*, the Humber, composed of the Ouse, Trent, and other branches; *Vedra*, the Were or Tees, rather the former; *Tina*, the Tyne, *Ituna*, the Eden, running into the *Æstuarium Itunæ*, the Solway frith; *Tuaesis*, or *Tuesis*, the Tweed; *Bodotria*, or *Boderia*, the Forth; *Glota*, the Clyde; *Taus*, the Tay; *Devana*, the Dee, &c.

The west part of the island is in general mountainous. The

only mountain, however, which the Romans have diftinguifhed by a name, is *Mons Grampius*, the Grampian mountain, called alfo *Crofs-benn*, or the crofs mountain, which beginning near the mouth of the Dee, not far from Aberdeen, runs weftward to Cowal in Argylefhire, almoft the whole breadth of the ifland.

The chief ftates were, *Cantii*, inhabiting Kent; *Trinobantes*, Middlefex; *Belgæ*, or *Regni*, Hampfhire, Wiltfhire, Somerfetfhire: *Durotriges*, Dorfetfhire; *Damnonii*, Devonfhire and Cornwall; *Atrebates*, Berkfhire; *Silures*, South Wales; *Ordovices*, North Wales; *Iceni*, Effex, Suffolk, Norfolk, &c.; *Brigantes*, Yorkfhire; and feveral others.

Britannia Barbara, called alfo *Caledonia*, was never fubdued by the Romans, who did not penetrate farther than the *montes Grampii*. It was inhabited by the *Caledonians* and *Picts*, fo called, becaufe they painted their bodies; which practice indeed was common to all the Britons, as to other barbarous nations. *Scoti*, the Scots, are only mentioned by later writers, after the time of Theodofius; and generally fuppofed to have come from Ireland: but by fome they are reckoned to be a colony of Saxons.

The fouth-eaft part of Britain is thought to have been peopled from Gaul. Tacitus imagines the Caledonians, from their fize and colour of their hair, to have been of German extraction. The *Silures*, or Welfh, for fimilar reafons, are believed to have come from Spain.

The Britains had fcarcely any towns of note when invaded by the Romans. The termination *Chefter*, which is common to fo many towns in England, is thought to be derived from the Latin *caftra*, they having been places of Roman encampments. Londinum, London, was early remarkable for the great refort of merchants. *Camalodunum*, Malden, or according to others, Colchefter, was the firft Roman colony in Britain. The port moft frequented under the emperors, was, *Rutupiæ*, Richborough, in Kent, the *Portus Dubris*, or *-æ*, Dover was afterwards more famous: and *Lemanis*, Lyme, near which Cæfar is fuppofed to have firft landed. Other remarkable places were, *Durovernum*, Canterbury; *Durobrivis*, Rochefter; *Venta Belgarum*, Winchefter; *Durnium* or *Durnovaria*, Dorchefter; *Ifca*, Exeter; *Verulamium*, Verulam, near St. Alban's; *Aquæ Solis*, or *Calidæ*, Bath; *Clanum*, Gloucefter; *Deva*, Chefter, on the river Dee, where the ancient walls and fortifications ftill remain; *Lindum Colonia*, Lincoln; *Eboracum*, York; *Luguvallum*, Carlifle; *Alatra caftra*, fuppofed to be Edinburgh, called anciently *Edenodunum*, from its Celtic appellation, *Dune Aidan*, the eminence or citadel of Aidan, its proprietor; *Burg* is Saxon, anfwering to *dune* in the Celtic; or rather, according to others, from *Eden*, a Northumbrian king, who either built or poffeffed it.

The chief iflands round Britain are, *Vectis*, Wight; *Caffiterides*, fuppofed to be the Scilly Iflands, fo called, from their producing tin, by the Phœnicians and Greeks, who gave this name likewife to *promontorium Bolerium*, Landfend, and *Damnonium* or *Ocrinum*, the Lizard point, as alfo to a part of Cornwall; *Mona*, Anglefey, the feat of the Druids, and *Mona* or *Monæda*, Man; *Ebudæ*, or *-des*, called alfo by a more modern name *Hebrides*, the weftern ifles of Scotland; *Orcades*, the Orkneys, oppofite to the promontory *Orcas*, Dungfbyhead: to which add the Shetland iflands, fuppofed to be the *Ultima Thule* of the ancients, which they imagined the moft remote part of the earth towards the north.

Manners and Cuftoms of the Ancient Britons.—When the Romans invaded Britain, it was divided into a number of fmall independent ftates, which facilitated the conqueft of it. Each ftate was governed by a king or chief magiftrate, and under him by feveral chieftains, who ruled each his own tribe with a kind of fubordinate authority. One of the chief parts of the regal office was to command in war; which thefe fovereigns always executed in perfon, whether they were kings or queens; for in this refpect, as in fucceeding to the crown, there was no diftinction of fexes "*neque enim fexum in imperiis difcernunt*," Tacit. Agric. 16. Thefe kings were frequently at war with one another, though Diodorus Siculus fays they ufually lived in peace.

The authority of the kings of Britain was greatly controuled by the priefts called Druids *(Druidæ)*, who were not only the minifters of religion, but alfo poffeffed the right of making laws, of explaining and executing them. Their power, and confequently the honour paid them, was incredibly great. They were confidered as the interpreters of the Gods; they were exempted from all taxes and military fervices; and their perfons were held facred and inviolable.

There were two other claffes of men highly refpected both in Gaul and Britain, the one called *Bards* (Bardi), who fang hiftorical and heroic fongs in praife of brave warriors; and the other, prophets (Vates), who foretold future events, from omens and the entrails of victims, Diodor. & Strab. ibid. for the Druids were much addicted to divination, Cic. Divin. i. 41. and to gratify that propenfity committed acts of the greateft cruelty.

The Britons were much more united with refpect to religious than political matters. The conftant jealoufy and frequent hoftility which fubfifted between the different ftates were very unfavourable to external defence. To this want of union Tacitus afcribes their fubjection to the Romans, Agric. 12. who, according to their ufual art, firft formed alliances with fome of the ftates, and employed their affiftance to crufh the reft, ib. 14.; Annal. xii. 31 & 32. then quarrelling with their allies, they reduced them alfo: which was fooner or later the fate of all the allies of Rome.

When the Romans firft invaded Britain, there was hardly in the ifland any thing anfwering to our ideas of a city or town. The dwellings of the Britons were fcattered over the country, like thofe of the ancient Germans, and generally fituated on the brink of fome rivulet, for the fake of water, and on the fkirt of fome wood or foreft, for the convenience of hunting, and pafture for their cattle, Tacit. Mor. Ger. 16. For, when invaded by the Romans, moft of the inhabitants of the interior parts of Britain lived on milk and flefh, without corn; and had no clothing but fkins.

The principal ftrength of the Britifh forces confifted in infantry; although they alfo had a numerous cavalry; and fome nations likewife fought from chariots *currus (effeda v. covini; unde* essedarii *vel* covinarii, *vocabantur, qui inde pugnabant)*, armed with fcythes, Mela, iii. 6. which they managed with great dexterity. The chieftains managed the reins, while their dependents fought from the chariot, Tacit. Agric. 12. Diodor. v. 21.

The cruel policy of the Romans in difarming the inhabitants of the conquered provinces, produced a wonderful change of character in the Britons; which the artful conduct of Agricola contributed greatly to accelerate. After building caftles and forts in proper places through the diftricts which had fubmitted, he ufed every poffible method to habituate the natives to the arts of peace, by exhorting them in private, and aiding them in public, to build temples, courts of juftice, and commodious dwelling-houfes. The children of the chief men he caufed to be inftructed in the liberal arts, and is faid to have preferred the genius of the Britons to the learning of the Gauls. Thus thofe who lately difdained the Roman language, grew fond of its beauties, Tacit. Agric. 21. The Roman habit began to be refpected, and the *toga* became fafhionable. By degrees they acquired a tafte for thofe refinements which ftimulate to vice *(delinimenta vitiorum)*, porticos, baths, and ele-

gant entertainments; and what conſtituted part of their ſlavery was, through inexperience, termed by them *humanity* or politeneſs, Tacit. ib. Thus the Britons, after being ſubjected to the Roman yoke, although greatly increaſed in numbers, and improved in point of domeſtic enjoyment, ſunk in a ſhort time from being one of the braveſt of nations into feebleneſs and effeminacy; ſo that when the Romans left them, they were in a manner quite defenceleſs, and thus became an eaſy prey to the firſt invaders.

Modern Diviſions of England.—England is divided into the kingdom of England, and principality of Wales. England comprehends ſix circuits, beſides Middleſex and Cheſhire, which belong to no circuit; the former being the ſeat of the ſupreme courts of juſtice, and the latter what is called a *county-palatine*, privileged with having its own judges.

The chief mountains in England are the hills of Weſtmoreland, the Malvern hills in Worceſter, the Peak in Derby, Snowdon and Plenlimmon in Wales.

The chief ports for the Navy are, Portſmouth, Plymouth, Deptford, and Chatham.

The chief trading towns are, London, Liverpool, Briſtol, and Hull; Birmingham is famous for hard-ware manufactures, buttons, buckles, &c.; Sheffield, for cutlery; Mancheſter, for cottons, checks, dimities, &c.; Norwich, for druggets and camblets; Colcheſter, for its bays and ſerges, &c.; Cornwall and Devonſhire ſupply tin and lead, &c.

There are five harbours on the coaſt of Suſſex and Kent, namely, Haſtings, Dover, Hythe, Romney, and Sandwich, which are called *Cinque-ports*. Theſe had anciently very conſiderable privileges, on account of their fitting out ſhips for the defence of the coaſt againſt any invader. They are ſtill under the government of the conſtable of Dover caſtle. The five cinque-ports, with their three dependents, Rye, Winchelſea, and Seaford, ſend 16 members to the Britiſh parliament, who are ſtyled *Barons of the cinque-ports*.

The inhabitants of England and Wales are generally computed at ſeven millions.

The eſtabliſhed religion is the reformed. The *Church of England* is governed by biſhops, whoſe benefices were converted by the Norman conqueror into temporal baronies; in right of which every biſhop, except the biſhop of Sodor and Man, has a ſeat in the houſe of peers. The king is the head of the church; under him there are two archbiſhops, and twenty-four biſhops. The archbiſhops are thoſe of Canterbury and York. The former is the firſt peer of the realm, and takes precedence before all dukes and officers of ſtate, except the members of the royal family. Beſides his own dioceſe, he has under him the biſhops of London, Wincheſter, Ely, Lincoln, Rocheſter, Lichfield and Coventry, Hereford, Worceſter, Bath and Wells, Saliſbury, Exeter, Chicheſter, Norwich, Oxford, Glouceſter, Peterborough, Briſtol; and in Wales, St. David's, Landaff, St. Aſaph, and Bangor.

The archbiſhop of York takes place of all dukes not of the blood royal, and of all officers of ſtate, the Lord Chancellor excepted. He has in his province, beſides his own dioceſe, the biſhopricks of Durham, Carliſle, Cheſter, and Sodor and Man.

The eccleſiaſtical government of England is lodged in the convocation, or aſſembly of the clergy. But as ſome clergymen in the reign of queen Anne, and the beginning of the reign of George II. endeavoured to raiſe its power too high, the king exerted his prerogative of calling the members together, and diſſolving them at pleaſure; and ſince that time they have never met to do buſineſs.

The civil government of England reſides in the king, lords, and commons, who, together, form the parliament, or ſovereign council of the nation. The houſe of commons conſiſts of five hundred and thirteen Engliſh repreſentatives, and of forty-five Scots, in all five hundred and fifty-eight.

The general diviſion of Britain is into England, Scotland, and Wales: for a more particular deſcription, ſee thoſe articles.

New-Britain, a large country of North America, called alſo *Terra Labrador*, has Hudſon's bay and ſtrait, on the north and weſt; Canada and the river St. Lawrence, on the ſouth; and the Atlantic ocean, on the eaſt. It is ſubject to Great Britain, but yields only ſkins and furs. The following extracts from a deſcription of this country were publiſhed in the *Phil. Tranſ.* Vol. lxiv.

"There is (ſays this writer) no part of the Britiſh dominions ſo little known as the immenſe country of Labrador. So few have viſited the northern parts of this vaſt country, that almoſt from the ſtreights of Belleiſle until you come to the entrance to Hudſon's bay, for more than ten degrees of latitude, no chart which can give any tolerable idea of the coaſt has been hitherto formed. The barrenneſs of the country explains why it has been ſo ſeldom frequented. Here avarice has but little to feed on.

"Its ſea-coaſt is moſt remarkable. Bordered by innumerable iſlands, and many of them being a conſiderable diſtance from the main land, a ſhip of burden would ſail a great way along the coaſt without being able to form any notion of its true ſituation. Hence it is that all charts of it have been ſo extremely erroneous; and hence aroſe thoſe opinions that ſome of the inlets extended a vaſt diſtance into the country, if not quite into the ſea of Hudſon's bay. Davis's inlet, which has been ſo much talked of, is not 20 leagues from the entrance of it to its extremity. The navigation here is extremely hazardous. Towards the land, the ſea is covered with large bodies and broken pieces of ice; and the farther you go northward, the greater is the quantity you meet with.

"Some of thoſe maſſes, which the ſeamen call *iſlands of ice*, are of a prodigious magnitude; and they are generally ſuppoſed to ſwim two thirds under water. You will frequently ſee them more than 100 feet above the ſurface; and to ſhips in a ſtorm, or in thick weather, nothing can be more terrible. Thoſe prodigious pieces of ice come from the north, and are ſuppoſed to be formed by the freezing of cataracts upon the lands about Eaſt Greenland and the Pole. As ſoon as the ſeverity of the winter begins to abate, their immenſe weight breaks them from the ſhore, and they are driven to the ſouthward. To the miſerable inhabitants of Labrador their appearance upon the coaſt ſerves as a token of the approach of ſummer.

"This vaſt tract of land is extremely barren, and altogether incapable of cultivation. The ſurface is every where uneven, and covered with large ſtones, ſome of which are of amazing dimenſions. There are few ſprings; yet throughout the country there are prodigious chains of lakes or ponds, which are produced by the rains and the melting of the ſnow. Theſe ponds abound in trout, but they are very ſmall.

"There is no ſuch thing as level land. It is a country formed of frightful mountains, and unfruitful valleys. A blighted ſhrub and a little moſs are ſometimes to be ſeen upon them, but in general the bare rock is all you behold. The valleys are full of crooked low trees, ſuch as the different pines, ſpruce, birch, and a ſpecies of cedar. Up ſome of the deep bays, and not far from the water, it is ſaid, however, there are a few ſticks of no inconſiderable ſize. In a word, the whole country is nothing more than a prodigious heap of barren rocks.

"The climate is extremely rigorous. There is but little appearance of ſummer before the middle of July; and in September the approach of winter is very evident. It has been re-

marked, that the winters within these few years have been less severe than they have been known heretofore. The cause of such an alteration it would be difficult to discover.

"All along the coast there are many rivers that empty themselves into the sea, yet there are but few of any consideration; and you must not imagine that the largest are any thing like what is generally understood by a river. Custom has taught us to give them this appellation; but the greatest part of them are nothing more than broad brooks or rivulets. As they are only drains from the ponds, in dry weather they are every where fordable; for, running upon a solid rock, they become broad without having a bed of any depth below the surface of the banks.

"The superficial appearance of this country is extremely unfavourable. What may be hidden in its bowels, we cannot pretend to suggest: probably it may produce some copper; the rocks in many places are impregnated with an ore of that resemblance. Something of an horny substance, which is extremely transparent, and which will scale out into a multitude of small sheets, is often found amidst the stones; there are both black and white of this sort. But the black is the most rare. It has been tried in the fire, but seems to be noways affected by heat.

"The species of wood here are not very various: excepting a few shrubs which have as yet received no name from the Europeans, the principal produce of the country is the different sorts of spruce and pine. Of these, even in the more southern parts, there is not abundance; as you advance northwards they gradually diminish; and by the time you arrive at the 60th degree of latitude, the eye is not delighted with any sort of herbage. Here the wretched residents build their miserable habitations with the bones of whales. If ever they cheer their aching limbs with a fire, they gather a few sticks from the sea shore, which have probably been washed from Norway or Lapland. A vast quantity of snow remains upon the land throughout the year.

"Although the winter here is so excessively rigid, in summer the heat is sometimes disagreeable; and in that season the weather is very moderate, and remarkably serene. It is but seldom foggy, speaking comparatively, between this and Newfoundland; nor are you so frequently liable to those destructive gales of wind which visit many other parts of the globe. It is in general high land, and sometimes you meet with mountains of an astonishing height; you are also frequently presented with prospects that are really awful, and extremely romantic."

The inhabitants of New Britain are called *Eskimaux*; for a particular account of whom, see the article ESKIMAUX.

BRITE, or BRIGHT, in husbandry. Wheat, barley, or any other grain, is said to *brite*, when it grows over ripe and shatters.

BRITTANY, or BRETAGNE, a considerable province of France, which is 150 miles in length, and 112 in breadth. It is a peninsula, surrounded on all sides by the ocean, except on the east where it joins to Anjou, Maine, Normandy, and Poitou. It is divided into five of the new departments of France. It carries on a great trade, by reason of the many harbours on its coasts. It was united to France in 1532. Rennes is the capital town.

BRITTLENESS, that quality of bodies which subjects them to be easily and completely broken by pressure or percussion.

Brittle bodies are extremely hard; a very small percussion exerts a force on them equivalent to the greatest pressure, and thus may easily break them. This effect is particularly remarkable in glass suddenly cooled, the brittleness of which is thereby much increased. Tin, though in itself tough, gives a brittleness to all the other metals when mixed with them.

BRITTON (Thomas), the famous musical smallcoal-man, was born at Higham Ferrers in Northamptonshire. He served his time in London, where he set up in a stable, next door to the little gate of St. John of Jerusalem, on Clerkenwell-green, which he converted into a house. Here getting acquainted with Dr. Garenciers, his near neighbour, he became an excellent chemist, constructing a movable laboratory which was much admired by all who saw it. His skill in music was not inferior to that in chemistry, either in the theory or practice; he had for many years a well frequented musical club, meeting at his own little cell; and was as well respected as known by persons of the first quality; being, above all, a valuable man in his moral character. In Ward's account of clubs, we are told, that "Britton's was first begun, or at least confirmed, by Sir Roger L'Estrange, a very musical gentleman; and that the attachment of Sir Roger and other ingenious gentlemen, lovers of the muses, to Britton, arose from the profound regard he had in general to all manner of literature. It is observable, that this meeting was the first of the kind, and the undoubted parent of some of the most celebrated concerts in London. Ward, who was his cotemporary, says, that at the first institution of it, his concert was performed in his own house, which is thus described. "On the ground floor was a repository for small-coal: over that was the concert room, which was very long and narrow; and had a ceiling so low, that a tall man could but just stand upright in it. The stairs to this room were on the outside of the house, and could scarce be ascended without crawling. The house itself was very old and low built, and in every respect so mean as to be a fit habitation only for a very poor man." This mansion, however, despicable as it may seem, attracted to it as polite an audience as ever the opera did. At these concerts Dr. Pepusch, Mr. Handel, Mr. Bannister, Mr. Henry Needler, and other capital masters, were performers. At the first institution of this club, it is certain Britton would receive no gratuity whatever from his guests, and was offended whenever any was offered him. According to some, however, he departed from this; and the rules were, Britton found the instruments, the subscription was 10s. a year, and they had coffee at a penny a dish. The singularity of his character, the course of his studies, and the collections he made, induced suspicions that Britton was not the man he seemed to be. Among other groundless conjectures, his musical assembly was thought by some to be only a cover for seditious meetings; by others, for magical purposes; and Britton himself was taken for an atheist, a presbyterian, a jesuit, &c. The circumstances of this man's death are not less remarkable than those of his life. There lived at that time one Samuel Honeyman, a blacksmith by trade, who became very famous for a faculty which he possessed of speaking as if his voice proceeded from some distant part of the house where he stood; in short, he was one of those men called *Ventriloqui*, *i. e.* those that speak from their bellies: See VENTRILOQUISM. One Robe, an acquaintance of Britton's, was foolish enough to introduce this man, unknown, to Britton, for the sole purpose of terrifying him: and he succeeded in it. Honeyman, without moving his lips, or seeming to speak, announced, as from afar off, the death of Britton within a few hours, with an intimation that the only way to avert his doom was for him to fall on his knees immediately and say the Lord's prayer: the poor man did as he was bid, went home and took to his bed, and in a few days died, leaving his friend Mr. Robe to enjoy the fruits of his mirth. This happened in September 1714. Britton left behind him a large collection of books, music, and musical instruments. Of the former Sir Hans Sloane was a considerable purchaser. His collection of music, mostly pricked by himself, and very neatly, sold for near 100l. In the British Museum there is a painting of him taken from the life.

BRIVES-LA-GALLARD, a town of France, in the department of Correze and late province of Limofin. It ftands in a fruitful plain, oppofite to an ifland formed by the river Correze, over which there are two handfome bridges. E. long. 1. 45. N. lat. 45. 15.

BRIXEN (the bifhopric of), is feated in Tirol, in Germany, near the frontiers of Friuli and Carinthia, towards the eaft. The bifhop has a vote and feat in the diet of the empire, and furnifhes his contingent when any tax is laid in Tirol. The principal places are Brixen, Sertzingen, Breuneck, and Lientz.

BRIXEN, the capital of the bifhopric of the fame name, and where the bifhop commonly refides, is feated on the river Eifache, at fome diftance from the mountain Brenner. It is furrounded with mountains, where there are plenty of vineyards, which yield good red wine. It is a populous town; and the houfes are well built with piazzas, and are painted on the outfide. The public buildings are very handfome, and there are feveral fpacious fquares. It is much frequented, on account of the mineral waters that are near it. E. long. 11. 50. N. lat. 46. 35.

BRIZA, QUAKING-GRASS, in botany; a genus of the digynia order, belonging to the triandria clafs of plants; and in the natural method ranking under the 4th order, *Gramina*. The calyx is two-valved, and multiflorous; the fpicula bifarious, or fpread to the two fides; with the fmall valves heart-fhaped and blunt, and the inner one fmall in proportion to the reft. There are five fpecies of briza, two of which are natives of Britain, *viz*. the media or middle quaking-grafs, and the minor or fmall quaking-grafs. They grow in pafture grounds.

BRIZE, in hufbandry, denotes ground that has lain long untilled.

BRIZE-*Vents*, fhelters ufed by gardeners who have not walls on the north-fide, to keep cold winds from damaging their beds of melons. They are inclofures about fix or feven feet high, and an inch or more thick; made of ftraw, fupported by ftakes fixed into the ground, and props acrofs on both infide and outfide; and faftened together with willow-twigs, or iron-wire.

BROACH, BROCHA, from the French *broche*, denotes an awl or bodkin; alfo a large packing-needle. A fpit, in fome parts of England, is called a *broach*; and from this word comes to pierce or broach a barrel. In Scotland, *broach*, *broche*, or *brotche*, is the name of an ornament or buckle which the Highlanders ufe like the *fibula* of the Romans, to faften their veft. They are ufually made of filver; of a round figure; with a tongue croffing its diameter, to faften the folds of the garment; fometimes with two tongues, one on each fide of a crofs-bar in the middle. There are preferved, in feveral families, ancient brotches of very elegant workmanfhip, and richly ornamented. Some of them are infcribed with names, to which particular virtues ufed to be attributed; others are furnifhed with receptacles for relics, fuppofed to preferve from harm. So that thefe brotches feem to have been worn not only for ufe but as amulets. One or two of this fort are figured and defcribed by Mr. Pennant, *Tour in Scotl.* i. 90. iii. 14. edit. 3d.

BROADCAST, as oppofed to the drill hufbandry, denotes the method of cultivating corn, turnips, pulfe, clover, the foreign graffes, and moft other field-plants that are not tranfplanted, by fowing them with the hand; in which method they are fcattered over the ground at large, and thence faid to be fown in broad-caft. This is called the *old hufbandry*, to diftinguifh it from the drill, horfe-hoeing, or new hufbandry. See HUSBANDRY.

BROAD-*piece*, a denomination given to certain gold pieces broader than a guinea; particularly Carolufes and Jacobufes, of which few are now to be found in circulation.

BROAD-*fide*, in the fea-language, a difcharge of all the guns on one fide of a fhip at the fame time. A broad-fide is a kind of volley of cannonade, and ought never to be given at a diftance from the enemy above mufket fhot at point-blank.

BROCADE, or BROCADO, a ftuff of gold, filver, or filk, raifed and enriched with flowers, foliages, and other ornaments, according to the fancy of the merchants or manufacturers. Formerly the word fignified only a ftuff, wove all of gold, both in the warp and in the woof, or all of filver, or of both mixed together; thence it paffed to thofe of ftuffs in which there was filk mixed, to raife and terminate the gold or filver flowers: but at prefent all ftuffs are called brocades, even thofe of filk alone, whether they be grograins of Tours or of Naples, fatins, and even taffeties or luftrings, if they be but adorned and worked with fome flowers or other figures. *Brocades* are at prefent out of fafhion in England.

BROCADE *Shell*, the Englifh name of a fpecies of LIMAX.

BROCATEL, or BROCADEL, a kind of coarfe brocade; chiefly ufed for tapeftry.

BROCCOLI, a kind of cabbage cultivated for the ufe of the table. See BRASSICA.

BROCHE, or BROACH. See BROACH.

BROCK, among fportfmen, a term ufed to denote a badger. A hart too, of the third year, is called a *brock*, or *brocket*; and a hind of the fame year is called a *brocket's fifter*.

BROD, a town of Hungary, in the county of Poffega in Sclavonia, feated on the river Save. It was once more confiderable than at prefent; and is memorable for a victory obtained over the Turks in 1668. E. long. 18. 36. N. lat. 45. 20.

BRODEAU (John), in Latin *Brodæus*, a great critic, on whom Lypfius, Scaliger, Grotius, and all the learned have beftowed great encomiums, was defcended from a noble family in France, and born at Tours in 1500. He was liberally educated, and placed under Alciat to ftudy the civil law; but foon forfaking that, he gave himfelf up wholly to languages and the belles lettres. He travelled into Italy, where he became acquainted with Sadolet, Bembus, and other famous wits; and here (fays Thuanus) he applied himfelf to the ftudy of mathematics, philofophy, and the facred languages, in which he made no fmall proficiency. Then, returning to his own country, he led a retired, but not an idle, life, as his many learned lucubrations abundantly teftify. He was a man free from all ambition and vain glory, and fuffered his works to be publifhed rather under the fanction and authority of others than under his own. His chief works are, 1. A commentary on the *Anthologia*. 2. Ten books of mifcellanies. 3. Notes on Oppian, Euripides, &c. He died in 1563, aged 63.

BRODDERA, or BRODRA, a town of Afia, in the empire of the Great Mogul. It ftands in a large fandy plain, on the little river Waffet; and is fortified, after the old way, with pretty good walls and towers. It is inhabited by Banians and callico weavers. The country about it produces plenty of gum-lac and indigo. E. long. 72. 30. N. lat. 22. 10.

BROGLING FOR EELS; the fame with SNIGGLING.

BROGLIO, a town of Piedmont in Italy, and capital of a county of the fame name, fituated near the frontiers of Provence, in E. long. 6. 42. N. lat. 44. 12.

BROKE (Sir Robert), lord chief juftice of the common pleas, was the fon of Thomas Broke, Efq; of Claverly in Shropfhire, and educated at Oxford; from whence he removed to the Middle Temple, and foon became a very eminent lawyer. In the year 1542, he was chofen fummer reader, and double reader in 1550. In 1552, he was made ferjeant at law; and the year following (firft of queen Mary), lord chief

justice of the common pleas; about which time he received the honour of knighthood. Stow says he was recorder of London and speaker of the house of commons; which is confirmed by a manuscript in the Ashmolean library. He died and was buried at Claverly in Shropshire, the place of his nativity, in 1558. Wood gives him the character of a great lawyer and an upright judge. His works are, 1. An abridgement containing an abstract of the year-books till the time of queen Mary. 2. Certain cases adjudged in the reign of Henry VIII. Edward VI. and queen Mary. 3. Reading on the statute of limitations, 32 Hen. VIII. c. 2.

BROKEN WIND, among farriers. See FARRIERY.

BROKER. The origin of the word is contested; some derive it from the French *broier*, "to grind;" others from *brocarder*, "to cavil, or triggle;" others deduce broker from a trader broken, and that from the Saxon *broc* "misfortune," which is often the true reason of a man's breaking. In which view, a broker is a broken trader by misfortune; and it is said none but such were formerly admitted to that employment.

BROKERS are of three kinds; exchange-brokers, stock-brokers, and pawn-brokers.

Exchange BROKERS, are a sort of negotiators, who contrive, make, and conclude bargains between merchants and tradesmen, in matters of money or merchandise, for which they have a fee or premium. These, in old English law-books, are called *broggers*, and in Scotland, *broccarii*, i. e. according to Skene, mediators or intercessors in any contract, &c.

They make it their business to know the alteration of the course of exchange, to inform merchants how it goes, and to notify to those who have money to receive or pay beyond sea, who are proper persons for negotiating the exchange with; and when the matter is accomplished, that is, when the money is paid, they have for brokage 2s. per 100l. sterling. These, by the statute of 8 and 9 William III. are to be licensed in London by the lord mayor, who gives them an oath, and takes bond for the faithful execution of their offices. If any person shall act as broker without being thus licensed and admitted, he shall forfeit the sum of 500l.: and persons employing him 5l.; and brokers are to register contracts, &c. under the like penalty: also brokers shall not deal for themselves, on pain of forfeiting 200l. They are to carry about with them a silver medal, having the king's arms and the arms of the city, and pay 40s. a year to the chamber of the city.

In France, till the middle of the 17th century, their exchange-brokers were called *courtiers de change*; but by an arrêt of council in 1639, the name was changed for that more creditable one of *agent de change, banque, & finance*; and in the beginning of the 18th century, to render the office still more honourable, the title of *king's counsellors* was added. At Grand Cairo, and several places of the Levant, the Arabs, who do the office of exchange-brokers, are called *consuls*. See CONSUL.

The exchange-brokers at Amsterdam, called *makelders*, are of two kinds: the one, like the English, called *sworn brokers*, because of the oath they take before the burgomasters: the others negotiate without any commission, and are called *walking brokers*. The first are in number 395; whereof 375 are Christians, and 20 Jews: the others are near double that number; so that in Amsterdam there are near 1000 exchange-brokers. The difference between the two consists in this: The books and persons of the former are allowed as evidence in the courts of justice; whereas, in case of dispute, the latter are disowned, and their bargains set aside. The fee of the sworn exchange-brokers of Amsterdam is fixed by two regulations, of 1613 and 1623, with regard to matters of exchange, to 18 sols for 100 livres de gros, or 600 florins; i. e. three sols for 100 florins; payable, half by the drawer and half by the person who pays the money. But custom has given rise to various alterations in that respect.

The Jews, Armenians, and Banians, are the chief brokers throughout most parts of the Levant and the Indies. In Persia, all affairs are transacted by a sort of brokers whom they call *delal*, i. e. great talkers. The manner of making their markets is very singular: after the brokers have launched out into long, and usually impertinent discourses, coming towards a conclusion, they only converse with their fingers. The buyer and seller's broker each take the other by the right hand, which they cover with their coat, or a handkerchief: the finger stretched out stands for six; bent for five; the tip of the finger for one; the whole hand for 100; and the hand clenched, for 1000. They will express even pounds, shillings, and pence, by particular positions of the hand. During all this mystic commerce, the two brokers appear as cool and composed as if there were nothing passing between them.

The French distinguish two kinds of brokers; one for the service of merchants, the other of manufacturers, artificers, and workmen. The business of the former is to facilitate the sale of goods in the wholesale and mercantile way; that of the other, to procure the goods wanted for manufacturers, artificers, &c. or to sell their goods when made. At Paris there is scarcely a company of tradesmen, or even mechanics, that have not their brokers, who are usually taken out of their body, and make it their sole business to negotiate in the particular kinds of goods to which such company is restrained by statute. There are brokers for drapery, brokers for grocery, brokers for mercery, &c. There are even brokers for tanners, curriers, cutlers, &c. &c.

Stock-BROKERS, are those who are employed to buy and sell shares in the joint stock of a company or corporation, and also in the public funds. As the practice of stock-jobbing has been carried to such an excess as became not only ruinous to a great number of private families, but even affected, or at least might soon affect, the public credit of the nation, the legislature thought fit to put some restraints upon it. The negotiations of these brokers are accordingly regulated by stat. 6 Geo. I. cap. 18. and 7 and 10 Geo. II. cap. 8. which, among other things, enact, that contracts in the nature of wagers, &c. incur a penalty of 500l. and by the sale of stock of which the seller is not possessed, a forfeit of 100l.; and that brokers keep a book, in which all contracts, with their dates, and the names of the parties concerned, shall be entered, on pain of 50l. Notwithstanding these legal restrictions, however, it has been surmised, that the public occasionally suffer by the artful manœuvres of these gentry.

Pawn-BROKERS, persons who keep shops and lend money upon pledges to necessitous persons, and most commonly at an exorbitant interest. They are more properly styled *pawn-takers*, or *tally-men*; sometimes *fripers*, or *fripperers*: these are meant in 1 Jac. I. cap. xxi. sect. 5. By the act 29 Geo. III. c. 57. for further regulating the trade or business of pawnbrokers, which is continued for two years by 33 Geo. III. c. 53, Pawn-brokers may legally take a profit after the following rates: For every pledge upon which there shall have been lent any sum not exceeding 2s. 6d. one halfpenny, for any time the said pledge shall remain in pawn, not exceeding one calendar month, and the same for every month afterwards, including the month in which such pledge shall be redeemed, although such month shall not be expired.

Where there shall have been lent 5s.—one penny; 7s. 6d.—one penny halfpenny; 10s.—two pence; 12s. 6d.—two pence halfpenny; 15s.—three pence; 17s. 6d.—three pence halfpenny; 1l.—four pence; and so on in proportion for any sum not exceeding 40s.

Where there ſhall have been lent any ſum above 40s. and not exceeding 10l. at and after the rate of three-pence, and no more, for the loan of every 20s. by the calendar month, including the current month; and ſo in proportion for any fractional ſum. Which ſums ſhall be taken as a full ſatisfaction for intereſt and warehouſe room.

Where goods are pawned for any ſum of money exceeding 5s. the pawn broker before he advances the money ſhall enter in a fair and regular manner, in a book kept by him for that purpoſe, a deſcription of the goods or chattels which he ſhall receive in pawn, the ſum of money to be advanced thereon, with the day of the month and year on which, and the name and place of abode of the perſon by whom ſuch goods are ſo pawned, and alſo the name and place of abode of the owner thereof, according to the information of the perſon pawning the ſame; and where the money lent on any goods ſhall not exceed the ſum of 5s. entry ſhall be made in a book by the pawn-broker within four hours after the ſaid goods ſhall have been ſo pawned; and every pawn-broker ſhall, at the time of taking every pawn whatſoever, give to the perſon ſo pawning the ſame, a note, fairly written or printed, or in part written and in part printed, containing therein a deſcription of the goods which he ſhall have received in pawn, and alſo the ſum advanced, with the date, alſo the name and place of abode of the perſon by whom ſuch goods are ſo pawned, and the name and place of abode of the owner thereof; alſo upon the ſaid note, or on the back thereof, ſhall be written or printed the name and place of abode of the pawn-broker giving the ſame; which ſaid note the party pawning the ſaid goods is required to accept in all caſes, and the pawn-broker ſhall not receive ſuch pledge unleſs the party pledging ſhall accept the ſame; and every ſuch note, where the ſum lent ſhall be leſs than 5s. ſhall be delivered gratis; if 5s. and leſs than 10s. the pawn-broker may take one halfpenny for the ſame; if 10s. and leſs than 20s. —one penny; if 20s. and leſs than 5l.—two pence; if 5l. or upwards,—four pence, and no more; and which note ſhall be produced to the pawn-broker before he ſhall be obliged to re-deliver the reſpective goods, except as herein-after is excepted.

Perſons pawning goods are allowed ſeven days after the expiration of the firſt month, without paying any thing for the ſaid ſeven days, and if after the expiration of ſeven days, and if before the expiration of fourteen days, by paying for one month and a half; but if the fourteen days have expired, the pawn-broker is intitled to the intereſt of the ſecond month; and the ſame regulation takes place in every ſubſequent month.

Perſons pawning goods the property of others, ſhall, upon conviction before a juſtice or juſtices of the peace, forfeit the ſum of twenty ſhillings, together with the value of the goods ſo pawned, and in caſe of non-payment of the forfeiture, to be committed to the houſe of correction, and to be kept to hard labour for no leſs time than one calendar month, nor longer than three, unleſs the forfeit ſhall be ſooner paid, and within three days before the expiration of the ſaid term ſhall be publicly whipped; and the ſaid forfeitures, when recovered, ſhall be applied towards making ſatisfaction to the party injured, and defraying the coſts of the proſecution, as ſhall be conſidered reaſonable by the juſtice; but if the party injured declines to accept of ſuch ſatisfaction and coſts, or if there ſhould be any overplus of the ſaid forfeitures, after making and paying the ſame, the forfeitures, or the overplus, ſhall be applied to the uſe of the poor of the pariſh where ſuch offence ſhall have been committed.

Perſons forging or counterfeiting notes, or procuring them to be done, or ſelling them knowing them to be forged, it ſhall be lawful for any perſon who ſhall have reaſon to ſuſpect the ſame, to ſeize and detain ſuch perſon uttering or offering the forged note, and to deliver him into the cuſtody of a conſtable, who ſhall convey ſuch perſon to ſome juſtice of the peace where the offence ſhall have been committed; and upon conviction the party ſhall be committed to the common gaol or houſe of correction, there to be impriſoned for any time not exceeding three calendar months, nor leſs than one, at the diſcretion of ſuch juſtice.

Perſons bringing goods to pawn, not giving a good account of themſelves, or refuſing to give an account at all, or upon ſuſpicion of offering ſtolen goods, or any perſon not intitled to redeem goods in pawn who ſhall endeavour to redeem the ſame, it ſhall be lawful for any perſon, or his agent, to whom ſuch goods are ſo offered, or with whom ſuch goods are in pledge, to ſeize and deliver ſuch perſon into the cuſtody of a conſtable, who ſhall carry him before a juſtice of the peace where the offence is committed; and ſhould there appear any ground of the ſaid offences, after a ſecond examination, they ſhall be committed to the common gaol or houſe of correction where the offence ſhall be committed, there to be dealt with according to law; but where the nature of the offence ſhall not authorize ſuch proceedings, they ſhall be committed for any time not exceeding three calendar months, nor leſs than one, at the diſcretion of ſuch juſtice.

Goods unlawfully pawned, without the privity of the owner, any juſtice of the peace may iſſue out a warrant for ſearching in the day time any warehouſe or houſe where the ſaid goods are ſuppoſed to be lodged; and upon the pawn-broker refuſing to open the ſame, any peace officer may break open the premiſes, doing no wilful damage, and the ſaid goods ſhall be reſtored to the owner.

Pawn-brokers refuſing to deliver up goods that have been pledged within the ſpace of one year, the money lent with the intereſt thereon being tendered for the ſame, provided the principal does not exceed 10*l*. upon conviction, a juſtice of peace is empowered to commit the offender to public priſon, there to remain until the goods be delivered up, or reaſonable ſatiſfaction made for the ſame. Perſons producing notes are to be deemed owners, unleſs notice to the contrary, of the ſame having been procured fraudulently or unjuſtifiably from the real owner be given.

Duplicates being loſt, the owner thereof, upon oath before, any juſtice, deſcribing the goods and circumſtances attending the loſs, ſhall be intitled to another from the pawn-broker; for which, in caſe the money lent ſhall not exceed 10s. the pawn-broker ſhall receive one penny; if above 10s. the pawn-broker is intitled to the ſame premium as when the goods were firſt pawned. Pawn-brokers receiving notice from the owners of goods before the expiration of a year, ſhall not diſpoſe of the ſaid goods until after the expiration of three months, to be computed from the expiration of the ſaid year.

Goods to be ſold by public auction after the expiration of one year, cauſing the ſame to be expoſed to public view, and catalogues thereof to be publiſhed, and two advertiſements, giving notice of ſuch ſale, together with the name of the pawn-broker, to be inſerted in ſome newſpaper, two days at leaſt before the firſt day of ſale, upon pain of forfeiting for every offence 5l. to the owner of the ſaid goods.

Pawnbrokers to enter an account of ſales in their books, of all goods pawned for upwards of 10s. and in caſe of any overplus by the ſale thereof, upon demand it ſhall be paid to the owner, provided ſuch demand ſhall be made within three years after ſuch ſale, the neceſſary coſts, principal and intereſt being deducted, and the perſons who poſſeſs a note ſhall be intitled to the inſpection of the book for the ſum of one penny; and in caſe the goods ſhall have ſold for more than the ſum entered, or ſuch entry ſhall not have been made, or ſhall not have ſold the ſame, or ſhall refuſe to pay ſuch overplus, perſons

so offending ſhall for every ſuch offence forfeit treble the ſum ſuch goods were originally pawned for, to be levied by diſtreſs.

Pawnbrokers ſhall not purchaſe goods whilſt in their cuſtody, or ſuffer them to be redeemed for that purpoſe; nor ſhall they lend money upon any pledge to any perſon who ſhall appear to be under twelve years of age, or to be intoxicated with liquor, or purchaſe the duplicate of any other pawnbroker, or buy any goods before the hours of eight in the forenoon, and after ſeven in the evening; nor ſhall they receive any goods in pawn before eight o'clock in the forenoon, and after nine at night, between Michaelmas and Lady Day, and before ſeven o'clock in the forenoon and after ten at night during the remainder of the year, excepting the evenings of Saturday, and the evenings preceding Good Friday and Chriſtmas Day; nor ſhall any perſon carry on the trade of a pawnbroker on any Sunday, Good Friday, or Chriſtmas Day.

Pawnbrokers are to place in view a table of rates. Their chriſtian and ſurnames and buſineſs are alſo to be written over the door, under a penalty of 10l.—half to the informer.

Pawnbrokers having ſold goods before the expiration of the time allowed by this act, or otherwiſe than according to the directions of this act, or having embezzled, or having injured goods in any reſpect, juſtices ſhall award reaſonable ſatisfaction to the owners of the ſaid goods, in caſe the ſame ſhall not amount to the principal and profit thereon; but in caſe the ſatisfaction awarded ſhall be equal to or exceed the principal and profit, the goods ſhall be delivered to the owner without paying any principal and intereſt, under a penalty of 10l. They are to produce their books before any juſtice if required, under a penalty of 10l. On neglecting to make their entry in a fair and regular manner, they forfeit 10l. and for every offence againſt this act where no penalty is provided, the ſum of 5l. to be levied by diſtreſs, and the informer ſhall be intitled to the ſum of 2l. 10s. the remainder to the poor of the pariſh.

No perſon is liable to a proſecution unleſs complaint ſhall be made within twelve months after the offence is committed. The act requires churchwardens to proſecute for every offence at the expence of the pariſh.

This act does not extend to pledges for money above 10l.; nor to perſons lending money upon goods at five per cent.

The act 33 Geo. III. c. 53, repealed the clauſe in 29 Geo. III. which directed that juſtices ſhould not receive any fees or gratuities for acting under that act.

In the cities of Italy, there are companies eſtabliſhed by authority for the letting out money on pawns, called *mounts of piety*; a title little becoming ſuch inſtitutions. In ſome parts of Italy, they have alſo mounts of piety of another kind, wherein they only receive ready money, and return it again with intereſt, at a certain ſum *per annum*. At Bologna, they have ſeveral ſuch mounts, which are diſtinguiſhed into *frank* and *perpetual*: the intereſt of the former is only four *per cent.*; that of the latter, ſeven.

Brokers are alſo thoſe who ſell old houſehold furniture, old wearing apparel, &c. The latter is a common employment for the poorer claſs of Jews in England.

BROME (Alexander), a poet and attorney in the lord mayor's court in the reign of Charles II. was the author of the greateſt part of thoſe ſongs and epigrams which were publiſhed in favour of the royaliſts, and againſt the *rump*, as well in Oliver Cromwell's time as during the rebellion. Theſe, together with his Epiſtles and Epigrams tranſlated from different authors, were all printed in one volume 8vo. after the Reſtoration. He alſo publiſhed a verſion of Horace, by himſelf and others, which is very far from being a bad one. He left behind him a comedy entitled *The Cunning Lovers*: and the world is indebted to him for two volumes of Richard Brome's plays in octavo; many of which, but for his care in preſerving and publiſhing them, would in all probability have been entirely loſt. He died in 1666.

Brome (Richard), a dramatic writer who lived in the reign of king Charles I. and was cotemporary with Decker, Ford, Shirley, &c. His extraction was mean, he having been originally no better than a menial ſervant to the celebrated Ben Jonſon. He wrote himſelf, however, into high reputation, as is teſtified not only by various commendatory verſes written by his cotemporaries and prefixed to many of his plays, but alſo by ſome lines which his quondam maſter addreſſed to him on account of his comedy called *The Northern Laſs*. Brome, in imitation of his maſter, laid it down as his firſt great point, to apply cloſely to the ſtudy of men and manners. His genius was entirely turned to comedy; and therefore his proper province was obſervation more than reading. His plots are all his own, and are far from being ill conducted; and his characters, which for the moſt part are ſtrongly marked, were the offspring of his own judgment and experience, and his cloſe attention to the foibles of the human heart. In a word, his plays in general are good ones; met with great applauſe when firſt acted; and, as Langbain informs us, were thought by the players worthy to be revived, to their own profit and the author's honour, in that critical age which he himſelf lived in. Nay, we have had a proof, even in our own time, of the merit of one of his comedies, which with a very little alteration has lately been revived, and with great ſucceſs, viz. *The Jovial Crew*, which for no leſs than three ſeaſons running brought crowded audiences to the theatre-royal in Covent-garden at all the frequent repetitions of its performance. The comedies which the author left behind him are 15 in number; ten of which are collected together, as above mentioned, in two volumes octavo. He joined alſo with Thomas Heywood in a play called *The Lancaſhire Witches*.

BROMELIA, the pine apple; a genus of the monogynia order, belonging to the hexandria claſs of plants; and in the natural method ranking under the 10th order, *Coronariæ*.

Of this genus Linnæus enumerates ſeven ſpecies; but the following are the moſt remarkable. I. The ananas; of which there are ſix varieties, viz. 1. The ovatus, or oval-ſhaped pine-apple. 2. The pyramidalis, pyramidal, or ſugar-loaf pine. 3. The glaber, with ſmooth leaves. 4. The lucidus, with ſhining green leaves. 5. The ſerrotinus, with a yellowiſh-coloured fleſh. 6. The viridis, or green pine-apple. The other ſpecies are, II. The nudicaulis, with the lower leaves indented and prickly. III. The lingulata, with obtuſe, ſawed, and prickly leaves.—The firſt ſort hath leaves very like ſome ſorts of aloes, but not ſo thick and ſucculent, which are ſtrongly armed with black ſpines. From the centre of the plant ariſes the flower-ſtalk, which is near three feet high, the lower part of which is garniſhed with entire leaves placed alternately at every joint. The upper part of the ſtalk is garniſhed with flowers ſet in a looſe ſpike or thyrſe quite round; theſe are ſucceeded by oval ſeed-veſſels, having a longitudinal partition, in the centre of which are faſtened ſmooth cylindrical ſeeds.—The ſecond hath ſhorter leaves than the firſt, which are ſharply ſawed on their edges, and of a deep green colour. The flower-ſtem ariſes from the centre of the plant, which divides upward into ſeveral branches: the upper parts of theſe are garniſhed with ſpikes of flowers, which come out alternately from the ſides of the branches, each having a narrow entire leaf juſt below it, which are longer than the ſpike. The flowers are placed very cloſe on the ſpikes; and when they decay, the empalement turns to an oval pointed ſeed-veſſel, incloſing ſeeds of the ſame ſhape with the other.

Culture of the pine-apple. The firſt ſort of ananas is the moſt common in Europe; but the ſecond ſort is much preferable to it, the fruit of this being larger and much better flavoured: the juice of this ſort is not ſo aſtringent as that of

the firft; fo that this fruit may be eaten in greater quantity with lefs danger. This fort frequently produces fuckers immediately under the fruit, whereby it may be increafed much fafter than the common fort; fo that in a few years it may be the beft common fort in Britain.—The third fort is preferved by fome curious perfons for the fake of variety; but the fruit is not worth any thing.—The fort with very fmooth grafs-green leaves was raifed from feeds taken out of a rotten fruit which came from the Weft Indies to the late Henry Heathcote, Efq. from whom Mr. Miller received one plant, which produced large fruit: this is what the people of America call the *king pine*.—The plants are propagated by planting the crowns which grow on the fruit, or the fuckers which are produced either from the fides of the plants or under the fruit: both which are found to be equally good; although by fome perfons the crown is thought preferable to the fuckers, as fuppofing it will produce fruit fooner than the fuckers, which is certainly a miftake. The fuckers and crowns muft be laid to dry in a warm place for four or five days, or more (according to the moifture of the part which adhered to the old plant or fruit); for if they are immediately planted, they will rot. The certain rule of judging when they are fit to plant, is by obferving if the bottom is healed over and become hard; for if the fuckers are drawn off carefully from the old plants, they will have a hard fkin over the lower part, fo need not lie fo long as the crowns of thofe whofe bottoms are moift. But whenever a crown is taken from the fruit, or the fuckers from old plants, they fhould be immediately divefted of their bottom-leaves, fo high as to allow depth for their planting: fo that they may be thoroughly dry and healed in every part, left when they receive heat and moifture they fhould perifh, which often happens when this method is not obferved. If thefe fuckers or crowns are taken off late in the autumn, or during the winter, or early in the fpring, they fhould be laid in a dry place in the ftove for a fortnight or three weeks before they are planted; but in the fummer feafon, they will, within fix or feven days, be fit for planting.

Thefe fhould be placed in a rich good kitchen-garden mould, not too heavy fo as to detain the moifture too long, nor over light and fandy; but where this is wanting, fome frefh earth fhould be got from a good pafture, and mixed with about a third part of rotten neats dung, or the dung of an old melon or cucumber bed which is well confumed. Thefe fhould be mixed fix or eight months before they are ufed, but if it be a year it will be the better; and fhould be often turned, that their parts may be the better united, as alfo the clods well broken. This earth fhould not be fcreened very fine; for if you only clear it of the great ftones, it will be better for the plants than when it is made too fine. You fhould always avoid mixing any fand with the earth, unlefs it be extremely ftiff, and then it will be neceffary to have it mixed at leaft fix months or a year before it is ufed; and it muft be frequently turned, that the fand may be incorporated in the earth fo as to divide its parts: but you fhould not put more than a fixth part of fand; for too much fand is very injurious to thefe plants. In the fummer feafon, thefe plants muft be frequently watered; but you fhould not give them large quantities at a time: you muft alfo be very careful that the moifture is not detained in the pots by the holes being ftopped, for that will foon deftroy the plants. If the feafon is warm, they fhould be watered twice a-week; but in a cool feafon, once a-week will be often enough: and, during the fummer feafon, you fhould once a-week water them gently all over their leaves; which will wafh and thereby greatly promote the growth of them. It is a practice with fome, frequently to fhift thefe plants from pot to pot. But this is by no means to be practifed by thofe who propofe to have large well-flavoured fruit: for, unlefs the pots be filled with the roots, by the time the plants begin to fhow their fruit, they commonly produce fmall fruit, which have generally large crowns on them; therefore the plants will not require to be new potted oftener than twice in a feafon. The firft time fhould be about the end of April, when the fuckers and crowns of the former year's fruit (which remained all the winter in thofe pots in which they were firft planted) fhould be fhifted into larger pots; *i. e.* thofe which were in halfpenny or three-farthing pots fhould be put into penny or at moft three-halfpenny pots, according to the fize of the plants; for you muft be very careful not to overpot them, nothing being more prejudicial to thefe plants. The fecond time for fhifting of them is in the beginning of Auguft; when you fhould fhift thofe which are of a proper fize for fruiting the following fpring into two-penny pots, which are full large enough for any of thefe plants. At each of thefe times of fhifting the plants, the bark-bed fhould be ftirred up, and fome new bark added, to raife the bed up to the height it was at firft made; and when the pots are plunged again into the bark-bed, the plants fhould be watered gently all over their leaves, to wafh off the filth, and to fettle the earth to the roots of the plants. If the bark-bed be well ftirred, and a quantity of good frefh bark added to the bed, at this latter fhifting, it will be of great fervice to the plants; for they may remain in the fame tan until the beginning of November, or fometimes later, according to the mildnefs of the feafon, and will require but little fire before that time. During the winter, they will not require to be watered oftener than once a-week, according as you find the earth in the pots to dry: nor fhould you give them too much at each time; for it is much better to give them a little water often, than to over-water them at any one time.

It is particularly neceffary never to fhift thofe plants which fhow their fruit into other pots; for if they are removed after the fruit appears, it will ftop the growth, and thereby caufe the fruit to be fmaller, and retard its ripening, fo that many times it will be October or November before the fruit is ripe: therefore you fhould be very careful to keep the plants in a vigorous growing ftate from the firft appearance of the fruit, becaufe upon this depends the goodnefs and the fize of the fruit; for if they receive a check after this, the fruit is generally fmall and ill-tafted.—When you have cut off the fruit from the plant whofe kind you are defirous to propagate, you fhould trim the leaves, and plunge the pots again into a moderate hot-bed, obferving to refrefh them frequently with water, which will caufe them to put out fuckers in plenty; fo that any perfon may be foon fupplied with plants enough of any of the kinds, who will but obferve to keep the plants in a healthy condition.

There is nothing more dangerous to thefe plants than their being attacked by fmall white infects, which appear at firft like a white mildew, but foon after have the appearance of lice: thefe attack both root and leaves at the fame time; and, if they are not foon deftroyed, will fpread over a whole ftove in a fhort time, and in a few weeks entirely ftop the growth of the plants by fucking out the nutritious juice, fo that the leaves will appear yellow and fickly, and have generally a great number of yellow tranfparent fpots all over them. Thefe infects, after they are fully grown, appear like bugs, adhering fo clofely to the leaves as not to be eafily wafhed off, and feem to have no local motion. They were originally brought from America upon the plants which were imported from thence; and are probably the fame infects which have deftroyed the fugar-canes of late in fome of the Leeward Iflands, for upon fome fugar-canes which were fent Mr. Miller from Barbadoes he obferved great numbers of thefe infects. Since they have been in England, they have fpread greatly in fuch ftoves where there has not been more than ordinary care taken to deftroy

them. They have alfo attacked the orange-trees in many gardens near London, and have done them incredible damage; but they do not endure the cold of our climate in winter, fo that they are never found on fuch plants as live in the open air. The only method yet difcovered for deftroying thefe infects, is by frequently wafhing the leaves, branches, and ftems, of fuch plants as they attack, with water in which there has been a ftrong infufion of tobacco ftalks. But this method cannot be practifed on the ananas plants, becaufe the infects will faften themfelves fo low between the leaves, that it is impoffible to come at them with a fponge to wafh them off; fo that if all thofe which appear to fight are cleared off, they will foon be fucceeded by a frefh fupply from below, and the roots will be alfo equally infefted at the fame time. Therefore, wherever thefe infects appear on the plants, the fafeft method will be to take the plants out of the pots, and clear the earth from the roots; then prepare a large tub, which fhould be filled with water in which there has been a ftrong infufion of tobacco ftalks; into this tub you fhould put the plants, placing fome fticks acrofs the tub to keep them immerfed in the liquid. In this water they fhould remain 24 hours; then take them out, and with a fponge wafh off all the infects from the leaves and roots, and dip the plants into a tub of fair water, wafhing them therein, which is the moft effectual way to clear them from the infects. After which, you fhould pot them in frefh earth; and, having ftirred up the bark-bed, and added fome new tan to give a frefh heat to the bed, the pots fhould be plunged again, obferving to water them all over the leaves, and this fhould be repeated once a-week during the fummer feafon; for thefe infects always multiply much fafter where the plants are kept dry, than where they are fometimes fprinkled over with water, and kept in a growing ftate. As thefe infects are frequently brought over from America on the ananas plants which come from thence, thofe perfons who procure their plants in that way, fhould look carefully over them when they receive them, to fee they have none of thefe infects on them; for if they have, they will foon be propagated over all the plants in the ftove where they are placed; therefore, whenever they are obferved, the plants fhould be foaked, as before directed, before they are planted into pots.

Such are the methods ufually taken in the culture of the pine-apple in this country. Lately, however, fome very confiderable improvements have been made in that. The leaves of the oak have been fubftituted to the more expenfive bark; and by treating the pines with them, they are found to thrive as well, and to produce as good fruit, as in the other method: of the proper method of managing thefe leaves for the rearing of exotic plants, an account is given under the article OAK-*Leaves*. But the moft confiderable improvement is that mentioned in the 67th volume of the Philofophical Tranfactions, where a method is fhewn by Mr. Baftard of Devonfhire, of raifing thefe fruits in water. He fays, "Before I enter into the particulars of raifing pine-apples in water, it will be neceffary to tell you that my hot-houfe is covered with the beft crown-glafs, which I apprehend gives more heat than the common fort of green glafs generally ufed for hot-houfes. In the front part of the houfe, and indeed any where in the loweft parts of it, the pine-apple plants will not thrive well in water. The way in which I treat them is as follows. I place a fhelf near the higheft part of the back wall, fo that the pine-plants may ftand without abfolutely touching the glafs, but as near it as can be: on this fhelf I place pans full of water, about feven or eight inches deep; and in thefe pans I put pine-apple plants, growing in the fame pots of earth as they are generally planted in to be plunged into the bark-bed in the common way: that is, I put the pot of earth, with the pine-plant in it, in the pan-full of water, and as the water decreafes I conftantly fill up the pan. I place either plants in fruit, or young plants as foon as they are well rooted, in thefe pans of water, and find they thrive equally well: the fruit reared this way is always much larger, as well as better flavoured, than when ripened in the bark-bed. I have more than once put only the plants themfelves without any earth, I mean after they had roots, into thefe pans of water, with only water fufficient to keep the roots always covered, and found them flourifh beyond expectation. In my houfe, the fhelf I mention is fupported by irons from the top, and there is an intervening fpace of about 10 inches between the back wall and the fhelf. A neighbour of mine has placed a leaden ciftern upon the top of the back flue (in which, as it is in contact with the flue, the water is always warm when there is fire in the houfe), and finds his fruit excellent and large. My fhelf does not touch the back flue, but is about a foot above it; and confequently the water is only warmed by the air in the houfe. Both thefe methods do well. The way I account for this fuccefs is, that the warm air always afcending to the part where the fhelf is placed, as being the higheft part of the houfe, keeps it much hotter than in any other part. The temperature at that place is, I believe, feldom lefs than what is indicated by the 73d degree of Fahrenheit's thermometer, and when the fun fhines it is often at above 100: the water the plants grow in feems to enable them to bear the greateft heat, if fufficient air be allowed; and I often fee the roots of the plants growing out of the holes in the bottom of the pot of earth, and fhooting vigoroufly in the water.

"My hot-houfe (the dimenfions of which it may be proper to know) is 60 feet long and 11 feet wide, the flues included; fix feet high in the front, and 11 feet at the back of the infide of the houfe. It is warmed by two fires. A leaden trough or ciftern on the top of the back flue is preferable to my fhelf, as in it the pine-plants grow much fafter in the winter, the water being always warmed by the flue: of this I have feen the great benefit thefe laft two months in my neighbourhood. It is not foreign to this purpofe to mention, that, as a perfon was moving a large pine-plant from the hot-bed in my houfe laft fummer, which plant was juft fhowing fruit, by fome accident he broke off the plant juft above the earth in which it grew, and there was no root whatever left to it: by way of experiment I took the plant, and fixed it upright in a pan of water (without any earth whatever) on the fhelf; it there foon threw out roots, and bore a pine-apple that weighed upwards of two pounds."

BROMLEY, a town of Kent in England, fituated on the river Ravenfburn, in E. long. 0. 5. N. lat. 51. 25.

BROMSGROVE, a town of Worcefterfhire in England, feated on the river Salwarp. It is a pretty good town, well inhabited by clothiers; and the market is large for corn, cattle, and all forts of provifions. W. long. 2. 5. N. lat. 52. 26.

BROMUS, BROOM-GRASS, in botany; a genus of the digynia order, belonging to the triandria clafs of plants; ranking, in the natural method, under the 4th order, *Gramina*. The calyx is bivalved, having a partial fpike, oblong and round, oppofite grains, with an awn below the point of each outer valve. There are 24 fpecies, eight of which are natives of Britain, viz. the fecalinus, or field broom-grafs; the arvenfis, or common broom-grafs; the ciliatus, or wall broom-grafs; the fterilis, or barren broom-grafs; the giganteus, or tall broom-grafs; the ramofus, or wood broom-grafs; and the pinnatus, or fpiked broom-grafs.

BROMYARD, a town of Herefordfhire in England; W. long. 2. 46. N. lat. 52. 20,

BRON, a town of Italy, in the duchy of Milan, where the

Imperialifts gained an advantage over the French in 1703. E. long. 16. 0. N. lat. 44. 50.

BRONCHIA, in anatomy, the ramifications of the trachea. See Anatomy.

BRONCHOCELE, a tumor rifing in the anterior part of the neck. See Surgery.

BRONCHOTOMY, in furgery, an incifion made in the afpera arteria, or wind-pipe, which is neceffary in many cafes, and efpecially in a quinfey which threatens fuffocation from the fwelling of the parts. It is alfo called *laryngotomy* and *tracheotomy*. See Surgery.

BRONKHORST (John Van), an eminent painter who flourifhed about the middle of the laft century. He was born at Utrecht; and after having ftudied under feveral mafters, entered the fchool of Cornelius Poelemburg, whofe ftyle of painting he imitated with great fuccefs. He painted both hiftory and landfcapes; and his pictures, which are very highly finifhed, are held in great eftimation. He amufed himfelf with the point; and fome landfcapes from Poelemburg, together with other fubjects from his own compofitions, are attributed to him.

BRONTIÆ, or Thunder-stones: fee Belemnites.

BRONTIUM, in Grecian antiquity, a place underneath the floor of the theatres, in which were kept brazen veffels full of ftones and other materials, with which they imitated the noife of thunder.

BRONTOLOGY, denotes the doctrine of thunder, or an explanation of its caufes, phenomena, &c. together with the prefages drawn from it. See Electricity and Thunder.

BRONZE, a compound of copper and tin, to which fometimes other metallic fubftances, particularly zinc, are added.—This metal is brittle, hard, and fonorous. It is employed for various ufes, as for making of bells, guns and ftatues; and the proportions of the component metals are varied to fuit the feveral purpofes to which it is applied. This compound, like fome others, is fpecifically heavier than either of the metals taken feparately. A metallic mafs, compofed of four fifths of copper and one-fifth part of tin, weighs in water $7\frac{1}{10}$ grains more than the fame quantities of thefe two metals would together weigh in water if not allayed. This proves, that in the union of copper and tin there is a penetration of parts, the one metal entering into the pores of the other; and this is further confirmed by an obfervation of Mr. Tillet, member of the royal academy of fciences. In his memoir concerning the ductility of metals, he takes notice, that when the mixture of copper and tin is made in the proportions above mentioned, the colour of the copper is entirely annulled and covered by that of the tin, although the quantity of the firft be four times greater; and this fingular effect cannot be underftood without admitting a total change in the fize and difpofition of the pores of the compound metal. Tin being lefs fubject to ruft than copper, bronze is alfo found to be lefs liable to be covered with verdigreafe than pure copper is; and this is one reafon why it is ufed for works that are expofed to air and weather. The greater fufibility of bronze than copper is alfo an advantageous property, and much facilitates the cafting of large articles.

Bronze alfo denotes a colour prepared to imitate bronze. There are two forts, the red and the yellow or golden. The latter is made folely of a bright copper-duft; the former, of the fame, with a little pulverized red ochre. Both are applied with varnifh.

BRONZES, a name given by antiquarians to figures either of men or beafts, to urns, and in general to every piece of fculpture which the antients made of that metal. We likewife give the name of *bronzes* to ftatues or bufts caft of bronze, whether thefe pieces be copies of antiques or original fubjects.—Among medallifts, all copper medals bear the name of *bronze*.

BRONZING, the art of imitating bronze, which is done by means of copper-duft or leaf, faftened on the outfide, as gold leaves are in gilding.

BROODING, the act of a hen in hatching her eggs. See Hatching.

BROOK, a little river or fmall current of water.—A brook is diftinguifhed from a river, infomuch as a river flows at all times, whereas a brook flows at fome particular feafons only.

Brook-*Lime*. See Veronica.

BROOKE (Mrs.), daughter of a clergyman of the name of Moore, was a lady as remarkable for her virtues and fuavity of fwelling as for her great literary accomplifhments. Her firft performance, which introduced her to the notice and confequent efteem of the public, was *Julia Mandeville*; a work concerning which there were various opinions, but which every body read with eagernefs. It has been often wifhed that fhe had made the cataftrophe lefs melancholy; and we believe that fhe afterwards was of the fame opinion, but fhe thought it beneath her character to alter it. She foon afterwards went to Canada with her hufband, who was chaplain to the garrifon at Quebec; and here fhe faw and loved thofe romantic characters and fcenes which gave birth to *Emily Montague*, a work moft defervedly in univerfal efteem, which has paffed through feveral editions, and which is now not eafily met with. On her return to England, accident introduced her, and congenial fentiments attracted her, to Mrs. Yates; an intimacy was formed, which terminated only with the life of that lady. Mrs. Brooke, in confequence of this connection, formed an acquaintance with Mr. Garrick, and wrote fome pieces for the ftage. She had, however, great reafon to be diffatisfied with his behaviour as a manager; and fhe made *The Excurfion*, a novel which fhe wrote at this time, the vehicle by which fhe exhibited to the public her complaints and anger againft the king of Drury. Her anger, we believe, was juft, but the retribution was too fevere. She herfelf afterwards thought fo, for fhe lamented and retracted it. Her firft dramatic performance was the tragedy of *Virginia*, 1756. Her next effort in that line was, *The Seige of Synope*, a tragedy introduced by Mr. Harris, and written principally with a view of placing Mrs. Yates in a confpicuous character. This did not altogether fail, but it did not become popular; it wanted energy, and it had not much originality; there was little to difapprove, but there was nothing to admire. Her next and moft popular production was *Rofina*, which, in a moft liberal manner, fhe prefented to Mr. Harris. Few modern pieces have been equally fuccefsful. Laft year alfo, a mufical piece of hers, entitled *Marian*, was introduced, which is now occafionally exhibited, for which we believe Shield is principally to be thanked. Mrs. Brooke was alfo the tranflator of various books from the French. She was efteemed by Dr. Johnfon, valued by Mifs Seward, and her company courted by all the firft characters of her time. She died in January 1789, two days after her hufband. Her hufband enjoyed the rectory of Colney in Norfolk, to which he had been preferred after his arrival from America.

BROOM, in botany. See Genista.

Butcher's Broom, in botany. See Ruscus.

Spanifh Broom, in botany. See Spartium.

Broom alfo denotes a well-known houfehold befom or implement wherewith to fweep away dirt, &c. The primitive broom, from whence the denomination is given to all the reft, was made of the genifta.

Broom-*flower* gives the denomination to an order of knights inftituted by St. Lewis of France, on occafion of his marriage. The motto was, *Exaltat humiles*, and the collar of the order

made up of broom-flowers and husks, enamelled and intermixed with *fleur-de-lys* of gold set in open lozenges, enamelled white, chained together, and to it hung a cross florence of gold. This answers to what the French call *Ordre de la Geneste*, from the name of a species of broom so called; different from the common broom, as being lower, the stalk smaller, and leaf narrow; the flower is yellow, and bears a long husk. Some also speak of another order of the *Geneste* or *Broom* established by Charles Martel, or rather Charles VI.

Broom-*gall*, in natural history, a name given by authors to a remarkable species of galls found on the *genista vulgaris* or common broom. This is occasioned, like all other galls, by the puncture and eating of an insect; and, when opened, is found to contain a small oblong worm, of a red colour, but whose size requires the use of a glass in order to see it distinctly.

Broom-*Rape*, in botany. See Orobanche.

BROOME (William), was born in Cheshire, as is said, of very mean parents. He was educated upon the foundation at Eton: and appeared early in the world as a translator of the Iliads into prose, in conjunction with Ozell and Oldisworth. He was afterwards introduced to Mr. Pope; and gained so much of his esteem, that he was employed to make extracts from Eustathius, for the notes to the translation of the Iliad; and in the volumes of poetry published by Lintot, commonly called "Pope's Miscellanies," many of his early pieces were inserted.—When the success of the Iliad gave encouragement to a version of the Odyssey, Pope, weary of the toil, called Fenton and Broome to his assistance; and taking only half the work upon himself, divided the other half between his partners, giving four books to Fenton, and eight to Broome. To the lot of Broome fell the 2d, 6th, 8th, 11th, 12th, 16th, 18th, and 23d; together with the burthen of writing all the notes.—The price at which Pope purchased this assistance was 300l. paid to Fenton; and 500l. to Broome; with as many copies as he wanted for his friends; which amounted to 100l. more. Broome died at Bath, Nov. 16, 1745.

BROOMING, or Breaming *of a ship*, the washing and burning off all the filth she has contracted on her sides with weeds, straw, broom, or the like, when she is on the careen, or on the ground. See Careening.

BROSSARD (Sebastian de), an eminent French musician. In the former part of his life he had been prebendary and chapel-master of the cathedral church of Strasburg; but afterwards became grand-chaplain, and also maitre de chapelle in the cathedral of Meaux. There is extant of his a work entitled *Prodromus musicalis*. He was author also of a very useful book, entitled *Dictionnaire de musique*, printed at Amsterdam, in folio, 1703; and afterwards at the same place in octavo, without a date. At the end of this book is a catalogue of authors ancient and modern, to the amount of 900, who have written on music; divided into classes, wherein are interspersed many curious observations of the author relating to the history of music. By Mr. Boivin's *Catalogue general des livres de musique* for the year 1729, it appears that Brossard was the author of two sets of motets, as also of nine *Leçons de Tenebres* therein mentioned. It seems that these several publications were at a time when the author was far advanced in years: for Walter takes notice, that in the *Mercure Galante*, he is mentioned as an abbé and componist, so early as the year 1678.

BROTHEL-houses, lewd places, being the common habitations of prostitutes. King Henry VIII. by proclamation, in the 37th year of his reign, suppressed all the stews or brothel-houses which had long continued on the Bank-side in Southwark. A brothelman was a loose idle fellow; and a *feme bordelier*, or *brothelier*, a common whore. The term *bordelman* is a contraction for *brothelman*. See Bawdy-*House*

BROTHER, *Frater*, a term of relation between two male children, spring from the same father, or mother, or both. Scaliger and Vossius derive *frater* from φρατηρ for φρατωρ, which properly signifies a person who draws water in the same well; φρεαρ, in Greek, signifying *well*, and φρυτρια, a company of people who have a right to draw water out of the same well.—The word, it is said, came originally from the city of Argos, where there were only a few wells distributed in certain quarters of the city, to which those of the same neighbourhood alone repaired. By the civil law, brothers and sisters stand in the second degree of consanguinity; by the canon law, they are in the first degree.—By the Mosaic law, the brother of a man who died without issue was obliged to marry the widow of the deceased. Deuter. xxv. 7.

The ancients applied the term brother indifferently to almost all who stood related in the collateral line, as uncles and nephews, cousin-germans, &c.—This we learn not only from a great many passages in the Old Testament, but also from profane authors: Cicero, in his Philippics, says, "Antonia was both wife and sister of Mark Antony; because she was daughter of his brother C. Antonius." Tullius Hostilius calls the Horatii and Curiatii, brothers; because they were sisters children.

The language of the Jews, bishop Pearson observes, included in the name of brethren not only the strict relation of fraternity, but also the larger of consanguinity. "We are brethren, says Abraham to Lot, Gen. xiii. 8. whereas Lot was only his nephew. Among us, kings give the title brother to each other; the unction in coronation being esteemed to create a kind of brotherhood. Nor is the custom modern: Menander mentions a letter of Cosroes king of Persia to the emperor Justinian, beginning thus: Cosroes, king of kings, &c. to the emperor Justinian my brother.—Kings now also give the same appellation to the electors of the empire; and the like was given by the French monarch to the late king of Sardinia, while only duke of Savoy.

In the civil law, brothers, *fratres*, in the plural, sometimes comprehend sisters: as *Lucius & Titia, fratres*; *tres fratres, Titius, Mævius, & Seia.*

Foster-Brothers, those who sucked the same nurse. The French call them *freres du lait*, or brothers by milk; which is most properly used in respect of a person who sucked a nurse at the same time with the nurse's own child.

Brothers-*German*, *Fratres Germani*. See German.

Brother was also a term used, by middle-age writers, for a *comes*, or governor of a province.

Brother is applied, in a less proper sense, to denote a person of the same profession. In which sense, judges, bishops, priests, &c. call each other brothers.

Brother is also a customary term for priests of the same persuasion to address one another by: but it is more particularly used to denote the relation between monks of the same convent; as, brother Zachary: in English, we more usually say, Friar Zachary, from the French word, *frere*, brother.—Preachers also call their hearers, *my brethren*, or *my dear brethren*. This appellation is borrowed from the primitive Christians, who all called each other *brothers*. But it is now principally used for such of the religious as are not priests; those in orders are generally honoured with the title of *father*, whereas the rest are only simply brothers.

Brother is also an appellation more peculiarly given to certain orders of religious: Thus, the

Brothers *of St. Alexis*, in the low countries, were an order of persons who attended on those who lay dying, and took care of the burial of the dead. See also *Brethren of* Charity, *of* Death, &c.

Poor Brothers, in the charity-house, a denomination given

to decayed gentlemen, to the number of 80, who are fubfifted with diet, clothing, and lodging, on the eftablifhment. The poor-brothers are to be gentlemen by defcent, come to poverty, or decayed merchants, foldiers, or officers of the king's houfehold. The conditions of admiffion are, that they have no eftate for life worth 200l. nor coming in, *viis & modis*, 24l. *per annum*; and that they be 50 years old, unlefs they have been maimed in the public fervice; in which cafe, the age of forty fuffices. They wear a livery-gown within doors.

Brothers *of Arms*, an appellation given to thofe who contract a kind of fraternity in war, obliging themfelves to the mutual fervice and affiftance of each other. In the military orders, the knights are alfo called *brothers*.—In the order of Malta, there is a particular clafs, who are called *ferving brothers*; confifting of fuch as cannot give proof of their nobility. In Latin they are denominated *fratres clientes*.

Brothers *of the rofy crofs*. See Rosycrucians.

BROUAGE, a maritime town of France, in the department of Lower Charente and late province of Saintonge. It confifts of five or fix ftreets, which terminate in a great fquare. It is famous for its falt-works, which are the fineft in the kingdom. W. long. 1. 0. N. lat. 45. 50.

BROURSHAVEN, a port-town of the United Provinces, in the ifland of Schonen in Zealand, feated on the north fide of the ifland, in a bay of the fea, in E. long. 3. 35. N. lat. 51. 50.

BROUGH, a town in Weftmoreland in England, feated under Stanmore-hill, W. long. 2. 50. N. lat. 54. 40. It was formerly a place of great note, being a Roman fortrefs; but is now fo much decayed, that it is little better than a village.

BROUGHTON (Thomas), a learned divine, and one of the original writers of the Biographia Britannica, was born at London, July 5th 1704, in the parifh of St. Andrew, Holborn; of which parifh his father was minifter. Upon receiving preferment through the favour of his patron bifhop Sherlock, he removed from London to Briftol, where he married the daughter of Thomas Harris, clerk of that city, by whom he had feven children, fix of whom furvived him. He refided on his living till his death, which happened December 21ft, 1774, in the 71ft year of his age. He was interred in the church of St. Mary Redcliff.

BROUNCKER, or Brounker, (William), lord vifcount of Caftle-Lyons, in Ireland, and the firft prefident of the Royal Society, was the fon of Sir William Brounker, knt. and born about the year 1620. He was diftinguifhed by his knowledge of the mathematics, and by the confiderable pofts of honour and profit he enjoyed after the reftoration; for he had at the fame time the office of chancellor to the queen, and the keeping of her great feal, that of one of the commiffioners of the navy, and mafter of St. Catharine's hofpital near the Tower of London. He wrote, 1. Experiments of the recoiling of guns. 2. An algebraical paper upon the fquaring of the hyperbola; and feveral letters to Dr. Ufher, archbifhop of Armagh. He died in 1684.

BROUWER (Adrian), a famous Dutch painter, born either at Oudenard, or Haerlem, in 1608, of poor parentage. He became the difciple of Francis Hals, under whom he proved an inimitable artift. His fubjects were taken from low life, always copied from nature; as droll converfations, drunken brawls, boors at cards, or furgeons dreffing the wounded. Brouwer was apprehended at Antwerp as a fpy; where being difcovered by Rubens, he procured his liberty, took him home, clothed him, and endeavoured to acquaint the public with his merit; but the levity of his temper made him quit his benefactor: and he died not long after, in 1640, deftroyed by a diffolute courfe of life.

BROW, or Eye Brow, an hairy arch above the eyes.

Brow-*Poft*, among builders, denotes a beam which goes acrofs a building.

Brow-*Antler*, among fportfmen, that branch of a deer's horn next the tail. See Antler.

BROWALLIA, in botany, a genus of the angiofpermia order, belonging to the didynamia clafs of plants, for which there is no Englifh name.—Of this there are two fpecies. The *demiffa*, with a fingle flower upon each footftalk; and the *elata*, with one or many flowers on each footftalk. The feeds of the firft were fent to Mr. Miller from Panama. It ufually grows about two feet high, and fpreads out into lateral branches on every fide of the ftalk, garnifhed with oval leaves which are entire, and have fhort footftalks. Towards the end of the branches, the flowers are produced fingly upon pretty long footftalks arifing from the wing of the leaf. Thefe are of a light blue colour, fometimes inclining to a purple or red; and there are often three colours of flowers on the fame plant. The plant flowers in July, Auguft, and September; and the feeds are ripe in five or fix weeks after. The fecond fort is a native of Peru: the ftalk of this plant is twice the fize of that of the firft, and appears fomewhat fhrubby; the leaves upon the flower-branches are fmooth: the footftalks have fome with one flower, others with three, and others with five; which are of a deep violet colour. As both fpecies of browallia are annual plants, they muft be raifed from feeds, which are to be fown on a hot-bed: but they may be tranfplanted in June, into the borders of the flower-garden; where, if the weather proves warm, they will flower and perfect feeds; but left thefe fhould fail, there fhould be a plant or two kept in the ftove to fecure feeds.

BROWN (Robert), a fchifmatic divine, the founder of the Brownifts, a numerous fect of diffenters in the reign of queen Elizabeth. He was the fon of Mr. Anthony Brown of Tolthrop in Rutlandfhire; whofe father obtained the fingular privilege of wearing his cap in the king's prefence, by a charter of Henry VIII. He died in Northampton jail, in the year 1630, aged 80. See farther particulars under the article Barrowists.

Brown (Sir Thomas), an eminent writer and phyfician, born in the parifh of St. Michael, Cheapfide, the 19th of October 1605. His moft celebrated piece, called "Religio Medici," the religion of a phyfician, was publifhed 1635. In 1646 he wrote his "Treatife on vulgar errors."—Wood informs us, that his practice as a phyfician was very extenfive, and that many patients reforted to him. In 1655 he was chofen honorary fellow of the College of Phyficians, as a man "virtute et literis ornatiffimus," eminently embellifhed with literature and virtue.—In 1671 he received, at Norwich, the honour of knighthood from Charles II. and died on his birth-day, Oct. 19, 1682.

Brown (Edward), an eminent phyfician, fon of the preceding, was born about 1642, and died Auguft 1708.—King Charles II. whofe phyfician he was, faid of him, that "he was as learned as any of the college (of which he died prefident), and as well bred as any at court."

Brown (William), an Englifh poet; born at Taviftock in Devonfhire; died 1645.—An edition of his works, which were become extremely fcarce, was publifhed, 1772, in three fmall volumes: the principal article in which is, "Britannia's Paftorals."

Brown (Thomas), "of facetious memory," as he is ftyled by Addifon, was the fon of a farmer in Shropfhire; and entered in Chrift-church college, Oxford, where he foon diftinguifhed himfelf by his uncommon attainments in literature. But the irregularities of his life not fuffering him to continue long there, he, inftead of returning to his father, went to Lon-

don to feek his fortune: his companions, however, being more delighted with his humour than ready to relieve his neceffities, he had recourfe to the ufual refuge of half-ftarved wits, fcribbling for bread; and publifhed a great variety of poems, letters, dialogues, &c. full of humour and erudition, but often indelicate. Though a good-natured man, he had one pernicious quality, which was, rather to lofe his friend than his joke. Towards the latter end of Tom Brown's life, we are informed by Mr. Jacob, that he was in favour with the earl of Dorfet, who invited him to dinner on a Chriftmas-day, with Mr. Dryden and fome other gentlemen celebrated for their ingenuity (as his lordfhip's cuftom was); when Mr. Brown to his agreeable furprife found a bank note of 50l. under his plate, and Mr. Dryden at the fame time was prefented with another of 100l. Mr. Brown died in the year 1704; and was interred in the cloifter of Weftminfter abbey, near the remains of Mrs. Behn; with whom he was intimate in his lifetime. His works have been printed both in 8vo and 12mo, making 4 vols.

Brown (John), an ingenious Englifh writer, born at Rotbury in Northumberland, Nov. 5, 1715. Having taken orders, and made himfelf eminent by many excellent fermons, he fell under the notice of Dr. Ofbaldifton; who, when raifed to the fee of Carlifle, made him one of his chaplains. It was probably about this time that he wrote his poem, intitled "Honour," to fhew that true honour can only be founded in virtue: it was infcribed to lord Lonfdale. His next poetical production, though not immediately publifhed, was his "Effay on Satire," in three parts: it was addreffed to Dr. Warburton, who prefixed it to the fecond volume of Pope's works by Warburton; with which it ftill continues to be printed; as well as in Dodfley's collection.—Brown now began to figure as a writer; and, in 1751, publifhed his "Effays on Shaftefbury's Characteriftics;" a work written with elegance and fpirit, and fo applauded as in a fhort time to go through five editions. His next appearance in the world was as a dramatic writer; and in 1755 his tragedy of "Barbaroffa" was produced upon the ftage; and afterwards his "Athelftan," in 1756.—Our author had taken his doctor of divinity's degree in 1755. In 1757 came out his famous work, intitled "An Eftimate of the Manners and Principles of the Times," 8vo; famous we call it, becaufe feven editions of it were printed in little more than a year. In 1758 he publifhed a fecond volume of "The Eftimate." His other works were, "The Cure of Saul, a facred Ode;" "A Differtation on the Rife, Union and Power, the Progreffions, Separations, and Corruptions, of Poetry and Mufic," 4to. "Thoughts on Civil Liberty, Licentioufnefs, and Faction;" "A Letter to the Rev. Dr. Lowth," &c.—Dr. Brown put an end to his life, Sept. 23, 1766, in his 51ft year. He had, it feems, a conftitutional tendency to infanity; and, from his early life, had been fubject, at times, to diforders in the brain, at leaft to melancholy in its excefs; of which he ufed to complain to his friends, and to "exprefs his fears, that one time or another fome ready mifchief might prefent itfelf to him at a time when he was wholly deprived of his reafon."

Brown (Sir William), a noted phyfician and multifarious writer, was fettled originally at Lynn in Norfolk, where he publifhed a tranflation of Dr. Gregory's Elements of Catoptrics and Dioptrics; to which he added, 1. A Method for finding the Foci of all Specula, as well as Lenfes univerfally; as alfo magnifying or leffening a given Object by a given Speculum or Lens, in any affigned Proportion. 2. A Solution of thofe Problems which Dr. Gregory has left undemonftrated. 3. A particular Account of Microfcopes and Telefcopes, from Mr. Huygens; with the Difcoveries made by Catoptrics and Dioptrics. Having acquired a competence by his profeffion, he removed to Queen Square, Ormond Street, London, where he refided till his death. By his lady, who died 1763, he had one daughter, grandmother to the prefent Sir Martin Brown Folkes, bart. A great number of lively effays, both in profe and verfe, the production of his pen, were printed and circulated among his friends. The active part taken by Sir William Brown in the conteft with the licentiates, 1768, occafioned his being introduced by Mr. Foote in his *Devil upon Two Sticks*. Upon Foote's exact reprefentation of him with his identical wig and coat, tall figure, and glafs ftiffly applied to his eye, he fent him a card complimenting him on having fo happily reprefented him; but as he had forgot his muff, he had fent him his own. This good-natured method of refenting difarmed Foote. He ufed to frequent the annual ball at the ladies' boarding-fchool, Queen Square, merely as a neighbour, a good-natured man, and fond of the company of fprightly young folks. A dignitary of the church being there one day to fee his daughter dance, and finding this upright figure ftationed there, told him he believed he was Hermippus *redivivus* who lived *anhelitu puellarum*. When he lived at Lynn, a pamphlet was written againft him: he nailed it up againft his houfe-door. At the age of 80, on St. Luke's day 1771, he came to Batfon's coffee-houfe in his laced coat and band, and fringed white gloves, to fhow himfelf to Mr. Crofby, then lord mayor. A gentleman prefent obferving that he looked very well, he replied, *he had neither wife nor debts*. He died in 1774, at the age of 82; and by his will he left two prize-medals to be annually contended for by the Cambridge poets.

Brown, among dyers, painters, &c. a dufky colour inclining towards rednefs. Of this colour there are various fhades or degrees, diftinguifhed by different appellations.

Spanifh Brown, an earth of great ufe among painters, being generally the firft or priming colour that they lay upon any kind of timber-work. That which is of the deepeft colour, and freeft from ftones, is to be preferred. It is beft and brighteft when burnt in the fire till it be red-hot.

BROWNIA, in botany; a genus of the endecandria order, belonging to the monadelphia clafs of plants. The calyx is bifid, the corolla double, the exterior quinquefid, and the interior pentapetalous. There is but one fpecies, the coccinea, a native of the Weft Indies.

BROWNISTS, a religious fect, which fprung out of the Puritans, towards the clofe of the 16th century. See Barrowists.

BROWNY, the name of a ferviceable kind of fprite, who according to a fuperftitious notion formerly prevalent in the Hebrides and Highlands of Scotland (as well as among the country people in England, where he had the name of *Robin Goodfellow*), was wont to clean the houfes, helped to churn, threfhed the corn, and would belabour all that pretended to make a jeft of him. He was reprefented as ftout and blooming, had fine long flowing hair, and went about with a wand in his hand. He was the very counterpart of Milton's *Lubber Fiend*, who

> Tells how the drudging goblin fwet,
> To earn his cream-bowl duly fet,
> When in one night, ere glimpfe of morn,
> His fhadowy flail hath threfh'd the corn,
> That ten day-lab'rers could not end;
> Then lies him down the Lubber Fiend,
> And, ftretch'd along the chimney's length,
> Bafks at the fire his hairy ftrength.

BROWSE, the tops of the branches of trees, whereon beafts feed. This is fometimes alfo called *brouce* and *bruttle*; probably from the French *brout*, which fignifies the fame thing.

Browse more properly denotes the food which deer find in young copfes, continually fprouting anew.

BRUCHSAL, a town of Germany, in the palatinate of the Rhine, and biſhopric of Spires, ſituated on the river Satz, in E. long. 8. 30. N. lat. 49. 15.

BRUCHUS, in zoology, a genus of inſects belonging to the order of coleoptera. The feelers are filiform, and gradually increaſe in thickneſs. There are ſeven ſpecies, viz. 1. The piſi, has grey elytra interſperſed with white ſpots, and a white fundament with two black ſpots. It is a native of North America, and deſtroys whole fields of peaſe: it is now found in ſeveral of the ſouthern parts of Europe; where it does great injury to the corn. 2. The theobromæ, with whitiſh elytra interſperſed with black points. It frequents the theobromæ or chocolate-trees in the Eaſt Indies. 3. The gleditſiæ, with ſtriated elytra of the ſame length with the belly, a pitch-coloured body, and green feelers. It is a native of America. 4. The bactris, with ſmooth elytra, a hoary body, and the hind part of the thighs oval. It frequents the palm-trees of Jamaica. 5. The granarius, has black elytra; the fore-feet are red, and the hind-feet are dentated. It infeſts the ſeeds of plants in different parts of Europe. 6. The ſeminarius, is black, with the baſe of the feelers and fore-feet teſtaceous. It is about the ſize of a louſe, and a native of Europe. 7. The pecticornis, with comb-ſhaped feelers longer than the body. It is a native of Barbary and China.

BRUEGHEL. See BREUGEL.

BRUGES, a large epiſcopal city of Auſtrian Flanders. It was formerly the Engliſh ſtaple for wool, and the centre of communication between the Lombards and the Hanſeatic merchants. Hither the Lombards brought the products of India, and the manufactures of Italy, and exchanged them for the commodities of the north; ſo that Bruges, at that period, was the greateſt trading town in Europe; and every commercial nation had a conſul here. But, in the 16th century, the civil wars, occaſioned by the tyranny of Philip II. drove the trade firſt to Antwerp, and then to Amſterdam. Bruges, therefore, is not populous now in proportion to its extent; and it poſſeſſes nothing to attract attention but ſome fine churches and rich monaſteries. Its ſituation, however, ſtill commands ſome trade; for it has canals to Ghent, Oſtend, Sluys, Nieuport, Furnes, Ypres, and Dunkirk. Here the order of the Golden Fleece was inſtituted in 1430. Bruges has been ſeveral times taken and retaken during the military conteſts in the Netherlands. The French obtained it in 1792, loſt it in 1793; and now again include it among their conqueſts. It is eight miles E. of Oſtend. Lon. 3. 5. E. Lat. 51. 12. N.

BRUGES (John of), whoſe real name was John van Eick, a celebrated Flemiſh painter, and the firſt who diſcovered the method of painting in oil, flouriſhed in the 15th century. He found in the courſe of his chemical experiments (to which ſcience he alſo applied himſelf), that, by grinding colours with linſeed or nut-oil, he could form them into a ſolid body which would reſiſt water, and not need the varniſh uſed in painting in water-colours or in freſco. He preſented the firſt picture painted in this manner to Alphonſus I. king of Naples, who was much pleaſed with it.

BRUIN (John de), profeſſor of natural philoſophy and mathematics at Utrecht, was born at Gorcum in 1620. He had uncommon ſkill in diſſecting animals, and was a great lover of experiments. He made alſo obſervations in aſtronomy. He publiſhed diſſertations *De vi altrice*; *De corporum gravitate et levitate*; *De cognitione Dei naturali*; *De lucis cauſa et origine*, &c. He had a diſpute with Iſaac Voſſius, to whom he wrote a letter printed at Amſterdam in 1663; wherein he criticiſes Voſſius's book *De natura et proprietate lucis*; and ſtrenuouſly maintains the hypotheſis of Deſcartes. He died in 1675, after he had been profeſſor 23 years: and his funeral oration was pronounced four days after by M. Grævius.

BRUISE, in ſurgery, the ſame with CONTUSION.

BRUMALES PLANTÆ, in botany, (from *bruma* winter); plants which flower in our winter: common about the Cape.

BRUMALIA, in Roman antiquity, feſtivals of Bacchus celebrated twice a-year; the firſt on the 12th of the kalends of March, and the other on the 18th of the kalends of November. They were inſtituted by Romulus, who during theſe feaſts uſed to entertain the ſenate. Among other heathen feſtivals which the primitive Chriſtians were much inclined to obſerve, Tertullian mentions the brumæ or brumalia.

BRUMOY (Peter), a learned Jeſuit, born at Rouen in 1668, diſtinguiſhed himſelf in his youth by his talents for the belles lettres; and during his whole life was beloved for his probity, his virtue, and the goodneſs of his heart. He wrote many works, the moſt conſiderable of which is his Theatre of the Greeks. He died at Paris in 1742.

BRUN (Charles le), was deſcended of a family of diſtinction in Scotland, and born in the year 1619. His father was a ſtatuary by profeſſion. He diſcovered, it is ſaid, ſuch an early inclination for painting, that at three years of age he uſed to take coals, and deſign on the hearth and ſides of the chimney, only by the light of the fire; and at 12 he drew the picture of his uncle ſo well, that it ſtill paſſes for a fine piece. His father being employed in the gardens at Sequier, and having brought his ſon along with him, the chancellor of that name took a liking to him, and placed him with Simon Vouet, an eminent painter. He was afterwards ſent to Fontainebleau, to take off ſome of Raphael's pieces. He ſent him next to Italy, and ſupported him there for ſix years. Le Brun, in his return, met with the celebrated Pouſſin, by whoſe converſation he greatly improved himſelf in his art, and contracted a friendſhip with him which laſted as long as their lives. A painting of St. Stephen, which he finiſhed in 1651, raiſed his reputation to the higheſt pitch. Soon after this, the king, upon the repreſentation of M. Colbert, made him his firſt painter, and conferred on him the order of St. Michael. His majeſty employed two hours every day to ſee him work, while he was painting the family of Darius at Fontainebleau. About the year 1662, he began his five large pieces of the hiſtory of Alexander the Great, in which he is ſaid to have ſet the actions of that famous conqueror in a more glorious light than Quintus Curtius hath done in his hiſtory. He procured ſeveral advantages for the royal academy of painting and ſculpture at Paris, and formed the plan of another of his own nation at Rome. There was ſcarce any thing done for the advancement of the fine arts in which he was not conſulted. It was through the intereſt of M. Colbert that the king gave him the direction of all his works, particularly of his royal manufactory at the Gobelins, where he had a handſome houſe with a genteel ſalary aſſigned to him. He was alſo made director and chancellor of the royal academy, and ſhowed the greateſt zeal to encourage the fine arts in France. He was endowed with a vaſt inventive genius, which extended itſelf to arts of every kind. He was well acquainted with the manners and hiſtory of all nations. Beſides his extraordinary talents, his behaviour was ſo genteel, and his addreſs ſo pleaſing, that he attracted the regard and affection of the whole court of France, where, by the places and penſions conferred on him by the king's liberality, he made a very conſiderable figure. Le Brun was the author of two celebrated treatiſes; one on phyſiognomy, and the other on the different characters of the paſſions. He died at Paris in the year 1690.

This painter may be ſaid to have poſſeſſed a univerſal talent except for landſcapes. He was not indeed admired for his colouring, nor for his ſkill in the diſtribution of his lights and ſhadows; but for a good guſto of deſign, an excellent choice of attitudes, an agreeable management of his draperies, a

beautiful and juſt expreſſion, and a ſtrict obſervance of decorum. In fine, his compoſitions demand the attention and admiration of the niceſt judges. The pieces that gained him moſt reputation were, beſides what we have already mentioned, thoſe which he finiſhed at Fontainebleau, the great ſtair-caſe at Verſailles, but eſpecially the grand gallery there, which was the laſt of his works, and is ſaid to have taken him up 14 years.

BRUNIA, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants. The flowers are aggregate or cluſtered; the filaments inſerted into the heels of the petals; the ſtigma is bifid: the ſeeds are ſolitary, and the capſule is bilocular. There are eight ſpecies.

BRUNSBUTTLE, a ſea port town of Germany, in the circle of Lower Saxony, and duchy of Holſtein, ſeated at the mouth of the river Elbe, in E. long. 8. 42. N. lat. 44. 30. It is ſubject to Denmark.

BRUNSFELSIA, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants. The corolla is funnel-ſhaped, and very long; and the fruit an unilocular polyſpermous berry. There is but one ſpecies, *viz.* the americana. It riſes with a woody branching rough ſtem ſix or eight feet high; garniſhed with oblong entire leaves on footſtalks, and large whitiſh flowers by threes or fours at the ends of the branches, ſucceeded by round ſaffron-coloured ſoft fruit. This plant may be raiſed from ſeeds ſown in pots in the ſpring, and plunged in a bark-bed. It may alſo be propagated by cuttings planted in pots in the ſame ſeaſon, plunging them alſo in a bark-bed or other hot-bed under glaſſes. The plants muſt always remain in the ſtove.

BRUNSWICK, a large and ſtrong town of Germany, in the circle of Lower Saxony and duchy of Brunſwick. It was formerly an Imperial and Hanſeatic town, till it was taken by the duke of Brunſwick Wolfenbuttle in 1671, who built a citadel to keep it in awe. In the ſquare before the caſtle is a famous ſtone ſtatue, with a lion made of block-tin, done after the life. Here is alſo a rich monaſtery of St. Blaiſe, whoſe prior is a prince of the houſe of Bevern. This town is famous for the well-known liquor called Mum, which has hence the name of Brunſwick Mum. It is ſeated on the river Ocker, 55 miles W. of Magdeburg. Long. 10. 42. E. Lat. 52. 25. N.

Brunswick, a country of Germany, in the circle of Lower Saxony, bounded on the N. by the duchy of Lunenburg, on the W. by the circle of Weſtphalia, on the S. by Heſſe, and the territory of Piechfield, and on the E. by Thuringia, with the principalities of Anhalt and Halberſtadt, and the duchy of Magdeburg. The rivers are the Weſer, the Ocker, and the Lyne, and it is fertile both in corn and paſtures. It is divided into four duchies and two counties. The duchies of Brunſwick Proper and of Brunſwick Wolfenbuttle, with the counties of Rheinſtein and Blanckenberg, are ſubject to the duke of Brunſwick Wolfenbuttle; while the elector of Hanover is duke of Brunſwick Grubenhagen and Brunſwick Calenberg, which alſo includes the duchy of Gottingen.

Brunswick, a town of Georgia, in North America, where the Turtle river enters St. Simon's ſound. It has a ſafe harbour, capable of containing a numerous fleet of men of war; and even the bar, at the entrance, has depth enough for the largeſt. The town is regularly laid out, but not yet completed. From its advantageous ſituation, and the fertility of the back country, it promiſes to be hereafter one of the firſt trading towns in Georgia. It is 70 miles S. W. by W. of Savannah. Long. 82. 0. W. Lat. 31. 10. N.

Brunswick, a city of New Jerſey, in North America, incorporated in 1784. It is ſituated on the S. W. bank of Rariton river, 12 miles above Perth Amboy. Its ſituation is low and unpleaſant, being under a high hill, which riſes at the back of the town. The ice, on the breaking up of the river in winter, frequently lodges on the ſhallow fording place, juſt oppoſite the town, and forms a temporary dam, which makes the water riſe many feet above its uſual height, and overflow the ground floors of the houſes that are not guarded againſt this inconvenience by elevated foundations. The inhabitants are beginning to build on the pleaſant hill above the town. They have a conſiderable inland trade, and many ſmall veſſels belonging to the port. Here is a flouriſhing college, called Queen's College. Long. 75. 0. W. Lat. 40. 20. N.

Brunswick (New), in North America. In 1784, Nova Scotia was divided into two provinces. The province now ſtyled New Brunſwick, is bounded on the W. of the river St. Croix, by the ſaid river to its ſource, and by a line drawn due N. thence to the S. boundary of Canada; to the N. by the ſame boundary as far as the W. extremity of the bay of Chaleurs; to the E. by the ſaid bay to the gulf of St. Lawrence to the bay called Bay Verte; to the S. by a line in the centre of the bay of Fundy, from the river St. Croix to the mouth of the Muſquat river, by the ſaid river to its ſource, and thence by a due E. line acroſs the iſthmus into the Bay Verte to join the E. lot above deſcribed, including all iſlands within ſix leagues of the coaſt. Since the concluſion of the American war, the emigration of loyaliſts to this province, from the United States, has been very great.

BRUSCHIUS (Gaſpar), a Latin hiſtorian and poet, was born at Egra in Bohemia, in 1518. He was devoted to books from his childhood, and eſpecially to poetry, in which he gained ſo much reputation, that he attained to the poetical crown, to the dignity of poet laureat, and of count palatine. He wrote with prodigious facility; and his verſes are extremely flowing, eaſy, and natural. He publiſhed Latin poems on a great variety of ſubjects; the hiſtory of the biſhops and biſhoprics of Germany; hiſtory of German monaſteries; and a great number of other works, of which a catalogue is given in Geſner's *Bibliotheque*. Bruſchius was far from being rich, or rather he was very poor; ſubſiſting almoſt entirely by the benefactions of his poetical patrons, and by preſents from the abbots and abbeſſes whoſe monaſteries he deſcribed. The liberalities of ſome abbots, while he was with Oporin at Baſil, enabled him to buy a new ſuit of clothes; but when he found, that appearing well dreſſed in the ſtreets procured him many marks of reſpect from the vulgar, he tore his new finery to pieces, "as ſlaves that uſurped their maſter's honours." Bruſchius ſeems to have been too great a philoſopher for the age he lived in, or indeed for any age. He was murdered in the foreſt of Scalingenbach, between Rottemberg on the Tauber and Winſheim: and it was believed that this aſſaſſination was concerted and carried into execution by ſome gentlemen againſt whom Bruſchius was about to write ſomething.

BRUSH, an aſſemblage of hairs or briſtles faſtened in the holes of a wooden handle or board. The manner of making bruſhes is by folding the hair or briſtle in two; and bringing it by means of a packthread, which is engaged in the fold, through the holes with which the wood is pierced all over, being afterwards faſtened therein with glue. When the holes are thus filled, the ends of the hair are cut to make the ſurface even.

Shearmen's Brush, is made of wild boars briſtles; and ſerves to lay the wool or nap of cloth, after ſhearing it for the laſt time.

Brush, among painters, a larger and coarſer kind of a pencil made of hogs briſtles, wherewith to lay the colours on their large pieces. The Chineſe painter's bruſh conſiſts of the ſtalk of a plant; whoſe fibres being fretted at both ends, and tied again, ſerve for a bruſh.

Wire-Brushes, are uſed by ſilver-ſmiths and gilders, for

fcrubbing filver, copper, or brafs pieces, in order to the gilding of them. There is a method of dyeing or colouring leather, performed by only rubbing the colour on the fkin with a brufh. This the French leather-gilders call *brouffure*; being the loweft of all the forts of dye that are in ufe.

Brush *of a Fox*, among fportfmen, fignifies his drag or tail, the tip or end of which is called the *chape*.

Brush is alfo ufed in fpeaking of a fmall thicket or coppice. In this fenfe the word is formed from the middle-age Latin *brufcia*, *brufcus*, which fignifies the fame.

Brush-*Wood* denotes fmall flender wood or fpray. See Browse.

Brush, in electricity, denotes the luminous appearance of the electric matter iffuing in a parcel of diverging rays from a point. Beccaria afcribes this appearance to the force with which the electric fluid, going out of a point, divides the contiguous air, and paffes through it to that which is more remote.

BRUSHING. Among jockies, a brufhing gallop denotes a brifk one: a horfe fhould have his brufhing gallop in a morning before watering.

BRUSSELS, the capital of Brabant, and the feat of the governor of the Auftrian Low Countries. Like all the towns in the Netherlands, it abounds with fine churches and monafteries: of the former, that dedicated to St. Gudule is the largeft. The principal fquares are the grand market place, in which is the noble ancient townhoufe on the one fide, and an old ftructure, called the king's houfe, on the other; the Place de Sablon, in which is a fountain erected by Thomas fecond earl of Ailefbury, who refided here 43 years in a kind of exile; the Place de St. Michel, a new fquare, near the opera houfe; the Place royale, another new fquare (with a new church on one fide), built on the fite of an old royal palace that was deftroyed by fire; the park, another new and very extenfive fquare, on one fide of which is a magnificent building for the fovereign council of Brabant, and the area is formed into beautiful public walks, with a Vauxhall, &c. There are many public fountains in the city, from fome of which the water flows in a very whimfical manner. Here is an academy of belles-lettres, and an opera-houfe after the Italian manner. There is a kind of nunnery here, called the Beguinage, which is like a little town, having fome ftreets, and being furrounded by a wall and a ditch. The women educated here are allowed to leave it when they choofe to marry. Bruffels is celebrated for its fine lace, camlets, and tapeftry. It was bombarded by marfhal Villeroy in 1695, by which 4000 houfes were deftroyed. It was taken by the French in 1746, but reftored at the fubfequent peace. It was again taken by them in 1792; but the Auftrians compelled them to evacuate it in March 1793. It is however among the later conquefts of the French republican army. It is feated partly on an eminence, and partly in a fertile plain, on the little river Senne, 22 miles S. of Antwerp, 26 S. E. of Ghent, and 148 N. by E. of Paris. Long. 4. 28. E. Lat. 50. 51. N.

BRUTE, a general name for all animals except mankind. Among brutes, the monkey kind bear the neareft refemblance to man; both in the external fhape and internal ftructure, but more in the former than in the latter. In the monkey kind, the higheft and the neareft approach to the likenefs of man is the Oran Outang, or Homo Sylveftris.—The ftructure and œconomy of brutes are the objects of what is called *Comparative* Anatomy. See that article.

Philofophers have been much puzzled about the effential characteriftics of brutes, by which they may be diftinguifhed from man. Some define a brute to be an *animal not rifible*, or a *living creature incapable of laughter*; others call them *mute animals*. The peripatetics allowed them a fenfitive power, but denied them a rational one. The Platonifts allowed them reafon and underftanding, though in a degree lefs pure and refined than that of men. Lactantius allows every thing to brutes which men have, except a fenfe of religion; and even this has been afcribed to them by fome fceptics. Defcartes maintained that brutes are mere inanimate machines, abfolutely deftitute not only of reafon, but of all thought and perception, and that all their actions are only confequences of the exquifite mechanifm of their bodies. This fyftem, however, is much older than Defcartes; it was borrowed by him from Gomez Pereira, a Spanifh phyfician, who employed 30 years in compofing a treatife which he entitled *Antoniana Margarita*, from the Chriftian names of his father and mother. It was publifhed in 1554: but his opinion had not the honour of gaining partifans, or even of being refuted; fo that it died with him. Even Pereira feems not to have been the inventor of this notion; fomething like it having been held by fome of the ancients, as we find from Plutarch and St. Auguftin. Others, who rejected the Cartefian hypothefis, have maintained that brutes are endowed with a foul effentially inferior to that of men; and to this foul fome have allowed immortality, others not. And, laftly, in a treatife publifhed by one Bougeant a Jefuit, entitled *A philofophical amufement on the language of beafts*, he affirms that they are animated by evil-fpirits or devils.

The opinion of Defcartes was probably invented, or at leaft adopted, by him to defeat two great objections: one againft the immortality of the fouls of brutes, if they were allowed to have any; the other againft the goodnefs of God, in fuffering creatures who had never finned, to be fubjected to fo many miferies. The arguments in favour of it may be ftated as follow: 1. It is certain, that a number of human actions are merely mechanical; becaufe they are done imperceptibly to the agent, and without any direction from the will; which are to be afcribed to the impreffion of objects and the primordial difpofition of the machine, wherein the influence of the foul has no fhare; of which number are all habits of the body acquired from the reiteration of certain actions. In all fuch circumftances, human beings are no better than automata. 2. There are fome natural movements fo involuntary, that we cannot reftrain them; for example, that admirable mechanifm ever on the watch to preferve an equilibrium, when we ftoop, bend, or incline our bodies in any way, or when we walk upon a narrow plank. 3. The natural liking for, and antipathy againft, certain objects, which in children precede the power of knowing and difcriminating them, and which fometimes in grown perfons triumph over all the efforts of reafon; are all phenomena to be accounted for from the wonderful mechanifm of the body, and are fo many cogent proofs of that irrefiftible influence which objects have on the human frame. 4. Every one knows how much our paffions depend on the degree of motion into which the blood is put, and the reciprocal impreffions caufed by the fympathy between the heart and brain, that are fo clofely connected by their nerves; and if fuch effects may be produced by fuch fimple mechanical means as the mere increafe of motion in the blood, without any direction of the will, we are not to wonder at the actions of brutes being the effects only of a refined mechanifm, without thought or perception. 5. A farther proof will arife from a confideration of the many wonderful effects which even the ingenuity of man has contrived to bring about by mechanical means; the androide, for inftance, of Mr. Kempell, which plays at chefs. Now, it is not to be queftioned, but that the mechanifm of the body of the meaneft animal infinitely furpaffes that of Mr. Kempell's machine; and what can be the confequence of this, but that the actions of that animal muft be proportionably more furprifing than thofe of the wooden chefs-player? See Androides and Automaton.

The above is a ſhort abſtract of all the arguments that are brought in favour of the Carteſian ſyſtem: but they are evidently very far from being concluſive. They are deficient, in the firſt place, becauſe, though we allow them in the utmoſt extent the Carteſians themſelves can deſire, they prove only the poſſibility of brutes being inanimate, and that the power of God actually could produce ſuch and ſuch actions from inanimate machines; but that he actually has done ſo, they have not the leaſt tendency to prove. In the ſecond place, the Carteſian argument is inſufficient, becauſe it has no limits, and knows not where to ſtop; as, by the ſame method of arguing, every man might prove his neighbour to be an inanimate machine: for though every individual be conſcious of his own thoughts, he is not ſo of thoſe of his neighbours; and it no more exceeds the power of God to cauſe an inanimate machine to perform the actions of a man than thoſe of a beaſt. Neither are the two objections which the hypotheſis is calculated to anſwer, to be at all admitted as arguments in its favour. They are, 1. That if we allow brutes to have ſouls, they muſt be immaterial, and conſequently immortal; and, 2. It ſeems a contradiction to the goodneſs of God to think that he ſhould ſubject innocent creatures to ſuch a multitude of evils as we ſee the brute creation endure in this world. The firſt of theſe is productive of no bad conſequences to us, though it ſhould be granted: and if it is ſuppoſed that brute creatures are really immortal, the ſecond objection vaniſhes; becauſe, in the enjoyment of endleſs felicity, all temporary afflictions, how ſevere ſoever, muſt be ſwallowed up as though they had never been.

As to a poſitive proof on the other ſide, viz. that brutes are really endowed with ſenſation and conſciouſneſs, there is undoubtedly the ſame evidence for the ſenſibility of brutes that there is for that of mankind. We ſee brutes avoid pain as much as we do; and we likewiſe ſee them ſeek for pleaſure and expreſs their happineſs in the enjoyment of certain things by ſigns not at all equivocal. Therefore, though we grant the poſſibility of all this being the effect of mere mechaniſm; yet, as we are conſcious that in ourſelves ſimilar effects are produced by a ſentient principle, we have all the reaſon in the world to conclude that in brutes they are likewiſe derived from a principle of ſenſation: eſpecially ſeeing we know of no kind of mechaniſm in any other part of nature that produces any thing like the effects juſt mentioned; and until we ſee that a mechaniſm of this kind does take place in ſome part of nature, we have no right to ſuppoſe it in any. As to thoſe actions of the human body in which it ſeems to move ſpontaneouſly, like an automaton, without the direction of the mind or will, it is almoſt ſuperfluous to obſerve, that they were not performed in this manner originally, but required very great exertions of the will and intellectual faculty before the body could be brought to perform them eaſily; ſo that from this nothing can be inferred. Add to this, that divine revelation ſets forth to us in many places the brute creation as objects of mercy; which could not be done without the higheſt abſurdity, if they were not really capable of feeling pleaſure and pain as well as we.

The moſt rational oppoſers of the Carteſian ſcheme maintain, that brutes are endowed with a principle of ſenſation as well as we; though of an inferior nature to ours. Great diſputes, however, have ariſen on this ſubject; ſome maintaining, that the ſoul in brutes is merely ſenſitive, and that they are altogether deſtitute of reflection and underſtanding; others, that they not only reaſon, but make a better uſe of it than men do. That the brutes are endowed only with ſenſation, and totally deſtitute of all power of reflection, or even reaſoning, is what can by no means be maintained on good grounds: neither can it be aſſerted that they act entirely from inſtinct, or a blind propenſity to certain things without knowing why or wherefore. In numberleſs inſtances, needleſs to be mentioned here, but which will readily occur to every reader, it is evident, that education will get the better of many of the natural inſtincts of brutes; which could never be the caſe were they abſolutely incapable of reaſoning. On the other hand, it is equally certain, that they are by no means capable of education in the ſame degree that men are; neither are the rational exertions of beaſts at all to be compared even with thoſe of the meaneſt ſavages. One remarkable inſtance of this is in the uſe of the element of fire. The moſt ſavage nations have known how to make this element ſubſervient to their purpoſes; or if ſome have been found who have been entirely ignorant of its exiſtence, they have quickly learned its uſes on ſeeing it made uſe of by others: but though many of the brute creation are delighted with warmth, and have opportunities every day of ſeeing how fire is ſupplied with fuel, and by that means preſerved, it never was known that one of them attempted to preſerve a fire by this means. This ſhows a ſtrange defect of rationality, unaccountable upon any other ſuppoſition than that the ſoul or ſentient principle of brutes is ſomehow or other inferior in its nature to that of man; but ſtill it is a ſentient principle, capable of perceptions as quick, and in many inſtances much more ſo than our own.

Father Bougeant ſupports his opinion of the ſpirits of brute creatures being devils, by many curious and forcible arguments, too long however to be enumerated in this place; but the reply to them is obvious. Beaſts, though remarkably miſchievous, are not completely ſo; they are in many inſtances capable of gratitude and love, which devils cannot poſſibly be. The very ſame paſſions that are in brutes, exiſt alſo in human nature; and if we choſe to argue from the exiſtence of thoſe paſſions, and the aſcendency they have over mankind at ſome times, we may ſay with as great juſtice, that the ſouls of men are devils, as that the ſouls of brutes are. All that can be reaſonably inferred from the greater prevalency of the malignant paſſions among the brutes than among men, is, that the former have leſs rationality than men: and accordingly it is found, that among ſavages, who exerciſe their reaſon leſs than other men, every ſpecies of barbarity is practiſed, without being deemed a crime.

On the preſent ſubject there is a very ingenious treatiſe in German, publiſhed by the late profeſſor Bergman, under the title (as tranſlated) of "Reſearches deſigned to ſhow what the brute animals certainly *are not*, and alſo what they probably are."—That they are *not* machines, he proves with more detail than ſeemed neceſſary for refuting an hypotheſis which would equally tend to make *us all* machines. It is certain, that the *half-reaſoning* elephant cannot be deemed a machine, by us, from any other conſideration, than that *he* goes upon four feet, while *we* go upon two; and he might as well take us for mere machines becauſe *we* go upon two feet, while *he* goes upon four.

But if animals are not mere machines, what *are* they? Manifeſtly ſenſitive beings, with an immaterial principle; and thinking or reaſoning beings, to a *certain degree*. In certain claſſes of animals this appears evident to our author, who ſeems to have obſerved with great ſagacity and attention their *various* operations and proceedings, their ways and means, &c. He thinks it impoſſible to deduce this variety of action, in any animals (if we except thoſe of the loweſt claſſes in the gradation of intelligence), from a general and uniform inſtinct: for they accommodate their operations to times and circumſtances. They combine; they chooſe the favourable moment; they avail themſelves of the occaſion, and ſeem to receive inſtruction by experience. Many of their operations announce reflection: the bird repairs a ſhattered neſt, inſtead of conſtructing inſtinctively a new one: the hen, who has been robbed of her eggs, changes her place in order to lay the remainder with

more fecurity: the cat difcovers both care and artifice in concealing her kittens. Again, it is evident, that, on many occafions, animals know their faults and miftakes, and correct them; they fometimes contrive the moft ingenious methods of obtaining their ends, and when one method fails have recourfe to another; and they have, without doubt, a kind of language for the mutual communication of their ideas. How is all this to be accounted for (fays our author), unlefs we fuppofe them endowed with the powers of perceiving, thinking, remembering, comparing, and judging? They have thefe powers, indeed, in a degree inferior to that in which they are poffeffed by the human fpecies, and form claffes below them in the graduated fcale of intelligent beings. But ftill it feems to our author unreafonable to exclude them from the place which the principles of found philofophy, and facts afcertained by conftant obfervation, affign to them in the great and diverfified fphere of life, fenfation, and intelligence;—he does not, however, confider them as beings whofe actions are directed to *moral* ends, nor confequently as accountable and proper fubjects for *reward* or *punifhment* in a future world.

That brute animals poffefs reflection and fentiment, and are fufceptible of the kindly as well as the irafcible paffions, independently of fexual attachment and natural affection, is evident from the numerous inftances of affection and gratitude daily obfervable in different animals, particularly the dog. Of thofe and other fentiments, fuch as pride, and even fenfe of glory, the elephant exhibits proofs equally furprifing and indubitable, as the reader may fee under the article ELEPHAS.

As to the natural affection of brutes, fays Mr. White, in his Natural Hiftory, &c. of Selborne, "the more I reflect on it, the more I am aftonifhed at its effects. Nor is the violence of this affection more wonderful than the fhortnefs of its duration. Thus every hen is in her turn the virago of the yard in proportion to the helpleffnefs of her brood; and will fly in the face of a dog or a fow in defence of thofe chickens which in a few weeks fhe will drive before her with relentlefs cruelty. This affection fublimes the paffions, quickens the invention, and fharpens the fagacity of the brute creation. Thus an hen, juft become a mother, is no longer the placid bird fhe ufed to be, but with feathers ftanding on end, wings hovering, and clocking note, fhe runs about like one poffeffed. Dams will throw themfelves in the way of the greateft danger in order to avert it from their progeny. Thus a partridge will tumble along before a fportfman in order to draw away the dogs from her helplefs covey. In the time of nidification the moft feeble birds will affault the moft rapacious. All the hirundines of a village are up in arms at the fight of an hawk, whom they will perfecute till he leaves that diftrict. A very exact obferver has often remarked, that a pair of ravens neftling in the rock of Gibraltar would fuffer no vulture or eagle to reft near their ftation, but would drive them from the hill with an amazing fury: even the blue-thrufh, at the feafon of breeding, would dart out from the clefts of the rocks to chafe away the keftril or the fparrow-hawk. If you ftand near the neft of a bird that has young, fhe will not be induced to betray them by inadvertent fondnefs, but will wait about at a diftance with meat in her mouth for an hour together. The flycatcher builds every year in the vines that grow on the walls of my houfe. A pair of thefe little birds had one year inadvertently placed their neft on a naked bough, perhaps in a fhady time, not being aware of the inconvenience that followed: but an hot funny feafon coming on before the brood was half fledged, the reflection of the wall became infupportable, and muft inevitably have deftroyed the tender young, had not affection fuggefted an expedient, and prompted the parent-birds to hover over the neft all the hotter hours, while with wings expanded and mouths gaping for breath they fcreened off the heat for their fuffering offspring. A farther inftance I once faw of notable fagacity in a willow-wren, which had built in a bank in my fields. This bird a friend and myfelf had obferved as fhe fat in her neft; but were particularly careful not to difturb her, though we faw fhe eyed us with fome degree of jealoufy. Some days after, as we paffed that way, we were defirous of remarking how this brood went on; but no neft could be found, till I happened to take up a large bundle of long green mofs as it were carelefly thrown over the neft, in order to dodge the eye of any impertinent intruder."

A wonderful fpirit of fociality in the brute creation, independent of fexual attachment, has been frequently remarked. Many horfes, though quiet with company, will not ftay one minute in a field by themfelves: the ftrongeft fences cannot reftrain them. A horfe has been known to leap out at a ftable window, through which dung was thrown, after company; and yet in other refpects remarkably quiet. Oxen and cows will not fatten by themfelves; but will neglect the fineft pafture that is not recommended by fociety. It would be needlefs to inftance this in fheep, which conftantly flock together. But this propenfity feems not to be confined to animals of the fame fpecies. In the work laft quoted, we are told of "a doe ftill alive, that was brought up from a little fawn with a dairy of cows; with them it goes a-field, and with them it returns to the yard. The dogs of the houfe take no notice of this deer, being ufed to her: but if ftrange dogs come by, a chafe enfues; while the mafter fmiles to fee his favourite fecurely leading her purfuers over hedge, or gate, or ftile, till fhe returns to the cows, who with fierce lowings and menacing horns drive the affailants quite out of the pafture."

Even great difparity of kind and fize does not always prevent focial advances and mutual fellowfhip. Of this the following remarkable inftance is given in the fame work: "A very intelligent and obfervant perfon has affured me, that in the former part of his life, keeping but one horfe, he happened alfo on a time to have but one folitary hen. Thefe two incongruous animals fpent much of their time together in a lonely orchard, where they faw no creature but each other. By degrees an apparent regard began to take place between thefe two fequeftered individuals. The fowl would approach the quadruped with notes of complacency, rubbing herfelf gently againft his legs: while the horfe would look down with fatiffaction, and move with the greateft caution and circumfpection, left he fhould trample on his diminutive companion. Thus, by mutual good offices, each feemed to confole the vacant hours of the other; fo that Milton, when he puts the following fentiment in the mouth of Adam, feems to be fomewhat miftaken:

> Much lefs can bird with beaft, or fifh with fowl,
> So well converfe, nor with the ox the ape."

To thefe inftances of attachment between incongruous animals from a fpirit of fociality or the feelings of fympathy, may be added the following inftance of fondnefs from a different motive, recounted by Mr. White in the work already fo frequently quoted. "My friend had a little helplefs leveret brought to him, which the fervants fed with milk in a fpoon; and about the fame time his cat kittened, and the young were difpatched and buried. The hare was foon loft, and fuppofed to be gone the way of moft fondlings, to be killed by fome dog or cat. However, in about a fortnight, as the mafter was fitting in his garden in the dufk of the evening, he obferved his cat, with tail erect, trotting towards him, and calling with little fhort inward notes of complacency, fuch as they ufe towards their kittens, and fomething gamboling after, which proved to be the leveret that the cat had fupported with her

milk, and continued to support with great affection. Thus was a graminivorous animal nurtured by a carnivorous and predaceous one!

"Why so cruel and sanguinary a beast as a cat, of the ferocious genus of *Felis*, the *murium leo*, as Linnæus calls it, should be affected with any tenderness towards an animal which is its natural prey, is not so easy to determine. This strange affection probably was occasioned by that desiderium, those tender maternal feelings, which the loss of her kittens had awakened in her breast; and by the complacency and ease she derived to herself from the procuring her teats to be drawn, which were too much distended with milk, till from habit she became as much delighted with this foundling as if it had been her real offspring.

"This incident is no bad solution of that strange circumstance which grave historians as well as the poets assert, of exposed children being sometimes nurtured by female wild beasts that probably had lost their young. For it is not one whit more marvellous that Romulus and Remus, in their infant state, should be nursed by a she-wolf, than that a poor little sucking leveret should be fostered and cherished by a bloody grimalkin.

> ——————*Viridi fœtam Mavortis in antro*
> *Procubuisse lupam: geminos huic ubera circum*
> *Ludere pendentes pueros, et lambere matrem*
> *Impavidos: illam tereti cervice reflexam*
> *Mulcere alternos, et corpora fingere lingua.*"

But besides the different qualities enumerated, besides reflection and sagacity often in an astonishing degree, and besides the sentiments and actions prompted by social and natural attachments, certain brutes seem on many occasions inspired with a superior faculty, a kind of presentiment or second-sight as it were, with regard to events and designs altogether unforeseen by the rational beings whom they concern. Of the faculty alluded to, various instances will probably consist with the knowledge or the recollection of most of our readers: we shall therefore only recite the following on account of its unquestionable authenticity. At the seat of the late earl of Lichfield, three miles from Blenheim, there is a portrait in the dining-room of Sir Henry Lee, by Johnston, with that of a mastiff dog which saved his life. It seems a servant had formed the design of assassinating his master and robbing the house; but the night he had fixed on, the dog, which had never been much noticed by Sir Henry, for the first time followed him up stairs, got under his bed, and could not be got from thence by either master or man: in the dead of night, the same servant entered the room to execute his horrid design; but was instantly seized by the dog, and being secured, confessed his intentions. There are ten quaint lines in one corner of the picture, which conclude thus:

> But in my dog, whereof I made no store,
> I find more love than those I trusted more.

Upon what hypothesis can we account for a degree of foresight and penetration such as this? Or will it be suggested, as a solution of the difficulty, that a dog may possibly become capable in great measure of understanding human discourse, and of reasoning and acting accordingly; and that, in the present instance, the villain had either uttered his design in soliloquy, or imparted it to an accomplice, in the hearing of the animal?

It has been much disputed whether the brutes have any language whereby they can express their minds to each other; or whether all the noise they make consists only of cries inarticulate, and unintelligible even to themselves. We are, however, too little acquainted with the intellectual faculties of these creatures to be able to determine this point. Certain it is, that their passions, when excited, are generally productive of some peculiar cry; but whether this be designed as an expression of the passion to others, or only a mechanical motion of the muscles of the larynx occasioned by the passion, is what we have no means of knowing. We may indeed, from analogy, conclude, with great reason, that some of the cries of beasts are really expressions of their sentiments; but whether one beast is capable of forming a design, and communicating that design by any kind of language to others, is what we submit to the judgment of the reader, after giving the following instance which among others is brought as a proof of it by father Bougeant. "A sparrow finding a nest that a martin had just built, standing very conveniently for him, possessed himself of it. The martin, seeing the usurper in her house, called for help to expel him. A thousand martins came full speed, and attacked the sparrow; but the latter being covered on every side, and presenting only his large beak at the entrance of the nest, was invulnerable, and made the boldest of them who durst approach him repent of their temerity. After a quarter of an hour's combat, all the martins disappeared. The sparrow thought he had got the better, and the spectators judged that the martins had abandoned their undertaking. Not in the least. Immediately they returned to the charge; and each of them having procured a little of that tempered earth with which they make their nests, they all at once fell upon the sparrow, and inclosed him in the nest to perish there, though they could not drive him thence. Can it be imagined that the martins could have been able to hatch and concert this design all of them together, without speaking to each other, or without some medium of communication equivalent to language?"

BRUTTON, a town of Somersetshire, in England: situated on the river Brew. W. long. 2. 30. N. lat. 51. 15.

BRUTUS, or BRUTE, according to the old exploded history of this country by Geoffroy of Monmouth, was the first king of Britain. He is said to have been the son of Sylvius, and he of Ascanius the son of Æneas, and born in Italy: killing his father by chance, he fled into Greece, where he took king Pandrasus prisoner, who kept the Trojans in slavery, whom he released on condition of providing ships, &c. for the Trojans to forsake the land. Being advised by the oracle to sail west beyond Gaul, he, after some adventures, landed at Totness in Devonshire. Albion was then inhabited by a remnant of giants, whom Brutus destroyed; and called the island, after his own name, *Britain*. He built a city called *New Troy*, since London; and having reigned here 24 years, at his death parcelled the island among his three sons: Locrine had the middle, called *Loegria*; Camber had Wales, and Albanact Scotland.

BRUTUS (John Michael), a man of learning, and a polite writer, in the 16th century. He was a native of Venice; and, having studied at Padua, spent great part of his life in travelling, and became historiographer to his imperial majesty. He wrote, 1. A history of Hungary. 2. A history of Florence. 3. Notes on Horace, Cæsar, Cicero, &c.; and other works. He was living in the year 1590.

BRUYERE (John de la), a celebrated French author, was born at Dourdan in the year 1664. He wrote Characters, describing the manners of his age, in imitation of Theophrastus; which characters were not always imaginary or general, but descriptive, as was well known, of persons of considerable rank. In the year 1693, he was by an order of the king chosen a member of the French academy; and died in the year 1696. —"The Characters of Bruyere (says Voltaire) may justly be ranked among the extraordinary productions of this age.

Antiquity furniſhes no examples of ſuch a work. A ſtyle rapid, conciſe, and nervous; expreſſions animated and picturesque; an uſe of language altogether new, without offending againſt its eſtabliſhed rules, ſtruck the public at firſt; and the alluſions, which are crowded in almoſt every page, completed its ſucceſs. When La Bruyere ſhowed his work in manuſcript to Maleſieux, the latter told him, that the book would have many readers, and its author many enemies. It ſomewhat ſunk in the opinion of men, when that whole generation whoſe follies it attacked were paſſed away: yet, as it contains many things applicable to all times and places, it is more than probable that it will never be forgotten."

BRUYIERS, a town of France, in the department of the Voſges, and late province of Lorrain. E. long. 6. 45. N. lat. 48. 15.

BRYANS-BRIDGE, a town of Ireland, in the county of Clare and province of Connaught, ſeated on the river Shannon, eight miles north of Limeric. W. long. 8. 30. N. lat. 52. 31.

BRYANT (Sir Francis), a ſoldier, ſtateſman, and a poet of no inconſiderable fame in his time, was born of a genteel family, educated at Oxford, and afterwards ſpent ſome time in travelling abroad. In the year 1522, the 14th of Henry VIII. he attended in a military capacity the earl of Surry on his expedition to the coaſt of Brittany; and commanded the troops in the attack of the town of Morlaix, which he took and burnt. For this ſervice he was knighted on the ſpot by the earl. In 1528, he was in Spain; but on what ſervice is doubtful. In 1529, he was ſent ambaſſador to France; and, the year following, to Rome on account of the king's divorce. He had alſo been there in 1522, in the ſame capacity, when cardinal Wolſey's election to the holy ſee was in agitation. He was gentleman of the privy chamber to king Henry VIII. and to his ſucceſſor Edward VI. in the beginning of whoſe reign he marched with the protector againſt the Scots; and after the battle of Muſſelburgh, in which he commanded the light horſe, was made banneret. In 1548, he was appointed chief governor of Ireland, where he married the counteſs of Ormond. He died ſoon after, and was buried at Waterford. He wrote, 1. Songs and Sonnets; ſome of which were printed with thoſe of the earl of Surrey and Sir Thomas Wyatt, Lond. 1565. 2. Letters written from Rome concerning the king's divorce; manuſcript. 3. Various letters of ſtate; which Ant. Wood ſays he had ſeen. 4. A diſpraiſe of the life of a courtier, &c. Lond. 1548. 8vo. from the French of Alaygri, who tranſlated it from the Caſtilian language, in which it was originally written by Guevara.

BRYE (John Theodore de), an excellent engraver, was a native of Liege; but he reſided chiefly at Frankfort, where he carried on a conſiderable commerce in prints. It does not appear when he was born, nor to what maſter he owed his inſtructions in the art of deſigning and engraving. He worked almoſt entirely with the graver, and ſeldom called in the aſſiſtance of the point. He acquired a neat, free ſtyle of engraving, excellently well adapted to ſmall ſubjects, in which many figures were to be repreſented; as *funeral parades, proceſſions*, and the like, which he executed in a charming manner. He alſo drew very correctly. His heads in general are ſpirited and expreſſive, and the other requiſites of his figures well marked. His back-grounds, though frequently very ſlight, are touched with a maſterly hand. He died, as his ſons inform us in the third part of Boiſſard's collection of portraits, on March 27th, 1598: the two firſt parts of that collection were engraved by himſelf, aſſiſted by his ſons, who afterwards continued it.

BRYENNIUS (Manuel), a Greek writer on muſic, is ſuppoſed to have flouriſhed under the elder Paleologos, viz. about the year of Chriſt 1120. He wrote three books on *Harmonics*; the firſt whereof is a kind of commentary on Euclid, as the ſecond and third are on Ptolemy. He profeſſes to have ſtudied perſpicuity for the ſake of young men. Meibomius had given the public expectations of a tranſlation of this work: but not living to complete it, Dr. Wallis undertook it; and it now makes a part of the third volume of his works, publiſhed at Oxford, in three volumes folio, 1699.

BRYGMUS, among phyſicians, a grating noiſe made by the gnaſhing of the teeth.

BRYONIA, BRYONY; a genus of the ſyngeneſia order, belonging to the monœcia claſs of plants; and in the natural method ranking under the 34th order, *Cucurbitaceæ*. The calyx of the male is five-toothed, with a quinqueſid corolla, and three filaments. In the female the calyx is dentated, the corolla quinqueſid, the ſtyle trifid, with a roundiſh many-ſeeded berry.

The ſpecies are, 1. The *alba*, rough, or white bryony with red flowers, is a native of dry banks under hedges in many parts of Britain. The roots of this plant have by impoſtors been brought into a human ſhape, and ſhown for mandrakes. The method practiſed by theſe people was to find a young thriving plant of bryony; then they opened the earth all round, being careful not to diſturb the lower fibres; and being provided with ſuch a mould as is uſed for making plaſter figures, they fixed the mould cloſe to the root, faſtening it with wire to keep it in its proper ſituation: then they filled the earth about the root, leaving it to grow to the ſhape of the mould; which in one ſummer it will do; ſo that if this is done in March, by September it will have the ſhape. The leaves of this plant are alſo impoſed on people for mandrake-leaves; although there is no reſemblance between them, nor any agreement in quality. 2. The *africana*, or African tuberous rooted bryony. 3. The *racemoſa*, or bryony with a red olive-ſhaped fruit. Theſe are natives of warm climates, and are perennial; but their branches decay every winter. They flower in July, and in warm ſummers will perfect their ſeeds in Britain. 4. The *cretica*, or ſpotted bryony of Crete. 5. The *variegata*, or American bryony with a variegated fruit. 6. The *bonarienſis*, or bryony with hairy palmated leaves, divided into five parts, and obtuſe ſegments. Theſe are likewiſe natives of warm countries; but merit cultivation on account of the pretty appearance they make when the plants are full of fruit.

The *culture* of the ſecond and third ſorts is effected by planting them in pots filled with freſh light earth. In winter they muſt be placed in the green-houſe to protect them from froſts and great rains, which would deſtroy them if they were expoſed. In ſummer, they may be left to the open air, and muſt be frequently refreſhed with water in dry weather. The three laſt ſorts are annual plants; they muſt be raiſed on a hot-bed early in the ſpring: and when the plants are about three inches high, they ſhould be each tranſplanted into a ſmall pot, and plunged into a hot-bed of tanner's bark. When the plants are grown ſo large as to ramble about on the ſurface of the bed, and begin to entangle with other plants, they ſhould be ſhifted into larger pots, and placed in the bark-ſtove; where their branches may be trained to the wall, or againſt an eſpalier, that they may have ſun and air, which is abſolutely neceſſary for their yielding fruit.

The roots of the firſt ſpecies are uſed in medicine. Theſe are ſometimes as thick as a man's thigh: their ſmell, when freſh, is ſtrong and diſagreeable; the taſte nauſeouſly bitter and acrid. The juice is ſo ſharp, as in a little time to excoriate the ſkin; in drying, they loſe great part of their acrimony, and almoſt their whole ſcent.—Bryony-root is a ſtrong irritating cathartic; and has been exhibited in maniacal caſes, in dropſies, and in ſeveral chronic diſeaſes. An extract prepared by water acts more mildly, and with greater ſafety, than the root in ſubſtance: given from half a dram to a dram, it is ſaid to prove a gentle purgative, and likewiſe to operate

powerfully by urine.—Bryony-root is directed in the pharmacopœia chirurgica in the compoſition of a ſtimulating plaſter and cataplaſm.

Black Bryony. See Tamus.

BRYUM, in botany; a genus of the 56th natural order of Linnæus, viz. *Muſci*, belonging to the cryptogamia claſs of plants. The anthera is operculated or covered with a lid, the calyptra poliſhed; and there is a filament ariſing from the terminal tubercle. There are 41 ſpecies, moſt of them natives of Britain.

BUA, an iſland of the gulph of Venice, on the coaſt of Dalmatia, near the town of Trau; called likewiſe the *Partridge-iſland*, becauſe frequented by thoſe birds. It is called *Bubus* by Pliny.

BUARCOS, a town of Portugal, in the province of Beira. W. long. 8. 5. N. lat. 40. 3.

BUBALIS, in zoology, the trivial name of the buffalo, a ſpecies of the bos. See Bos.

BUBASTIS, in the Egyptian mythology, one of the names of Iſis or the moon. The Egyptians beſtowed different names on the ſun, either to characterize his effects or his relations with reſpect to the earth; they followed the ſame method reſpecting the moon. A barbarous cuſtom was introduced at the feſtivals celebrated in honour of Bubaſtis, called by the Greeks alſo *Ilithyia* or *Lucina*, to mark her preſiding over childbed. The Egyptians adored her under this name in the city of Ilithyia, ſituated near Latopolis.

BUBBLE, in philoſophy, a ſmall drop or veſicle of any fluid filled with air; and formed either on its ſurface by an addition of more of the fluid, as in raining, &c.; or in its ſubſtance, by an inteſtine motion of its component particles. Bubbles are dilatable or compreſſible, *i. e.* they take up more or leſs room as the included air is more or leſs heated, or more or leſs preſſed from without; and are round, becauſe the included air acts equally from within all around.

Bubble, in commerce, a cant term given to a kind of project for raiſing money on imaginary grounds, much practiſed in France and England in the years 1719, 1720, and 1721. The pretence of thoſe ſchemes was the raiſing a capital for retrieving, ſetting on foot, or carrying on, ſome promiſing and uſeful branch of trade, manufacture, machinery, or the like. To this end propoſals were made out, ſhowing the advantages to be derived from the undertaking, and inviting perſons to be engaged in it. The ſum neceſſary to manage the affair, together with the profits expected from it, were divided into ſhares or ſubſcriptions, to be purchaſed by any diſpoſed to adventure therein. Bubbles, by which the public have been tricked, are of two kinds, viz. 1. Thoſe which we may properly enough term *trading-bubbles*; and, 2. Stock or fund bubbles. The former have been of various kinds; and the latter have occurred at different periods, as in 1719 and 1720.

BUBO, in ornithology, the trivial name of a ſpecies of ſtrix. See Strix.

Bubo, or *Buboe*, in ſurgery, a tumour which ariſes with inflammation, only in certain or glandular parts, as in the arm-pits and in the groins. See Surgery.

BUBON, macedonian parsley: a genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The fruit is ovated, ſtriated, and villous.

The *Species* are, 1. The *macedonicum*; this ſends out many leaves from the root, and the loweſt grow almoſt horizontally, ſpreading near the ſurface of the ground: the foot-ſtalk of each leaf divides into ſeveral ſmaller; which are garniſhed with ſmooth rhomb-ſhaped leaves, which are of a bright pale-green colour, and ſawed on their edges. In the centre of the plant ariſes the flower-ſtem, which is little more than a foot high, dividing into many branches, each being terminated by an umbel of white flowers, which are ſucceeded by oblong hairy ſeeds. This plant, in warm countries, is biennial: the plants, which riſe from ſeeds, one year produce flowers, and ſeeds the next, and then periſh: but in Britain they ſeldom flower till the third or fourth year from the ſeed; but whenever the plant flowers, it always dies. 2. The *rigidus*, hard or rigid ferula, is a native of Sicily. It is a low perennial plant, having ſhort, ſtiff, and very narrow leaves: the flower-ſtalk riſes a foot high, which is terminated by an umbel of ſmall white flowers; which are ſucceeded by ſmall, oblong, channelled ſeeds. It is a plant of little beauty or uſe, ſo is only cultivated for the ſake of variety. 3. The *galbanum* or African ferula, riſes with an upright ſtalk to the height of eight or ten feet, which at bottom is woody, having a purpliſh bark covered with a whitiſh powder that comes off when handled. The upper part of the ſtalk is garniſhed with leaves at every joint, the foot-ſtalks half-embracing them at their baſe, and are ſet with leaves like thoſe of the lovage, but ſmaller, and of a grey colour: the top of the ſtalk is terminated by an umbel of yellow flowers; which are ſucceeded by oblong channelled ſeeds, which have a thin membrane or wing on their border. When any part of the plant is broken, there iſſues out a little thin milk of a cream colour, which has a ſtrong ſcent of galbanum. 4. The *gummiferum*, with a mock chervil leaf, riſes with a ligneous ſtalk about the ſame height; and is garniſhed with leaves at each joint, which branch out like the former; but the ſmall leaves or lobes are narrow and indented like thoſe of baſtard hemlock. The ſtalk is terminated by an umbel of ſmall yellow flowers, which are ſucceeded by ſeeds like thoſe of the former ſort.—Theſe plants are all propagated by ſeeds, and require the common culture of other exotic vegetables. The galbanum of the ſhops is ſuppoſed to be procured from the third and fourth ſorts.

BUBONOCELE, or hernia inguinalis, in ſurgery, a tumour in the groin, formed by a prolapſus of the inteſtines, omentum, or both, through the proceſſes of the peritoneum and rings of the abdominal muſcles. See Surgery.

BUBONIUM, in botany, a ſynonyme of the Inula.

BUC (George), a learned Engliſh antiquarian, flouriſhed in the beginning of the 17th century. In the reign of king James I. he was made one of the gentlemen of his majeſty's privy-chamber, and knighted: he was alſo conſtituted maſter of the revels. What he moſtly diſtinguiſhed himſelf by was his writing, 1. The hiſtory of the reign of Richard III.; in which he takes great pains to wipe off the bloody ſtains that have blotted his character, and repreſents the perſon and actions of that prince in a much leſs odious light than other hiſtorians have done. He alſo wrote, 2. A treatiſe of the art of revels; and, 3. a work entitled The third univerſitie of England.

BUCANEER, one who dries and ſmokes fleſh or fiſh after the manner of the Indians. The name was particularly given to the firſt French ſettlers on the iſland of St. Domingo, whoſe ſole employment conſiſted in hunting bulls or wild boars, in order to ſell their hides and fleſh. The name has alſo been applied to thoſe famous piratical adventurers, chiefly Engliſh and French, who joined together to make depredations on the Spaniards of America.

The Bucaneers of St. Domingo lived in little huts built on ſome ſpots of cleared ground, juſt large enough to dry their ſkins on, and contain their bucanning houſes. Theſe ſpots they called *Boucans*, and the huts they dwelt in *Ajoupas*, a word which they borrowed from the Spaniards, and the Spaniards from the natives. Though theſe ajoupas lay open on all ſides, they were very agreeable to the hardy inhabitants, in a climate where wind and air are ſo very deſirable. As the

bucaneers had neither wife nor child, they associated by pairs, and mutually rendered each other all the services a master could reasonably expect from a servant, living together in so perfect a community, that the survivor always succeeded his deceased partner. This kind of union or fellowship they called *s'ematteloter* [insailoring], and each other *matelot* [sailor], whence is derived the custom of giving, at least in some parts of the French Antilles, the name *matelotage* [sailorage], to any kind of society formed by private persons for their mutual advantage. They behaved to each other with the greatest justice and openness of heart: it would have been a crime to keep any thing under lock and key; but, on the other hand, the least pilfering was unpardonable, and punished with expulsion from the community. And indeed there could be no great temptation to steal, when it was reckoned a point of honour, never to refuse a neighbour what he wanted; and where there was so little property, it was impossible there should be many disputes. If any happened, the common friends of the parties at variance interposed, and soon put an end to the difference.

Their dress consisted of a filthy greasy shirt, dyed with the blood of the animals they killed; a pair of trowsers still more nasty: a thong of leather by way of belt, to which they hung a case containing some Dutch knives, and a kind of very short sabre called *manchette*; a hat without any brim, except a little flap on the front to take hold of it by; and shoes of hogskin all of a piece. Their guns were four feet and a half in the barrel, and of a bore to carry balls of an ounce. Every man had his contract servants, more or fewer according to his abilities; besides a pack of 20 or 30 dogs, among which there was always a couple of beagles. Their chief employment at first was ox-hunting; and, if at any time they chased a wild hog, it was rather for pastime, or to make provision for a feast, than for any other advantage.

Such were the bucaneers of St. Domingo, and such their situation, when the Spaniards undertook to extirpate them. And at first they met with great success; for as the bucaneers hunted separately, every one attended by his servants, they were easily surprised. Hence the Spaniards killed numbers, and took many more, whom they condemned to a most cruel slavery. But whenever the bucaneers had time to put themselves into a state of defence, they fought like lions, to avoid falling into the hands of a nation from whom they were sure to receive no quarter; and by this means they often escaped. The Spaniards at length made a general hunt over the whole island; and, by destroying their game, put the bucaneers under a necessity of betaking themselves to another course of life. Some of them turned planters; and thereby increased some of the French settlements on the coast, and formed others. The rest, not relishing so confined and regular a life, entered among the freebooters, who thereby became a very powerful body. France, who had hitherto disclaimed for her subjects these ruffians whose successes were only temporary, acknowledged them, however, as soon as they formed themselves into settlements; and took proper measures for their government and defence.

With regard to the *piratical* BUCANEERS, before the English had made any settlement at Jamaica, or the French at St. Domingo, some pirates of both nations, who had driven the Spaniards out of the small island of Tortuga, fortified themselves there, and with amazing intrepidity made excursions against the common enemy. They formed themselves into small companies, consisting of 50, 100, or 150 men each. A boat, of a greater or smaller size, was their only armament. Here they were exposed night and day to all the inclemencies of the weather, having scarce room enough to lie down. A love of absolute independence, the greatest blessing to those who are not proprietors of land, rendered them averse from those mutual restraints which the members of society impose on themselves for the common good; some of them chose to sing, while others were desirous of going to sleep. As the authority they had conferred on their captain was confined to his giving orders in battle, they lived in the greatest confusion. Like the savages, having no apprehension of want, nor any care to preserve the necessaries of life, they were constantly exposed to the severest extremities of hunger and thirst. But deriving, even from their very distresses, a courage superior to every danger, the sight of a ship transported them to a degree of phrensy. They never deliberated on the attack, but it was their custom to board the ship as soon as possible. The smallness of their vessels, and the skill they showed in the management of them, screened them from the fire of the greater ships; and they presented only the fore part of their little vessels filled with fusileers; who fired at the port holes with so much exactness, that it entirely confounded the most experienced gunners. As soon as they threw out their grappling, the largest vessel seldom escaped them.

In cases of extreme necessity, they attacked the people of every nation, but fell upon the Spaniards at all times. They thought that the cruelties the latter had exercised on the inhabitants of the new world justified the implacable aversion they had sworn against them. But this was heightened by a personal pique, from the mortification they felt in seeing themselves debarred from the privilege of hunting and fishing, which they considered as natural rights. Such were their principles of justice and religion, that, whenever they embarked on any expedition, they used to pray to heaven for the success of it; and they never came back from the plunder, but they constantly returned thanks to God for their victory.

The bucaneers, when they had got a considerable booty, at first held their rendezvous at the island of Tortuga, in order to divide the spoil; but afterwards the French went to St. Domingo, and the English to Jamaica. Each person, holding up his hand, solemnly protested that he had secreted nothing of what he had taken. If any one among them was convicted of perjury, a case that seldom happened, he was left, as soon as an opportunity offered, upon some desert island, as a traitor unworthy to live in society. Such brave men among them as had been maimed in any of their expeditions, were first provided for; and after this act of justice and humanity, the remainder of the booty was divided into as many shares as there were claimants. The commander had by right only a single share with the rest; but they complimented him with two or three, in proportion as he had acquitted himself to their satisfaction. Favour never had any influence in the division of the booty; for every share was determined by lot. When these duties had been complied with, they then indulged themselves in all kinds of profusion. Unbounded licentiousness in gaming, wine, women, every kind of debauchery, was carried to the utmost pitch of excess, and was stopt only by the want which such profusion necessarily brought on. Those men who were enriched with several millions, were in an instant totally ruined, and destitute of clothes and provisions. They returned to sea; and the new supplies they acquired were soon lavished in the same manner.

The Spanish colonies, flattering themselves with the hopes of seeing an end to their miseries, and reduced almost to despair in finding themselves a perpetual prey to these ruffians, grew weary of navigation. They gave up all the power, conveniencies, and fortune, which their connections procured them, and formed themselves almost into so many distinct and separate states. They were sensible of the inconveniencies arising from such a conduct, and avowed them; but the dread of falling into the hands of rapacious and savage men, had greater influence over them than the dictates of honour, interest, and policy.

This gave rise to that spirit of inactivity which continues to this time.

This despondency served only to increase the boldness of the bucaneers. As yet they had only appeared in the Spanish settlements, in order to carry off some provisions when they were in want of them. They no sooner found their captures begin to diminish, than they determined to recover by land what they had lost at sea. The richest and most populous countries of the continent were plundered and laid waste. The culture of lands was equally neglected with navigation; and the Spaniards dared no more appear in their public roads, than sail in the latitudes which belonged to them.

The separation of the English and French, when the war, on account of the prince of Orange, divided the two nations; the successful means they both made use of to promote the cultivation of land among their colonies, by the assistance of these enterprising men; and the prudence they showed in fixing the most distinguished among them, and entrusting them with civil and military employments; the protection they were both under a necessity of affording to the Spanish settlements, which till then had been a general object of plunder: all these circumstances, and various others, besides the impossibility there was of supplying the place of these remarkable men, who were continually dropping off, concurred to put an end to a society as extraordinary as ever existed. Without any regular system, without laws, without any degree of subordination, and even without any fixed revenue, they became the astonishment of that age in which they lived, as they will be also of posterity.

BUCCELLARII, an order of soldiery under the Greek emperors, appointed to guard and distribute the ammunition bread; though authors are somewhat divided as to their office and quality. Among the Visigoths, buccellarius was a general name for a client or vassal who lived at the expence of his lord. Some give this denomination to parasites in the courts of princes, some make them the body-guards of emperors, and some fancy they were only such as emperors employed in putting persons to death privately.

BUCCELLATUM, among ancient military writers, denotes camp-bread, or bisket baked hard and dry, both for lightness and keeping. Soldiers always carried with them enough for a fortnight, and sometimes much longer, during the time that military discipline was kept up.

BUCCINA, an ancient musical and military instrument. It is usually taken for a kind of trumpet; which opinion is confirmed by Festus, by his defining it a crooked horn, played on like a trumpet. Vegetius observes, that the buccina bent in a semicircle, in which respect it differed from the tuba or trumpet. It is very hard to distinguish it from the cornu or horn, though it was something less, and not quite so crooked; yet it certainly was of a different species, because we never read of the cornu in use with the watch, but only the buccina. Besides, the sound of the buccina was sharper, and to be heard much farther than either the cornu or the tuba. In scripture, the like instrument, used both in war and in the temple, was called *rams-horn*, *kirenjobel*, and *sopheroth*, *hagijobelim*.—This instrument was in use among the Jews to proclaim their feast-days, new-moons, jubilees, sabbatic years, and the like. At Lacedæmon, notice was given by the buccina when it was supper-time; and the like was done at Rome, where the grandees had a buccina blown both before and after they sat down to table. The sound of the buccina was called *buccinus*, or *bucinus*; and the musician who played on it was called *buccinator*.

BUCCINUM, or WHELK, a genus of shell-fish belonging to the order of vermes testaceæ. This animal is one of the snail kind. The shell is univalve, spiral, and gibbous. The aperture is oval, ending in a small strait canal. Linnæus enumerates about 60 species, most of which are found in the southern seas.

The six following are found in the British seas, viz. 1. The *pullus*, or brown whelk, with five spires striated, waved, and tuberculated. Aperture wrinkled; upper part replicated. Length five eighths of an inch. 2. The *undatum*, or waved whelk, with seven spires, is spirally striated, and deeply and transversely undulated. Length three inches. Inhabits deep water. 3. The *striatum* has eight spires, with elevated striæ, undulated near the apex. Length near four inches. 4. The *reticulatum*, with spires scarcely raised, and strongly reticulated, is of a deep brown colour, and of an oblong form. The aperture white, glossy, and denticulated. Size that of a hazel nut. 5. The *minutum*, or small whelk, with five spires, striated spirally, ribbed transversely. Size less than a pea. Found also in Norway. 6. The *lapillus*, or massy whelk, with about five spires; side of the mouth slightly toothed: a very strong thick shell, of a whitish colour. A variety yellow, or fasciated with yellow, on a white ground; or sulcated spirally, and sometimes reticulated. Length near an inch and a half. Inhabits, in great abundance, rocks near low-water mark. This is one of the British shells that produce the purple dye analogous to the *purpura* of the ancients. See MUREX.

BUCCLEUGH, a village in the county of Selkirk in Scotland, from which the noble family of Scott have the title of Duke. They would likewise have been dukes of Monmouth, had it not been for the attainder, they being the lineal descendants of his Grace: they are now also heirs to the noble family of Montague in England.

BUCCO, the BARBET, in ornithology, a genus belonging to the order of picæ. The beak is cultrated, turned inwards, compressed on the sides, and emarginated on each side at the apex; and there is a long slit below the eyes. The nostrils are covered with feathers. The feet have four toes, two before and two behind. Linnæus mentions only one species, the capensis; but ornithologists enumerate several, either as such, or as individuals differing only in age or sex, all found in Asia, Africa, or the southern parts of America.

BUCENTAUR, a galeas, or large galley of the doge of Venice, adorned with fine pillars on both sides, and gilt over from the prow to the stern. This vessel is covered over head with a kind of tent, made of purple silk. In it the doge receives the great lords and persons of quality that go to Venice, accompanied with the ambassadors and counsellors of state, and all the senators seated on benches by him. The same vessel serves also in the magnificent ceremony of Ascension-day, in which the duke of Venice throws a ring into the sea to espouse it, and to denote his dominion over the gulph of Venice.

BUCENTAUR is also the name of a ship, as great and as magnificent as that of the Venetians, built by order of the elector of Bavaria, and launched on a lake which is six leagues in length.

BUCEPHALA, or BUCEPHALOS, in the ancient geography, a town built by Alexander, on the west side of the Hydaspis, a river of the Hither India, in memory of his horse Bucephalus, which was killed in the action with Porus, after crossing that river. Others say, this horse died of age, being 30 years old; and not in the battle, but some time after. His being branded or marked on the buttock with the head of an ox, gave rise to his name. This generous animal, which had so long shared the toils and dangers of his master, had formerly received signal marks of royal regard. Having disappeared in the country of the Uxii, Alexander issued a proclamation, commanding his horse to be restored, otherwise he would ravage the whole country with fire and sword. This command was immediately obeyed. "So dear," says Arrian,

"was Bucephalus to Alexander, and fo terrible was Alexander to the Barbarians."

BUCER (Martin), one of the firft authors of the reformation at Stralburgh, was born in 1491, in Alface; and took the religious habit of St. Dominic, at feventeen years of age: but meeting afterward with the writings of Martin Luther, and comparing them with the Scriptures, he began to entertain doubts concerning feveral things in the Romifh religion. After fome conferences with Luther at Heidelberg in 1521, he adopted moft of his fentiments; but in 1532 he gave the preference to thofe of Zuinglius. He affifted in many conferences concerning religion; and in 1548 was fent for to Augfburg to fign the agreement between the Papifts and Proteftants, called the *interim*. His warm oppofition to this project expofed him to many difficulties and hardfhips; the news of which reaching England, where his fame had already arrived, Cranmer archbifhop of Canterbury gave him an invitation to come over, which he readily accepted. In 1549, an handfome apartment was affigned him in the univerfity of Cambridge, and a falary to teach theology. King Edward VI. had the greateft regard for him. Being told that he was very fenfible of the cold of the climate, and fuffered much for want of a German ftove, he fent him 100 crowns to purchafe one. He died of a complication of diforders in 1551; and was buried at Cambridge with great funeral pomp. Five years after, in the reign of queen Mary, his body was dug up, and publicly burnt, and his tomb demolifhed; but it was afterwards fet up by order of queen Elizabeth. He compofed many works, among which are commentaries on the evangelifts and gofpels.

BUCEROS, in ornithology, a genus belonging to the order of picæ. The beak is convex, cultrated, very large, and ferrated outwards: the fore-head is naked, with a bony gibbofity. The noftrils are behind the bafe of the beak. The tongue is fharp and fhort. The feet are of the greffarii kind, *i. e.* the toes are diftinct from each other. There are four fpecies of the buceros, *viz.* 1. The bicornis, with a flat bony fore-head, and two horns before. The body is black, and about the fize of a hen; but the breaft, belly, and thighs are white. There is a white fpot on the wing; the tail is long, with ten black prime feathers, and the four outermoft on each are white. The feet are greenifh, with three toes before and one behind. It is a native of China, and called *calao* by Willughby and other authors. The pied hornbill, defcribed by Mr. Latham (*Synopf.* vol. i. p. 349.) from a living fpecimen which came from the Eaft Indies, the author fuppofes to be the fame fpecies, differing merely in fex or age. In fize, it was a trifle bigger than a crow. The manners of this bird were peculiar: it would leap forwards or fideways with both legs at once like a magpie or jay, never walking: when at reft, it folded its head back between the wings: the general air and appearance was rather ftupid and dull, though it would fometimes put on a fierce look if at any time it was furprifed or the like: it would eat lettuce after bruifing it with its bill, and fwallow raw flefh; as well as devour rats, mice, and fmall birds, if given to him: it had different tones of voice on different occafions; fometimes a hoarfe found in the throat, moft like oück, oück; at other times very hoarfe and weak, not unlike the clucking of a Turkey hen. This bird ufed to difplay the wings and enjoy itfelf in a warm fun, but fhivered in the cold; and as the winter approached died, unable to bear the feverity of the climate, fo different to its nature. Another variety, the calao (Phil. Tranf. vol. xxiii. p. 394), is about the fize of a hen. It inhabits the Philippine iflands, and has a cry more like that of a hog or a calf than of a bird. The Gentoos rank it among their gods, and pay worfhip to it. It lives altogether in woods, feeding on fruits, fuch as the Indian fig, alfo piftachios, &c. which it fwallows whole; and after the external parts have been digefted, it brings up the nuts again whole, without the kernels being anywife damaged or unfit for vegetation. 2. The hydrocorax or Indian crow of Ray, has a plain bony forehead without any horns. The body is yellowifh, and blackifh below. It inhabits the Molucca ifles. Willughby obferves, that it refembles our raven in the bill, but is red on the temples like fome kinds of turkies; has wide noftrils and ill-favoured eyes; and that it feeds chiefly on nutmegs, whence its flefh is very delicate, and has a fine aromatic relifh. This in its native places is frequently tamed, and is ufeful in deftroying rats and mice in houfes. 3. The rhinoceros, has a crooked horn in the fore-head joined to the upper mandible. It is a native of India. Thefe birds are faid to feed on flefh and carrion; and that they follow the hunters for the purpofe of feeding on the entrails of the beafts which they kill; that they chafe rats and mice, and after preffing them flat with the bill in a peculiar manner, toffing them up into the air, fwallow them whole immediately on their defcent. 4. The nafutus, has a fmooth forehead. It is about the fize of a magpie, and is a native of Senegal. Thefe are very common at Senegal and other warm parts of the old continent, where they are called *tock*. They are very tame and foolifh birds while young, infomuch as to fuffer themfelves to be taken by the hand; but having learned experience with mature age, they then become rather fhy. When taken young, they immediately become familiar; but are fo ftupid as not to feed of themfelves, though food be offered to them, requiring it to be put into their mouths. In their wild ftate they feed on fruits, but when domefticated eat bread, and will fwallow almoft any thing that you will give them.

BUCHAN, a county or diftrict of Scotland, lying partly in the fhire of Aberdeen and partly in that of Banff: it gives the title of earl to the noble and ancient family of Erfkine.

BUCHANAN (George), the beft Latin poet of his time, perhaps inferior to none fince the Auguftan age, was born in February 1506. This accomplifhed fcholar and diftinguifhed wit was not defcended of a family remarkable for its rank. He had no occafion for the fplendour of anceftry. He wanted not a reflected greatnefs, the equivocal, and too often the only ornament of the rich and noble. The village of Killearn, in Stirlingfhire, Scotland, was the place of his nativity; and the abject poverty in which his father died might have confined him to toil at the loweft employments of life, if the generofity of an uncle had not affifted him in his education, and enabled him to purfue for two years his ftudies at Paris. But that fhort fpace was fcarcely elapfed, when the death of his benefactor made it neceffary that he fhould return to his own country, and forfake, for a time, the paths of fcience.

He was yet under his 20th year, and furrounded with the horrors of indigence. In this extremity, he enlifted as a common foldier under John duke of Albany, who commanded the troops which France had fent to affift Scotland in the war it waged, at this period, againft England. But nature had not deftined him to be a hero. He was difgufted with the fatigues of one campaign; and, fortunately, John Major, then profeffor of philofophy at St. Andrew's, hearing of his neceffity and his merit, afforded him a temporary relief. He now became the pupil of John Maiz, a celebrated teacher in the fame univerfity, under whom he ftudied the fubtilties of logic; and contracting an attachment to his mafter, he followed him to Paris. There, after having encountered many difficulties, he was invited to teach grammar in the college of St. Barbe. In this flavifh occupation he was found by the earl of Caffilis; with whom, having remained five years at Paris, he returned into Scotland. He next acted as preceptor to the famous earl of Moray, the natural fon of James V. But while he was form-


Buceros
Pied Hornbill
Buphaga Africana
Byrrhus
Cancroma Cochlearia
Cantharis
Diff.t Species
Caprimulgus
or Goat Sucker
Bucco
The Bull-faced Barbet
ursera
ummifera
Bursera
Gummifera

ing this nobleman for public affairs, he found that his life was in danger; and from enemies, whofe vindictive rage could fuffer no abatement, and who would not fcruple the moft difhonourable means of gratifying it.

The fcandalous lives of the clergy had, it feems, excited his indignation; and, more than reafoning or argument, had eftranged him from the errors of Popery. The Francifcan monks, in return to the beautiful but poignant fatires he had written againft them, branded him with the appellation of *atheift*; a term which the religious of all denominations are too apt indifcriminately to lavifh where they have conceived a prejudice; and, not fatisfied with the outrage of abufe and calumny, they confpired his deftruction. Cardinal Beaton gave orders to apprehend him, and bribed king James with a very confiderable fum to permit his execution. He was feized upon accordingly; and the firft genius of his age was about to perifh by the halter, or by fire, to fatisfy a malignant refentment, when, efcaping the vigilance of his guards, he fled into England. Henry VIII. at all times the flave of caprice and paffion, was then burning, on the fame day, and at the fame ftake, the Lutheran and the Papift. His court did not fuit a philofopher or a fatirift. After a fhort ftay, Buchanan croffed the fea to France; and, to his extreme difappointment, found, at Paris, cardinal Beaton, as ambaffador from Scotland. He retired privately to Bourdeaux, dreading, perhaps, new misfortunes, and concerned that he could not profecute his ftudies in obfcurity and in filence. Here he met Andrew Govea, a Portuguefe of great learning and worth, with whom he had formerly been acquainted during his travels, and who was now employed in teaching a public fchool. He difdained not to act as the affiftant of his friend; and during the three years he refided at this place, he compofed the tragedies which do him fo much honour. It was here, alfo, that he wrote fome of the moft pleafant of thofe poems, in which he has rallied the mufes, and threatened to forfake them, as not being able to maintain their votary. About this time, too, he prefented a copy of verfes to the emperor Charles V. who happened to pafs through Bourdeaux.

His enemies, in the mean while, were not inactive. Cardinal Beaton wrote about him to the archbifhop of Bourdeaux; and by every motive which a cunning and a wicked heart could invent, he invited him to punifh the moft peftilential of all heretics. The archbifhop, however, was not fo violent as the cardinal. On enquiring into the matter, he was convinced that the poet had committed a very fmall impropriety; and allowed himfelf to be pacified. But fortune was not long to continue her fmiles. Andrew Govea being called by the king of Portugal, his mafter, to eftablifh an academy at Coimbra, he entreated Buchanan to accompany him. He obtained his requeft; and had not been a year in his own country, when he died, and left his affociate expofed to the malice of his inveterate enemies the monks. They loudly objected to him that he was a Lutheran; that he had written poems againft the Francifcans; and that he had been guilty of the abominable crime of eating flefh in Lent. He was confined to a monaftery till he fhould learn what thefe men fancied to be religion: and they enjoined him to tranflate the Pfalms of David into Latin verfe; a tafk which every man of tafte knows with what admirable fkill and genius he accomplifhed.

After having obtained his liberty, he had the offer of a fpeedy promotion from the king of Portugal; the iffue of which, his averfion to the clergy did not allow him to wait. He haftened to England; but the perturbed ftate of affairs during the minority of Edward VI. not giving him the promife of any lafting fecurity, he fet out for France. There he had not been long, when he publifhed his Jephtha, which his neceffities made him dedicate to the marfhal de Briffac. This patron did not want generofity, and could judge of merit. He fent him to Piedmont, as preceptor to his fon Timoleon de Coffi. In this employ he continued feveral years; and during the leifure it afforded him, he fully examined the controverfies which now agitated Europe; and he put a finifhing hand to many of the moft admired of his fmaller poems.

When he found that his pupil had no longer any ufe for him, he went into Scotland, and made an open profeffion of the reformed faith. But he foon quitted his native country for France; which appears to have been more agreeable to his tafte. Queen Mary, however, having determined that he fhould have the charge of educating her fon, recalled him: and till the prince fhould arrive at a proper age, he was nominated to the principality of St. Andrew's. His fuccefs as James's preceptor is well known. When it was reproached to him, that he had made his majefty a pedant: "It is a wonder (he replied) that I have made fo much of him." Mackenzie relates a ftory concerning his tutelage of his pedantic majefty, which is ftrongly expreffive of Buchanan's character as a man of humour, and at the fame time fhows the degree of his veneration for royalty. The young king being one day at play with his fellow-pupil the mafter of Erfkine, Buchanan, who was then reading, defired them to make lefs noife. Finding that they difregarded his admonition, he told his majefty, if he did not hold his tongue, he would certainly whip his breech. The king replied, he would be glad to fee who would *bell the cat*, alluding to the fable. Buchanan, in a paffion, threw the book from him, and gave his majefty a found flogging. The old countefs of Mar, who was in the next apartment, rufhed into the room, and taking the king in her arms, afked how he dared to lay his hand on *the Lord's anointed*. "Madam (fays Buchanan), I have whipped his a—; you may kifs it, if you pleafe."

On the occurrence of thofe misfortunes which befel the amiable but imprudent Mary, he went over to the party of the earl of Moray; and at his earneft defire was prevailed upon to write his "Detection," a work which his greateft admirers have read with regret. Having been fent with other commiffioners to England, againft his miftrefs, he was, on his return, rewarded with the abbacy of Crofs Raguel; made director to the chancery; and fome time after lord of the privy council and privy feal. He was likewife rewarded by queen Elizabeth with a penfion of 100l. a-year. The twelve laft years of his life he employed in compofing his Hiftory of Scotland. After having vied with almoft all the more eminent of the Latin poets, he contefted with Livy and Salluft the palm of eloquence and political fagacity. But it is to be remembered with pain, that, like the former of thefe hiftorians, he was not always careful to preferve himfelf from the charge of partiality. In the year 1582, he expired at Edinburgh, in the 76th year of his age.

Many writers who have mentioned this author, fpeak of him in very different language, according to their religious and political prejudices. From his works, however, it is evident, that, both as a Latin poet and profe writer, he has rarely been equalled fince the reign of Auguftus; nor is he lefs deferving of remembrance as a friend to the natural liberties of mankind, in oppofition to ufurpation and tyranny. "The happy genius of Buchanan (fays Dr. Robertfon), equally formed to excel in profe and in verfe, more various, more original, and more elegant, than that of almoft any other modern who writes in Latin, reflects, with regard to this particular, the greateft luftre on his country." To his memory an obelifk 100 feet high, was erected in 1788 by fubfcription, at Killearn the place of his nativity, defigned by Mr. J. Craig, nephew to the celebrated poet Thomfon.

The following is a lift of his works. 1. *Rerum Scoticarum*, &c. 2. *Pfalmorum Davidis paraphrafis poetica*. 3. *De jure regni apud Scotos dialogus*. 4. *Pfalmus* civ. *cum judicio Bar-*

claii, &c. 5. *Pſalmus* cxx. *cum analyſi organica Benzeri*. 6. *Baptiſtes, ſive calumnia*. 7. *Alceſtis, tragœdia*. 8. *Tragœdiæ ſacræ, et exteræ*. 9. *De caleto recepto carmen, apud Stephan*. 10. *Franciſcanus et Fratres*, &c. 11. *Elegiæ, Sylviæ*, &c. 12. *De ſphera Harbornæ*. 13. *Poemata*. 14. *Satyra in cardinalem Lotharingium*. 15. *Rudimenta grammatices, Tho. Linacri ex Anglico ſermone in Latinum verſæ*. 16. An admonition to the true lords. 17. *De proſodia*. 18. *Chamæleon*, 1572. 19. *Ad viros ſui ſeculi epiſtolæ*. 20. *Literæ reginæ Scoticæ ad com. Bothweliæ*. 21. A detection of the doings of Mary queen of Scots, and of James earl of Bothwell, againſt Henry lord Darnly. 22. *Vita ab ipſo ſcripta biennio ante mortem, cum commentario D. Rob. Sibbaldi, M. D.* 23. Life of Mary queen of Scots. Theſe have been ſeverally printed often, and in various countries. An edition of them all collected together was printed at Edinburgh in 1704, in two folio volumes.

BUCHANNESS, a cape or promontory of Scotland, which is the fartheſt point of Buchan, not far from Peterhead, and the moſt eaſtern of all Scotland. E. long. 0. 30. N. lat. 57. 28.

BUCHAW, a free and imperial town of Germany, in Suabia, ſeated on the river Tederſee, 22 miles ſouth-weſt of Ulm. Here is a monaſtery, whoſe abbeſs has a voice in the diets of the empire. E. long. 9. 37. N. lat. 48. 5.

BUCHAW, a ſmall territory of Germany, in the circle of the Upper Rhine, which comprehends the diſtrict of the abbot of Flud.

BUCHOREST, a pretty large town of Turkey, in Europe, ſeated in the middle of Walachia, and the ordinary reſidence of a hoſpodar. The houſes are mean and very ill built, except a few that belong to the principal perſons. In 1716, a party of Germans ſent from Tranſylvania entered this town, and took the prince priſoner with all his court, and carried them off. This expedition was the more eaſily performed, as ſeveral lords of the country had a ſecret intelligence with the governor of Tranſylvania. This prince had no other way to regain his liberty, but by giving up that part of Walachia which lies between the river Aluth and Tranſylvania, to the emperor of Germany, by the peace concluded at Paſſarowitz in 1718. The Germans entered again into the capital of his dominions, and levied exceſſive contributions. But affairs took another turn after the fatal battle of Crotzka in 1737; for the emperor was obliged to reſtore this part of Walachia to the hoſpodar, in virtue of the treaty of Belgrade. E. long. 26. 30. N. lat. 44. 30.

BUCHOM, a ſmall, free, and imperial town of Suabia, in Germany, ſeated on the lake of Conſtance, in E. long. 9. 20. N. lat. 47. 41.

BUCIOCHE, in commerce, a ſort of woollen cloth manufactured in the late province of Provence in France. The French ſhips carry it to Alexandria and Cairo.

BUCK, in zoology, a male horned beaſt of venery or chaſe, whoſe female is denominated a *doe*. See CERVUS.

BUCK is alſo applied to the males of the hare and rabbit kind. See LEPUS.

BUCK-*Bean*, in botany. See *Buck*-BEAN.

BUCK-*Thorn*, the Engliſh name of the RHAMNUS.

BUCK-*Wheat*. See POLYGONUM.

BUCKENHAM, a town of Norfolk in England, which formerly had a ſtrong caſtle, but now demoliſhed. It is ſeated in a flat, in E. long. 1. 10. N. lat. 52. 30.

BUCKET, a ſmall portable veſſel to hold water, often made of leather for its lightneſs and eaſy uſe in caſes of fire.—It is alſo the veſſel let down into a well, or the ſides of ſhips, to fetch up water.

BUCKING, the firſt operation in the whitening of linen yarn or cloth. See BLEACHING.

BUCKINGHAM, the chief town of Buckinghamſhire in England, ſtands in a low ground, on the river Ouſe, by which it is almoſt ſurrounded, and over which there are three handſome ſtone bridges. The town is large and populous, ſends two members to parliament, and had the title of a duchy. It ſeems, however, to have been but an inconſiderable place at the Conqueſt; for, according to Doomſday-book, it paid only for one hide, and had but 26 burgeſſes. Edward the elder fortified it in the year 918 againſt the incurſions of the Danes, with a rampart and turrets. It alſo had formerly a caſtle in the middle of the town, of which no veſtiges now remain. The ſhrine of St. Rumbald, the patron of fiſhermen, preſerved in the church, was held in great veneration. The county gaol ſtands in this town, and here the aſſizes are ſometimes kept. It was formerly a ſtaple for wool, but that advantage it has now loſt. It is governed by a bailiff and 12 burgeſſes, who are the ſole electors of the members. In its neighbourhood are many paper-mills upon the Ouſe. W. long. 0. 58. N. lat. 51. 30.

BUCKINGHAM-*Shire*, or BUCKS, a county of England bounded on the N. by Northamptonſhire; on the E. by Bedfordſhire, Herts, and Middleſex: on the W. by Oxfordſhire; and on the S. by Berks, from which it is ſeparated by the Thames, as it is from Middleſex by the Coln. The other rivers of this county are the Ouſe and the Tame. It is about 39 miles in length, and 18 in breadth, containing 8 hundreds, 185 pariſhes, and 11 market-towns. It ſends 14 members to parliament; namely, two for the county, and two each for Buckingham, Aileſbury, Wendover, Great Marlow, Chipping Wycombe, and Agmondeſham. The air is healthy, and the ſoil rich, being chiefly chalk or marl. The moſt general manufacture is bonelace and paper. With reſpect to its products, barley is cultivated in the Chiltern hills; and great part of the vale of Aileſbury is devoted to grazing. Fine wheat is grown in the uplands; and the woods of the hills, chiefly beech, form a conſiderable article of profit, both as fuel and timber.

BUCKLE, a well known utenſil, made of divers ſorts of metals, as gold, ſilver, ſteel, braſs, &c. The faſhion or form of buckles is various; but their uſe, in general, is to make faſt certain parts of our dreſs, as the ſhoes, knee garters, &c.

BUCKLE, in heraldry. The buckle was ſo much eſteemed in former times, that few perſons of repute and honour wore their girdle without it; and it may be conſidered, in coats of arms, as a token of the ſurety, the faith, and ſervice of the bearer.

BUCKLER, a piece of defenſive armour uſed by the ancients. It was worn on the left arm; and compoſed of wickers woven together, or wood of the lighteſt ſort, covered with hides, and fortified with plates of braſs or other metal. The figure was ſometimes round, ſometimes oval, and ſometimes almoſt ſquare. Moſt of the bucklers were curiouſly adorned with all ſorts of figures of birds and beaſts, as eagles, lions; nor of theſe only, but of the gods, of the celeſtial bodies, and all the works of nature; which cuſtom was derived from the heroic times, and from them communicated to the Grecians, Romans, and Barbarians. The ſcutum, or Roman buckler, was of wood, the parts being joined together with little plates of iron, and the whole covered with a bull's hide. An iron plate went about it without, to keep off blows; and another within, to hinder it from taking any damage by lying on the ground. In the middle was an iron boſs or *umbo* jutting out, very ſerviceable to glance off ſtones and darts; and ſometimes to preſs violently upon the enemy, and drive all before them. They are to be diſtinguiſhed from the clypei, which were leſs, and quite round, belonging more properly to other nations, though for ſome little time uſed by the Romans. The ſcuta themſelves were of two kinds; the *ovata*, and the *imbricata*: the former is a plain oval figure; the other oblong, and bending inward like half a

cylinder. Polybius makes the scuta four feet long, and Plutarch calls them ποδηρεις, *reaching down to the feet*. And it is very probable that they covered almost the whole body, since in Livy we meet with soldiers who stood on the guard, sometimes sleeping with their head on their shield, having fixed the other part of it in the earth.

Votive BUCKLERS: Those consecrated to the gods, and hung up in their temples, either in commemoration of some hero, or as a thanksgiving for a victory obtained over an enemy; whose bucklers, taken in war, were offered as a trophy.

BUCKOR, a province of Asia, subject to the great mogul. It is seated on the river Indus, on the banks of which there are corn and cattle; but the west part, which is bounded by Sagestan in Persia, is a desert. The inhabitants are strong, robust, and apt to mutiny; for which reason the mogul has a garrison at the chief town, called *Buckor*, which is seated in an island made by the river Indus. They are all Mahometans, and drive a great trade in cotton cloth, and other Indian commodities. E. long. 70. 5. N. lat. 28. 20.

BUCKRAM, in commerce, a sort of coarse linen cloth stiffened with glue, used in the making of garments to keep them in the form intended. It is also used in the bodies of women's gowns; and it often serves to make wrappers to cover cloths, serges, and such other merchandises, in order to preserve them and keep them from the dust, and their colours from fading. Buckrams are sold wholesale by the dozen of small pieces or remnants, each about four ells long, and broad according to the piece from which they are cut. Sometimes they use new pieces of linen cloth to make buckrams, but most commonly old sheets and old pieces of sail-cloth.

BUCKSTALL, a toil to take deer, which must not be kept by any body that has not a park of his own, under certain legal penalties.

BUCOLIC, in ancient poetry, a kind of poem relating to shepherds and country affairs, which, according to the most generally received opinion, took its rise in Sicily. Bucolics, says Vossius, have some conformity with comedy. Like it, they are pictures and imitations of ordinary life; with this difference, however, that comedy represents the manners of the inhabitants of cities, and bucolics the occupations of country people. Sometimes, continues he, this last poem is in form of a monologue, and sometimes of a dialogue. Sometimes there is action in it, and sometimes only narration; and sometimes it is composed both of action and narration. The hexameter verse is the most proper for bucolics in the Greek and Latin tongues. Moschus, Bion, Theocritus, and Virgil, are the most renowned of the ancient bucolic poets.

BUD, in botany. See the article GEMMA.

BUDA, the capital of Lower Hungary, situated on the side of a hill, on the S. W. bank of the Danube. The churches and public buildings are handsome. In the adjacent country are vineyards, which produce excellent wine; and baths so hot, that they will boil an egg in a short time: these baths were in excellent order, with magnificent rooms, while the Turks had possession of the place. It was taken by the Turks in 1526, and retaken by the Austrians the same year. The Turks took it again in 1529, and it was afterward besieged several times by the Germans to no purpose, till 1686, when it was taken. It is 105 miles S. E. of Vienna, and 560 N. W. of Constantinople. Long. 18. 22. E. Lat. 47. 25. N.

BUDA (the beglerbeglic of), was one of the chief governments of the Turks in Europe. It included all the countries of Upper Hungary between the rivers Tiesse and Danube, and between Agria and Novigrad all Lower Hungary, from Gran and Canisca, the eastern part of Sclavonia, and almost all Servia: but a good part of this government now belongs to the Emperor.

BUDÆUS (William), the most learned man in France in the 15th century, was descended of an ancient and illustrious family, and born at Paris in 1467. He was placed young under masters; but barbarism prevailed so much in the schools of Paris, that Budæus took a dislike to them, and spent his whole time in idleness, till his parents sent him to the university of Orleans to study law. Here he passed three years without adding to his knowledge; for his parents sending for him back to Paris, found his ignorance no less than before, and his reluctance to study, and love to gaming and other sinful pleasures, much greater. They talked no more to him of learning of any kind; and, as he was heir to a large fortune, left him to follow his own inclinations. He was passionately fond of hunting, and took great pleasure in horses, dogs, and hawks. The fire of youth beginning to cool, and his usual pleasures to pall upon his senses, he was seized with an irresistible passion for study. He immediately disposed of all his hunting equipage, and even abstracted himself from all business to apply himself wholly to study; in which he made, without any assistance, a very rapid and amazing progress, particularly in the Latin and Greek languages. The work which gained him most reputation was his treatise *de Asse*. His erudition and high birth were not his only advantages; he had an uncommon share of piety, modesty, gentleness, and good breeding. The French king Francis I. often sent for him; and at his persuasion, and that of Du Bellay, founded the royal college of France, for teaching the languages and sciences. The king sent him to Rome with the character of his ambassador to Leo X. and in 1522 made him master of requests. The same year he was chosen provost of the merchants. He died at Paris in 1540. His works, making four volumes in folio, were printed at Basil in 1557.

BUDDÆUS (John Francis), a celebrated Lutheran divine, and one of the most learned men Germany has produced, was born in 1667, at Anclam, a town of Pomerania, where his father was minister. He was at first Greek and Latin professor at Colberg; afterwards professor of morality and politics in the university of Hall; and at length, in 1705, professor of divinity at Jena, where he fixed, and where he died, after having acquired a very great reputation. He was the author of various publications in divinity.

BUDDESDALE, or BETTISDALE, a town of Suffolk in England, seated in a dale or valley. Its street takes in a good part of Ricking, all which together make up the town, for of itself it is but a hamlet, having a small chapel, and an endowed grammar-school, to which belong certain scholarships, assigned to Bennet or Corpus Christi-college in Cambridge, being the gift of Sir Nicholas Bacon, lord keeper of the great seal. E. long. 1. 8. N. lat. 52. 25.

BUDDING, in gardening. See ENGRAFTING.

BUDDLE, in mineralogy, a large square frame of boards, used in washing the tin ore.

BUDDLEIA, in botany; a genus of the monogynia order, belonging to the tetrandria class of plants. The calyx and corolla are quadrifid; the stamina placed at the incisures of the corolla. The capsule is bisulcated, bilocular, and polyspermous. There are two species, viz. the americana, and occidentalis. The first is a native of Jamaica and most of the other American islands; where it rises to the height of ten or twelve feet, with a thick woody stem covered with a grey bark; and sends out many branches towards the top, which come out opposite. At the ends of the branches the flowers are produced in long close spikes branching out in clusters, which are yellow, consisting of one leaf cut into four segments; these are succeeded by oblong capsules filled with small seeds. The second grows naturally at Carthagena; and rises much higher than the other, dividing into a great number of slender branches covered

with a ruffet hairy bark, garnifhed with long fpear-fhaped leaves ending in fharp points: at the end of the branches are produced branching fpikes of white flowers growing in whorls round the ftalks, with fmall fpaces between each.—Thefe plants grow in gullies, or other low fheltered fpots; their branches being too tender to refift the force of ftrong winds. They may be propagated by feeds procured from thofe places where they are natives; and are to be managed like other exotics: only their feeds muft be fown in pots as foon as they arrive, and very lightly covered; for if they are buried deep in the earth, they will all be deftroyed.

BUDELICH, a town of Germany, in the electoral circle of the Rhine and archbifhopric of Treves, feated on the little river Traen, in E. long. 6. 55. N. lat. 49. 52.

BUDGE-BARRELS, among engineers, fmall barrels well hooped, with only one head; on the other end is nailed a piece of leather, to draw together upon ftrings like a purfe. Their ufe is for carrying powder along with a gun or mortar; being lefs dangerous, and eafier carried, than whole barrels. They are likewife ufed upon a battery of mortars, for holding meal-powder.

BUDGELL (Euftace), Efq. an ingenious and polite writer, was the fon of Gilbert Budgell, doctor of divinity; and was born at St. Thomas, near Exeter, about the year 1685. He was educated at Chrift-church college, Oxford: from which he removed to the Inner Temple, London: but inftead of ftudying the law, for which his father intended him, he applied to polite literature; kept company with the genteeleft perfons in town; and particularly contracted a ftrict intimacy with the ingenious Mr. Addifon, who was firft coufin to his mother, and who, on his being made fecretary to lord Wharton lord lieutenant of Ireland, took him with him as one of the clerks of his office. Mr. Budgell, who was about 20 years of age, and had read the claffics, and the works of the beft Englifh, French, and Italian authors, now became concerned with Sir Richard Steele and Mr. Addifon in writing the Tatler, as he had, foon after, a fhare in writing the Spectators, where all the papers written by him are marked with an X; and when that work was completed, he had likewife a hand in the Guardian, where his performances are marked with an afterifk. He was afterwards made under-fecretary to Mr. Addifon, chief fecretary to the lords juftices of Ireland, and deputy-clerk of the council. Soon after, he was chofen member of the Irifh parliament; and in 1717, Mr. Addifon, having become principal fecretary of ftate in England, procured him the place of accountant and comptroller general of the revenue in Ireland. But the next year, the duke of Bolton being appointed lord-lieutenant, Mr. Budgell wrote a lampoon againft Mr. Webfter, his fecretary, in which his Grace himfelf was not fpared; and upon all occafions treated that gentleman with the utmoft contempt. This imprudent ftep was the primary caufe of his ruin: for the duke of Bolton, in fupport of his fecretary, got him removed from the poft of accountant-general; upon which, returning to England, he, contrary to the advice of Mr. Addifon, publifhed his cafe in a pamphlet, intitled, "A letter to the lord * * *, from Euftace Budgell, Efq. accountant-general," &c. Mr. Addifon had now refigned the feals, and was retired into the country for the fake of his health; Mr. Budgell had alfo loft feveral other powerful friends, who had been taken off by death, particularly the lord Halifax and the earl of Sunderland: he, however, made feveral attempts to fucceed at court, but was conftantly kept down by the duke of Bolton. In the year 1720 he loft 20,000l. by the South-fea fcheme, and afterwards fpent 5000l. more in unfuccefsful attempts to get into parliament. This completed his ruin. He at length employed himfelf in writing pamphlets againft the miniftry, and wrote many papers in the Craftfman. In 1733, he began a weekly pamphlet, called *The Bee*; which he continued for above 100 numbers, printed in eight volumes 8vo. During the progrefs of this work, Dr. Tindal's death happened, by whofe will Mr. Budgell had 2000l. left him; and the world being furprifed at fuch a gift from a man entirely unrelated to him, to the exclufion of the next heir, a nephew, and the continuator of Rapin's hiftory of England, immediately imputed it to his making the will himfelf. Thus the fatirift;

> Let Budgell charge low Grub-ftreet on my quill,
> And write whate'er he pleafe, except my will.

It was thought he had fome hand in publifhing Dr. Tindal's *Chriftianity as old as the creation*; for he often talked of another additional volume on the fame fubject, but never publifhed it. After the ceffation of the Bee, Mr. Budgell became fo involved in law-fuits, that he was reduced to a very unhappy fituation. He got himfelf called to the bar, and attended for fome time in the courts of law; but finding himfelf unable to make any progrefs, and being diftreft to the utmoft, he determined at length to make away with himfelf. Accordingly, in the year 1736, he took a boat at Somerfet-ftairs, after filling his pockets with ftones; ordered the waterman to fhoot the bridge; and, while the boat was going under, threw himfelf into the river. He had feveral days before been vifibly diftracted in his mind. Upon his bureau was found a flip of paper, on which were thefe words:

> What Cato did, and Addifon approv'd,
> Cannot be wrong.

Befides the above works, he wrote a Tranflation of Theophraftus's Characters. He was never married; but left one natural daughter, who afterwards affumed his name, and became an actrefs in Drury-lane.

BUDNÆANS, in ecclefiaftical hiftory, fo called from the name of their leader, Simon Budnæus. They not only denied all kind of religious worfhip to Jefus Chrift, but afferted, that he was not begotten by any extraordinary act of divine power; being born, like other men, in a natural way. Budnæus was depofed from his minifterial functions in the year 1584, and publicly excommunicated, with all his difciples; but afterwards abandoning his peculiar fentiments, he was re-admitted to the communion of the Socinian fect. Crellius afcribes the origin of the above opinion to Adam Neufer.

BUDOA, a maritime town of Dalmatia, with a bifhop's fee, fubject to the Venetians. It is feated between the gulf of Cattaro and the city of Dulugno, on the coaft of Albany; and is an important fortrefs, where the Venetians always keep a ftrong garrifon. In 1667, it fuffered greatly by an earthquake: and in 1686, was befieged by Soliman, bafhaw of Scutari; but general Cornaro obliged him to raife the fiege. E. long. 19. 22. N. lat. 42. 12.

BUDRIO, a town of Italy, in the Bolognefe. The adjacent fields produce large quantities of fine hemp, which renders the town of more confequence than larger places. E. long. 11. 35. N. lat. 44. 27.

BUDUN, is the name of one of the Ceylonefe gods; he is fuppofed to have arrived at fupremacy, after fucceffive tranfmigration from the loweft ftate of an infect, through the various fpecies of living animals. There have been three deities of this name, each of which is fuppofed to reign as long as a bird removes a hill of fand, half a mile high, and fix miles round, by a fingle grain in a thoufand years.

BUDWEIS, a royal city of Bohemia, in Germany. It is pretty large and well built, furrounded with ftrong walls, fortified with a good rampart, and might be made an important place. E. long. 14. 19. N. lat. 42. 15.

BUDZIAC TARTARY, lies on the rivers Neifter, Bog, and Nieper; having Poland and Ruffia on the north, Little Tartary on the eaft, the Black Sea on the fouth, and Beffarabia on the weft. The chief town is Oczakow. It is fubject to Turkey.

BUENA VISTA, one of the Cape de Verd iflands, lying in N. lat. 15. 56. It is alfo called *Bonvifta*, and *Bonnevue*; but the firft is the true appellation, the others being only abbreviations and corruptions of the original name, which fignifies a *good profpect*, intimating the beautiful appearance it makes to fhips at fea. This ifland is reckoned near 20 leagues in circumference, and is diftinguifhed on the north fide by a ridge of white rocks that bound it. The coaft that ftretches eaft and north-weft is terminated with fundry banks to the fea; but the interior part is chiefly mountainous. From the northern point there is a large ridge of rocks projecting near a whole league into the fea, againft which the waves break with incredible fury. Another point of rocks ftretches into the fea, on the fouthern point of the ifland eaftward, a league and a half beyond that point; and in that bay is the beft road for fhipping.

BUENOS AYRES, or CIVIDAD DE LA TRINIDAD, a confiderable feaport of La Plata, on the E. coaft of S. America, with a bifhop's fee. It is well fortified; and hither is brought a great part of the treafures and merchandife of Peru and Chili, which are exported to Spain. It was founded by Mendofa in 1535, but afterward abandoned. In 1544, another colony of the Spaniards came here, who left it alfo; but it was rebuilt in 1582, and is at prefent inhabited by Spaniards and the native Americans. It is feated on the Plata, 50 miles from the fea, though the river there is 21 miles in breadth. Lon. 58. 26. W. Lat. 34. 35. S.

BUFALMACO (Boramico), an Italian painter; the firft who put labels to the mouths of his figures, with fentences; fince followed by bad mafters, but more frequently in caricatura engravings. He died in the year 1340.

BUFF, in commerce, a fort of leather prepared from the fkin of the buffalo; which dreffed with oil, after the manner of fhammy, makes what we call *buff-fkin*. This makes a very confiderable article in the French, Englifh, and Dutch commerce at Conftantinople, Smyrna, and all along the coaft of Africa. The fkins of elks, oxen, and other like animals, when prepared after the fame manner as that of the buffalo, are likewife called *buffs*. Of buff-fkin, or buff-leather, were made a fort of coats for the horfe or *gens d'armes* of France, bandaliers, belts, pouches, and gloves.—In France, there are feveral manufactories defigned for the dreffing of thofe forts of hides, particularly at Corbeil, near Paris; at Niort, at Lyons, and other places.

BUFFALO, in zoology, See Bos.

BUFFET was anciently a little apartment, feparated from the reft of the room by flender wooden columns, for the difpofing of china, glafs-ware, &c. The purpofes of the buffet are now fupplied by a large table in a dining-room, called a *fide-board*, for the plate, glaffes, bottles, bafons, &c. to be placed on. In houfes of perfons of diftinction in France, the buffet is a detached room, decorated with pictures relative to the fubject, with fountains, cifterns, and vafes. It is commonly faced with marble or bronze.

BUFFON (Count de). See CLERC.

BUFFOON, a droll, or mimic, who diverts the public by his pleafantries and follies. Menage, after Salmafius, derives the word from *buffo*, a name given to thofe who appeared on the Roman theatre with their cheeks blown up; that, receiving blows thereon, they might make the greater noife, and fet the people a-laughing. Others, as Rhodiginus, make the origin of buffoonery more venerable; deriving it from a feaft inftituted in Attica by K. Erictheus, called *buphonia*.—Buffoons are the fame with what we otherwife find denominated *fcurræ*, *gelafiani*, *mimilogi*, *miniftelli*, *goliardi*, *joculatores*, &c. whofe chief fcene is laid at the tables of great men. Gallienus never fat down to meat without a fecond table of buffoons by him. Tillemont alfo renders *pantomimes* by buffoons. In which fenfe he obferves, the fhows of the buffoons were taken away by Domitian, reftored by Nerva, and finally abolifhed by Trajan.

BUFONIA, TOAD-GRASS; a genus of the monogynia order, belonging to the diandria clafs of plants; and in the natural method ranking under the 22d order, *Caryophylleæ*. The calyx is quinquedentate; there is no corolla; the berry is monofpermous. There is but one fpecies, *viz.* the tenuifolia, a native of Britain.

BUFONITA, in natural hiftory, the toad-ftone. This has been received not only among the lift of native ftones by the generality of authors, but even has held a place among the gems, and is ftill worn in rings by fome people; though undoubtedly it is an extraneous foffil. There has been an idle opinion in the world, that it was found in the head of an old toad; and that this animal voided it at the mouth, on being put on a red cloth. The general colour of the bufonitæ is a deep dufky brown; but it varies greatly in this refpect in feveral fpecimens, fome of which are quite black, others of an extremely pale, fimple brown, a chefnut colour, liver colour, black, grey, or whitifh. The bufonitæ are ufually found immerfed in beds of ftone; and fo little doubt is there of what they have originally been, viz. the petrified teeth of the lupus pifcis, or wolf-fifh, that part of the jaw of the fifh has fometimes been found with the teeth petrified in it. To the bufonitæ many medical virtues have been afcribed, but the prefent practice has rejected them.

BUG, or BUGG, in zoology, the Englifh name of a fpecies of cimex. See CIMEX. For the deftruction of this troublefome infect, many remedies have been propofed; but there is fcarcely any fo effectual as a mixture of corrofive fublimate *(hydragyrus muriatus)* and lard, in the proportion of half an ounce of the former to fix ounces of the latter. The fublimate fhould be firft rubbed extremely fine in a marble mortar, adding a few drops of common oil, till its particles are minutely divided. The lard fhould then be added by little and little, till the whole is well mixed; and laftly, as much more oil as will make the mixture of the confiftence of a very thick paint. The bedftead is to be then taken to pieces, brufhed in the joints, and fome of this unguent applied with a fmall brufh all over, and likewife between every crevice that can be difcovered. Some recommend a mixture of fpirit of wine, oil of turpentine, and camphor; but thefe ingredients evaporate quickly, and, though deftructive to all the bugs that are alive, this liquid does not prevent the nits from being hatched. Beds infefted with bugs fhould be taken down and dreffed every year for at leaft two or three years, after which it is probable they will no longer need it.

BUGEY, a former province of France, being the S. E. divifion of Breffe in Burgundy, on the frontiers of Savoy.

BUGGERS, *Bulgarii*, anciently fignified a kind of heretics, otherwife called *Paterini*, *Cathari*, and *Albigenfes*.

The word is formed of the French *Bougres*, and that from *Bougria* or *Bulgaria*, the country where they chiefly appeared. Among other errors, they held, that men ought to believe no fcripture but the New Teftament; that baptifm was not neceffary to infants; that hufbands who converfed with their wives could not be faved; and that an oath was abfolutely unlawful. They were ftrenuoufly refuted by Fr. Robert, a Dominican, furnamed the *Bugger*, as having formerly made profeffion of this herefy.

The Buggers are mentioned by Matthew Paris, in the reign of Henry III. under the name of *Bugares*. *Circa dies autem illos invaluit hæretica pravitas eorum qui vulgariter dicuntur Paterini & Bugares, de quorum erroribus malo tacere quam loqui*. The term *Bugger*, or *Buggerer*, came afterwards to be ufed for a Sodomite; it being one of the imputations laid, right or wrong, on the Bulgarian heretics, that they taught, or at leaft practifed, this abominable crime.

Bugger *(Bulgarius)* is alfo a denomination given to ufurers; ufury being a vice to which the fame heretics are faid to have been much addicted.

BUGGERY, or Sodomy, is defined by Sir Edward Coke to be a carnal copulation againft nature, either by a confufion of fpecies, that is to fay, either a man or woman with a brute beaft; or fexes, as a man with a man, or a man unnaturally with a woman. It is faid this fin againft God and nature was firft brought into England by the Lombards. As to its punifhment, the voice of nature and of reafon, and the exprefs law of God (Levit. xx. 13, 14.), determine it to be capital. Of this we have a fignal inftance, long before the Jewifh difpenfation, by the deftruction of two cities by fire from heaven; fo that this is an univerfal, not merely a provincial, precept. Our ancient law, in fome meafure, imitated this punifhment, by commanding fuch mifcreants to be burnt to death; though Fleta fays, they fhould be buried alive; either of which punifhments was indifferently ufed for this crime among the ancient Goths. But now the general punifhment of all felonies is the fame, namely, hanging: and this offence, which in the times of Popery was only fubject to ecclefiaftical cenfures, was made felony without benefit of clergy by ftatute 25 Hen. VIII. c. 6. revived and confirmed by 5 Eliz. c. 17. And the rule of law herein is, that, if both parties are arrived at years of difcretion, *agentes et confentientes pari pœna plectantur*, "both are liable to the fame punifhment."

BUGIA, a province of the kingdom of Algiers in Africa. It is almoft furrounded with mountains; and is divided into three parts, Benijubar, Auraz, and Labez. Thefe mountains are peopled with the moft ancient Arabs, Moors, or Saracens. The province is very fertile in corn.

Bugia, by the Africans called *Bugeiah*, a maritime town of Africa, in the kingdom of Algiers, and once the capital of the province of that name. It is fuppofed to be the *Saldæ* of Strabo, built by the Romans. It has a handfome port formed by a narrow neck of land running into the fea; a great part of whofe promontory was formerly faced with a wall of hewn ftone; where was likewife an aqueduct, which fupplied the port with water, difcharging it into a capacious bafon; all which now lie in ruins. The city itfelf is built on the ruins of a large one, at the foot of a high mountain that looks towards the north-eaft; a great part of whofe walls run up quite to the top of it; where there is alfo a caftle that commands the whole town, befides two others at the bottom, built for a fecurity to the port. The inhabitants carry on a confiderable trade in plough-fhares, mattocks, and other iron tools, which they manufacture from the neighbouring mines. The town is watered by a large river, fuppofed to be the Nafava of Ptolemy. The place is populous, and has a confiderable market for iron work, oil, and wax, which is carried on with great tranquillity; but is no fooner over than the whole place is in an uproar, fo that the day feldom concludes without fome flagrant inftance of barbarity. E. long. 4. N. lat. 35. 30.

BUGIE, a town of Egypt, fituated on the weftern fhore of the Red Sea almoft oppofite to Ziden, the port-town to Mecca, and about 100 miles weft of it. E. long. 36. N. lat. 22. 15.

BUGLE, in botany. See Ajuga.

BUGLOSS, in botany. See Anchusa.

Vipers Bugloss, in botany. See Echium.

BUILDING, a fabric erected by art, either for devotion, magnificence, or domeftic accommodation.

Building is alfo ufed for the art of conftructing and raifing an edifice; in which fenfe it comprehends as well the expences as the invention and execution of the defign. See Architecture.

The modern buildings are much more commodious, and alfo more beautiful, than thofe of former times, which were dark, low, and ill contrived. Our buildings are remarkable now for uniformity and convenience, a houfe after the modern way affording, on the fame quantity of ground, almoft double the conveniences which could be had from the old plan of building. By acts 11 Geo. I. and 4 Geo. III. for the regulation of building within the weekly bills of mortality, and in other places therein fpecified, party walls are required to be erected of brick or ftone, which fhall be two bricks and a half thick in the cellar, two bricks thick upwards to the garret floor, &c. and other limitations are enacted refpecting the difpofition of the timbers, &c. And every building is to be furveyed; and the perfon who offends againft the ftatute in any of the particulars recited, is liable to a forfeit of 250l. to be levied by warrant of juftices of the peace. The other principal ftatutes relating to building are 19 Car. II. c. 3. 22 Car. II. c. 11. 5 Eliz. c. 4. 35 Eliz. c. 6. 6 Ann. c. 31. 7 Ann. c. 17. 33 Geo. II. c. 30. and 6 Geo. III. c. 37. By acts 27 and 34 of Geo. III. certain duties are laid upon bricks; and thefe have occafioned builders to conftruct their work in a much flighter manner than heretofore. It is an evil indeed which is daily increafing, and muft fhortly call for the interference of the legiflature.

Building *of Ships*. See Ship-building.

BUILTH, or Bealt, a town of South-Wales in Brecknockfhire, pleafantly feated on the river Wye, over which there is a wooden bridge that leads into Radnorfhire. W. lon. 3. 10. N. lat. 52. 8.

BUIS (Le), a territory of France in the department of Drome and late province of Dauphiny. It is a fmall mountainous country, but pretty fertile; and Le Buis and Nions are the principal places.

BUKARI, a fmall well-built town of Hungarian Dalmatia, fituated on the Golfo di Bikeriza, in E. long. 20. 53. N. lat. 45. 20.

BUKHARIA, a general name for all that vaft tract of land lying between Karazm and the *great Kobi*, or fandy defert bordering on China. It derives its name of *Bukharia* from the mogul word *Bukhar*, which fignifies a learned man; it being formerly the cuftom for thofe who wanted inftruction in the languages and fciences to go into Bukharia. Hence this name appears to have been given to it by the Mogul, who under Jenghiz Khan conquered the country. It is nearly the fame with that called by the Arabs *Mawaralnahr*, which is little other than a tranflation of the word *Tranfoxana*, the name formerly given to thefe provinces. This region is divided into Great and Little Bukharia. *Great Bukharia* (which feems to comprehend the *Sogdiana* and *Bactriana* of the ancient Greeks and Romans with their dependencies) is fituated between the 34th and 46th degrees of north latitude, and between the 76th and 92d degrees of eaft longitude. It may be about 390 miles long, and 320 broad, and includes the towns Bokhara, Zam, Wardanfi, Karakul, Siunjbala, Karfhi, Zarjui, Nerfem, Karmina, &c. *Little Bukharia* is fo called, not becaufe it is lefs in dimenfions than the other, for in reality it is larger; but becaufe it is inferior to it as to the number and beauty of its cities, goodnefs of the foil, &c. It is fituated between the 93d and 118th degrees of eaft longitude,

and between 35° 30′ and 45° of north latitude; being in length from east to west about 850 miles, and in breadth from north to south 580: but if its dimensions be taken according to its semicircular course from the south to the north-east, its length will be 1200 miles. The inhabitants both of Great and Little Bukharia are generally those people called *Bukbars*.

BUL, in the ancient Hebrew chronology, the eighth month of the ecclesiastical, and the second of the civil, year: it has since been called *Marshevan*, and answers to our October.

BULAC, a town of Egypt, situated on the eastern shore of the river Nile, about two miles west of Grand Cairo, of which it was the port town, and contains about 4000 families. It is a place of great trade, as all the vessels going up and down the Nile make some stay here. It is also at this place that they cut the banks of the river every year, in order to fill their canals and overflow the neighbouring grounds, without which the soil would produce neither grain nor herbage. E. lon. 32. N. lat. 30.

BULAFO, a musical instrument, consisting of several pipes of wood tied together with thongs of leather, so as to form a small interstice between each pipe. It is used by the negroes of Guinea.

BULARCHUS, a Greek painter; the first who introduced (among the Greeks at least) different colours in the same picture. He flourished 740 years before the christian æra.

BULB, in the anatomy of plants, a kind of large bud, generally produced under the ground, upon or near the root of certain herbaceous plants, hence denominated *bulbous*. A bulb is defined by Linnæus to be a species of hybernaculum, produced upon the descending caudex or root; consisting of stipulæ, petioli, the rudiments of the former leaves, and scales or bark. Trees which are perennial, with a woody and durable stem or trunk, have generally proper buds or gemmæ, but no bulbs.

In bulbous plants, as the tulip, onion, or lily, what we generally call the *root*, is in fact a bulb or hybernaculum, which incloses and secures the embryo or future shoot. At the lower part of this bulb may be observed a fleshy knob or tubercle, from whence proceed a number of fibres or threads. This knob, with the fibres attached to and hanging from it, is, properly speaking, the true root; the upper part being only the cradle or nursery of the future stem, which after the bulb has repaired a certain number of times, it perishes; but not till it has produced at its sides a number of smaller bulbs or suckers for perpetuating the species.

In bulbous roots, where the stalk and former leaves of the plant are sunk below, and formed into what is called the *bulb* or wintering of the future vegetable, the radicles or small fibres that hang from the bulb are to be considered as the root; that is, the part which furnishes nourishment to the plant: the several rinds and shells whereof the bulb chiefly consists, successively perish, and shrink up into so many dry skins; betwixt which, and in their centre, are formed other leaves and shells, and thus the bulb is perpetuated.

All bulbous roots, says Dr. Grew in his Anatomy of Plants, may be considered as hermaphrodite roots, or root and trunk both together: for the radicles or strings only are absolute roots; the bulb actually containing those parts which springing up make the body or leaves of the plant; so that it may be regarded as a large bud under ground.

Bulbous roots are said to be solid, when composed of one uniform lump of matter; tunicated, when formed of multitudes of coats surrounding one another; squamose, when composed of, or covered with, lesser flakes; duplicate, when there are only two to each plant; and aggregate, when there is such a congeries of such roots to each plant.

BULBOCASTANUM, in botany. See Bunium.

BULBOCODIUM, mountain-saffron; a genus of the monogynia order, belonging to the hexandria class of plants; and, in the natural method, ranking under the 9th order, *Spathaceæ*. The corolla is funnel-shaped, and hexapetalous, with the heels narrow, supporting the stamina. There are two species, the *alpinum* and *vernum*. The first sort grows naturally on the Alps, and also on Snowdon in Wales. It has a small bulbous root, which sends forth a few long narrow leaves somewhat like those of saffron, but narrower. In the middle of these the flower comes out, which stands on the top of the footstalk, growing erect, and is shaped like those of the crocus, but smaller; the foot-stalk rises about three inches high, and hath four or five short narrow leaves placed alternately upon it below the flower. This flowers in March, and the seeds are ripe in May. The second is a native of Spain. It has a bulbous root shaped like that of the snow-drop, which sends out three or four spear-shaped concave leaves, between which comes out the flower, standing on a very short footstalk. The flowers appear about the same time with the last; at first they are of a pale colour, but afterwards change to a whitish purple. These plants may be propagated by off-sets at the decay of the flower and leaf every second or third year; also, by sowing the seed in pots in autumn, sheltering them in a frame from frost; and the plants will appear in the spring, which, at the decay of the leaves, may be taken up for planting in the borders in October, where they will flower the year following.

BULBOSE, or Bulbous. See Bulb.

BULEUTÆ, in Grecian antiquity, were magistrates answering to the decuriones among the Romans. See Decurio.

BULFINCH, in ornithology. See Loxia.

BULGARIA, a small province of Turkey in Europe, bounded on the north by Wallachia, on the east by the Black sea, on the south by Romania and Macedonia, and on the west by Servia. It is very narrow, but 325 miles long on the side of the Danube, from Servia till it falls into the Black sea. Bulgaria is a province of the Ottoman empire. The inhabitants are Christians; but extremely ignorant, insomuch that they seem to know nothing of Christianity but baptism and fasting. It is divided into four sangiacates; Byden, Sardice, Nicopolis, and Silistria. The chief towns are of the same names, except Sardice, which is now called *Sophia*.

Bulgarian *Language*, the same with the Sclavonic.

BULIMY, a disease in which the patient is said to be affected with an insatiable and perpetual desire of eating; and, unless he is indulged, he often falls into fainting fits. It is otherwise called *fames canina*, canine appetite.

BULITHUS, a stone found either in the gall-bladder, or in the kidneys and bladder, of an ox.

BULK *of a* Ship, the whole content in the hold for the stowage of goods.

Bulk-*Heads* are partitions made athwart the ship with boards, by which one part is divided from the other; as the great cabin, gun-room, bread-room, and several other divisions. The *bulk-head afore* is the partition between the forecastle and gratings in the head.

BULL (Dr. John), a celebrated musician and composer, was born in Somersetshire about the year 1563, and, as it is said, was of the Somerset family. He was educated under Blitheman. In 1586 he was admitted at Oxford to the degree of bachelor of music, having practised in that faculty fourteen years; and in 1592 was created doctor in the university of Cambridge. Bull was the first Gresham professor of music, and was appointed to that station upon the special recommendation of queen Elizabeth. However skilful he might be in his profession, it seems he was not able to read his lectures in Latin; and therefore, by a special provision in the ordinances respect-

ing the Gresham professors, made anno 1597, it is declared, that because Dr. Bull is recommended to the place of music-professor by the queen's most excellent majesty, being not able to speak Latin, his lectures are permitted to be altogether in English. In the year 1601, he went abroad for the recovery of his health, and travelled incog. into France and Germany. Dr. Ward has given the life of Dr. Bull, in his lives of the Gresham professors, and relates many anecdotes to his honour. Wood says, he died at Hamburgh: others have said, at Lubeck.

The only works of Bull in print are lessons in the "Parthenia, or the maiden-head of the first music that ever was printed for the virginals." An anthem of his, "Deliver me, O God!" is to be found in Bernard's collection of church-music. Dr. Ward has given a long list of compositions of Dr. Bull in manuscript in the collection of the late Dr. Pepusch, by which it appears that he was equally excellent in vocal and instrumental harmony.

Bull (George), bishop of St. David's, was born at Wells in 1634; and educated at Exeter college, in Oxford. During the usurpation of Cromwell, he adhered steadily, though still with great prudence, to the forms of the church of England; and in the reign of James II. preached very strenuously against the errors of Popery. He wrote, 1. A defence of the Nicene faith. 2. Apostolical harmony. 3. Primitive apostolical tradition; and other works.

Bull, in zoology. See Bos.

Wild Bulls. The wild bulls now so numerous on the continent of America, are said to have sprung from one bull and seven cows, which were carried thither by some of the first conquerors.

Bull, in astronomy. See Astronomy.

Bull's-*Eye*, among seamen, a small, obscure, sublime cloud, ruddy in the middle, that sometimes appears to mariners, and is the immediate forerunner of a great storm at sea.

Bull-*Fighting*, a sport or exercise much in vogue among the Spaniards and Portuguese, consisting in a kind of combat of a cavalier or torreadore against a wild bull, either on foot or on horseback, by riding at him with a lance. The Spaniards have bull-fights, i. e. feasts attended with shows, in honour of St. John, the Virgin Mary, &c. This sport the Spaniards received from the Moors, among whom it was celebrated with great eclat. Some think that the Moors might have received the custom from the Romans, and they from the Greeks. Dr. Plot is of opinion, that the Ταυροκαθαψιων ημεραι among the Thessalians, who first instituted this game, and of whom Julius Cæsar learned and brought it to Rome, were the origin both of the Spanish and Portuguese bull-fighting, and of the English bull-running. This practice was prohibited by Pope Pius V. under pain of excommunication incurred *ipso facto*. But succeeding popes have granted several mitigations in behalf of the toradors.

A striking relic of barbarity in the Spanish manners of the present day, is the excessive attachment of that nation to bull-fights, a spectacle which shocks the humanity of every other people in Europe. Many Spaniards consider this practice as the sure means of preserving that energy by which they are characterised, and of habituating them to violent emotions, which are terrible only to timid minds. But it seems difficult to comprehend what relation there is between bravery and a spectacle where the assistants now run no danger; where the actors prove by the few accidents which befal them, that theirs has nothing in it very interesting; and where the unhappy victims meet only with certain death as the reward of their vigour and courage. Another proof that these spectacles have little or no influence on the disposition of the mind is, that children, old men, and people of all ages, stations, and characters, assist at them; and yet their being accustomed to such bloody entertainments appears neither to correct their weakness and timidity, nor alter the mildness of their manners.

Though the bull-fights are very expensive, they bring great gain to the undertakers. The worst places cost two or four rials, according as they are in the sun or in the shade. The price of the highest is a dollar. When the price of the horses and bulls, and the wages of the *Torreadorss*, have been paid out of this money, the rest is generally appropriated to pious foundations: at Madrid it forms one of the principal funds of the hospital. It is only during summer that these combats are exhibited, because the season then permits the spectators to sit in the open air, and because the bulls are then more vigorous. Those which are of the best breed are condemned to this kind of sacrifice; and connoisseurs are so well acquainted with their distinguishing marks, that as soon as a bull appears upon the arena, they can mention the place where he was reared. This arena is a kind of circus surrounded by about a dozen of seats, rising one above another; the highest of which only is covered. The boxes occupy the lower part of the edifice. In some cities, Valladolid for example, which have no place particularly set apart for these combats, the principal square is converted into a theatre. The balconies of the houses are widened, so as to project over the streets which end there; and it is really a very interesting sight to see the different classes of people assembled around this square, waiting for the signal when the entertainment is to commence, and exhibiting every external sign of impatience and joy. The spectacle commences by a kind of procession around the square, in which appear, both on horseback and on foot, the combatants who are to attack the fierce animal; after which two alguazils, dressed in perukes and black robes, advance with great gravity on horseback; who go and ask from the president of the entertainment an order for it to commence. A signal is immediately given; and the animal, which was before shut up in a kind of hovel with a door opening into the square, soon makes his appearance. The officers of justice, who have nothing to do with the bull, prudently hasten to retire, and their fright is a prelude to the cruel pleasure which the spectators are about to enjoy. The bull, however, is received with loud shouts, and almost stunned by the noisy expressions of their joy. He has to contend first against the picadores, combatants on horseback, who, dressed according to the ancient Spanish manner, and as it were fixed to their saddles, wait for him, each being armed with a long lance. This exercise, which requires strength, courage, and dexterity, is not considered as disgraceful. Formerly the greatest lords did not disdain to practise it; even at present some of the hidalgos solicit for the honour of fighting the bull on horseback, and they are then previously presented to the people, under the auspices of a patron, who is commonly one of the principal personages at court.

The picadores, whoever they may be, open the scene. It often happens that the bull, without being provoked, darts upon them, and every body entertains a favourable opinion of his courage. If, notwithstanding the sharp-pointed weapon which defends his attack, he returns immediately to the charge, their shouts are redoubled, as their joy is converted into enthusiasm; but if the bull, struck with terror, appears pacific, and avoids his persecutors, by walking round the square in a timid manner, he is hooted at and hissed by the whole spectators, and all those near whom he passes load him with blows and reproaches. He seems then to be a common enemy, who has some great crime to expiate; or a victim, in the sacrifice of which all the people are interested. If nothing can awaken his courage, he is judged unworthy of being tormented by men; the cry of *perros, perros*, brings forth new enemies against him, and large dogs are let loose upon him, which seize him by the neck and ears in a furious manner. The animal then finds the use of

thoſe weapons with which nature has furniſhed him; he toſſes the dogs into the air, who fall down ſtunned, and ſometimes mangled; they however recover, renew the combat, and generally finiſh by overcoming their adverſary, who thus periſhes ignobly. If, on the other hand, he preſents himſelf with a good grace, he runs a longer and nobler, but a much more painful career. The firſt act of the tragedy belongs to the combatants on horſeback; this is the moſt animated and bloody of all the ſcenes, and often the moſt diſguſting. The irritated animal braves the pointed ſteel which makes deep wounds in his neck, attacks with fury the innocent horſe who carries his enemy, rips up his ſides, and overturns him together with his rider. The latter, then diſmounted and diſarmed, would be expoſed to imminent danger, did not combatants on foot, called *chulos*, come to divert the bull's attention, and to provoke him, by ſhaking before him different pieces of cloth of various colours. It is, however, at their own riſk that they thus ſave the diſmounted horſeman; for the bull ſometimes purſues them, and they have then need for all their agility. They often eſcape from him by letting fall in his way the piece of ſtuff which was their only arms, and againſt which the deceived animal expends all his fury. Sometimes he does not accept this ſubſtitute, and the combatant has no other reſource but to throw himſelf ſpeedily over a barrier, ſix feet high, which incloſes the interior part of the arena. In ſome places this barrier is double, and the intermediate ſpace forms a kind of circular gallery, behind which the purſued torreadore is in ſafety. But when the barrier is ſingle, the bull attempts to jump over it, and often ſucceeds. The reader may eaſily imagine in what conſternation the neareſt of the ſpectators then are; their haſte to get out of the way, and to crowd to the upper benches, becomes often more fatal to them than even the fury of the bull, who, ſtumbling at every ſtep, on account of the narrowneſs of the place and the inequality of the ground, thinks rather of his own ſafety than of revenge, and beſides ſoon falls under the blows which are given him from all quarters.

Except in ſuch caſes, which are very rare, he immediately returns. His adverſary, recovered, has had time to get up; he immediately remounts his horſe, provided the latter is not killed or rendered unfit for ſervice, and the attack commences; but he is often obliged to change his horſe ſeveral times. Expreſſions cannot then be found to celebrate theſe acts of proweſs, which for ſeveral days become the favourite topic of converſation. The horſes, very affecting models of patience, courage, and docility, may be ſeen treading under their feet their own bloody entrails, which drop from their ſides half torn open, and yet obeying, for ſome time after, the hand which conducts them to new tortures. Spectators of delicacy are then filled with diſguſt, which converts their pleaſure into pain. A new act is however preparing, which reconciles them to the entertainment. As ſoon as it is concluded that the bull has been ſufficiently tormented by the combatants on horſeback, they retire, and leave him to be irritated by thoſe on foot. The latter, who are called *banderilleros*, go before the animal: and, the moment he darts upon them, they plunge into his neck, two by two, a kind of darts called *banderillas*, the points of which are hooked, and which are ornamented with ſmall ſtreamers made of coloured paper. The fury of the bull is now redoubled; he roars, toſſes his head, and the vain efforts which he makes ſerve only to increaſe the pain of his wounds: this laſt ſcene calls forth all the agility of his adverſaries. The ſpectators at firſt tremble for them, when they behold them placed ſo near the horns of this formidable animal; but their hands, well exerciſed, aim their blows ſo ſkilfully, and they avoid the danger ſo nimbly, that after having ſeen them a few times, one neither pities nor admires them, and their addreſs and dexterity ſeem only to be a ſmall epiſode of the tragedy, which concludes in the following manner. When the vigour of the bull appears to be almoſt exhauſted; when his blood, iſſuing from twenty wounds, ſtreams along his neck and moiſtens his robuſt ſides; and when the people, tired of one object, demand another victim; the preſident of the entertainment gives the ſignal of death, which is announced by the ſound of trumpets. The metador then advances, and all the reſt quit the arena; with one hand he holds a long dagger, and with the other a kind of flag, which he waves backwards and forwards before his adverſary. They both ſtop and gaze at one another; and while the agility of the metador deceives the impetuoſity of the bull, the pleaſure of the ſpectators, which was a while ſuſpended, is again awakened into life. Sometimes the bull remains motionleſs, throws up the earth with his foot, and appears as if meditating revenge.

The bull in this condition, and the metador who calculates his motion and divines his projects, form a group which an able pencil might not diſdain to delineate. The aſſembly in ſilence behold this dumb ſcene. The metador at length gives the mortal blow; and if the animal immediately falls, a thouſand voices proclaim with loud ſhouts the triumph of the conqueror; but if the blow is not deciſive, if the bull ſurvives and ſeeks ſtill to brave the fatal ſteel, murmurs ſucceed to applauſe, and the metador, whoſe glory was about to be raiſed to the ſkies, is conſidered only as an unſkilful butcher. He endeavours to be ſoon revenged, and to diſarm his judges of their ſeverity. His zeal ſometimes degenerates into blind fury, and his partiſans tremble for the conſequences of his imprudence. He at length directs his blow better. The animal vomits up blood; he ſtaggers and falls, while his conqueror is intoxicated with the applauſes of the people. Three mules, ornamented with bells and ſtreamers, come to terminate the tragedy. A rope is tied round the bull's horns, which have betrayed his valour, and the animal which but a little before was furious and proud, is dragged ignominiouſly from the arena which he has honoured, and leaves only the traces of his blood and the remembrance of his exploits, which are ſoon effaced on the appearance of his ſucceſſor. On each of the days ſet apart for theſe entertainments, ſix are thus ſacrificed in the morning, and twelve in the afternoon, at leaſt in Madrid. The three laſt are given excluſively to the metador, who, without the aſſiſtance of the picadores, exerts his ingenuity to vary the pleaſure of the ſpectators. Sometimes he cauſes them to be combated by ſome intrepid ſtranger, who attacks them mounted on the back of another bull, and ſometimes he matches them with a bear: this laſt method is generally deſtined for the pleaſure of the populace. The points of the bull's horns are concealed by ſomething wrapped round them, which breaks their force. The animal, which in this ſtate is called *Embolado*, has power neither to pierce nor to tear his antagoniſt. The amateurs then deſcend in great numbers to torment him, each after his own manner, and often expiate this cruel pleaſure by violent contuſions; but the bull always falls at length under the ſtroke of the metador. The few ſpectators who are not infected by the general madneſs for this ſport, regret that thoſe wretched animals do not, at leaſt, purchaſe their lives at the expence of ſo many torments and ſo many efforts of courage: they would willingly aſſiſt them to eſcape from their perſecutors. In the minds of ſuch ſpectators diſguſt ſucceeds compaſſion, and ſatiety ſucceeds diſguſt. Such a ſeries of uniform ſcenes makes that intereſt become languid, which this ſpectacle, on its commencement, ſeemed to promiſe. But to connoiſſeurs, who have thoroughly ſtudied all the ſtratagems of the bull, the reſources of his addreſs and fury, and the different me-

thods of irritating, tormenting, and deceiving him, none of these scenes resembles another, and they pity those frivolous observers who cannot remark all their varieties.

The Spanish government are very sensible of the moral and political inconveniences arising from this species of phrensy. They have long since perceived, that among a people whom they wish to encourage to labour, it is the cause of much disorder and dissipation; and that it hurts agriculture, by destroying a great number of robust animals, which might be usefully employed: but they are obliged to manage with caution a taste which it might be dangerous to attempt to abolish precipitately. They are, however, far from encouraging it. The court itself formerly reckoned bull-fights among the number of its festivals, which were given at certain periods. The *Plaza-Mayor* was the theatre of them, and the king and the royal family honoured them with their presence. His guards presided there in good order. His halberdiers formed the interior circle of the scene; and their long weapons, held out in a defensive posture, were the only barrier which they opposed against the dangerous caprices of the bull. These entertainments, which by way of excellence were called *Fiestas Reales*, are become very rare. Charles III. who endeavoured to polish the nation, and to direct their attention to useful objects, was very desirous of destroying a taste in which he saw nothing but mischief; but he was too wise to employ violent means for that purpose. He however confined the number of bull-fights to those the profits of which were applied to the support of some charitable institution, with an intention of substituting for these other funds afterwards. Bull-fights, by these means being rendered less frequent, will, perhaps, gradually lose their attractions, until more favourable circumstances permit the entire abolition of them.

BULL-*Running*, denotes a feudal custom obtaining in the honour of Tutbury in Staffordshire; where, anciently, on the day of the assumption of our Lady, a bull is turned loose by the lord to the minstrels; who, if they can catch him before he passes the river Dove, are to have him for their own, or, in lieu thereof, to receive each 40 pence; in consideration of which custom they pay 20 pence yearly to the said lord.

BULL *and Boar*. By the custom of some places, the parson is obliged to keep a bull and boar for the use of his parishioners, in consideration of his having tithes of calves and pigs, &c.

BULL-*Frog*, in zoology. See RANA.

BULL-*Head*, or *Miller's Thumb*, in ichthyology. See COTTUS.

BULL, among ecclesiastics, a written letter, dispatched, by order of the Pope, from the Roman chancery, and sealed with lead, being written on parchment, by which it is partly distinguished from a brief: see the article BRIEF.—It is a kind of apostolical rescript, or edict; and is chiefly in use in matters of justice or grace. If the former be the intention of the bull, the lead is hung by a hempen cord; if the latter, by a silken thread. It is this pendent lead, or seal, which is, properly speaking, the bull, and which is impressed on one side with the heads of St. Peter and St. Paul, and on the other with the name of the Pope and the year of his pontificate. The bull is written in an old, round, Gothic letter, and is divided into five parts, the narrative of the fact, the conception, the clause, the date, and the salutation, in which the Pope styles himself *servus servorum*, i. e. the servant of servants. These instruments, besides the lead hanging to them, have a cross, with some text of scripture, or religious motto, about it. Bulls are granted for the consecration of bishops, the promotion to benefices, and the celebration of jubilees, &c.

BULL *in cœna Domini*, a particular bull read every year, on the day of the Lord's supper, or Maunday Thursday, in the Pope's presence, containing excommunications and anathemas against heretics, and all who disturb or oppose the jurisdiction of the holy see. After the reading of the bull, the Pope throws a burning torch in the public place, to denote the thunder of this anathema.

Golden BULL, an edict, or imperial constitution, made by the emperor Charles IV. reputed to be the magna charta, or the fundamental law of the German empire. It is called *golden*, because it has a golden seal, in the form of a pope's bull, tied with yellow and red cords of silk: upon one side is the emperor represented sitting on his throne, and on the other the capital of Rome. It is also called *Caroline*, on Charles IV.'s account. Till the publication of the golden bull, the form and ceremony of the election of an emperor were dubious and undetermined, and the number of the electors not fixed. This solemn edict regulated the functions, rights, privileges, and pre-eminences, of the electors. The original, which is in Latin, on vellum, is preserved at Francfort: this ordonnance, containing 30 articles or chapters, was approved of by all the princes of the empire, and remains still in force.

Silver BULLS were not in so frequent use; though instances of them might be produced.

Leaden BULLS were sent by the emperors of Constantinople to despots, patriarchs, and princes; and the like were also used by the grandees of the Imperial court, as well as by the kings of France, Sicily, &c. and by bishops, patriarchs, and popes. It is to be observed, that the leaden bulls of these last had, on one side, the name of the pope or bishop inscribed. Polydore Virgil makes pope Stephen III. the first who used leaden bulls, about the year 772. But others find instances of them as early as Silvester, Leo. I. and Gregory the Great. The latter popes, beside their own names, strike the figures of St. Peter and St. Paul on their bulls; a practice first introduced by Pope Paschal II. But why, in these bulls, the figure of St. Paul is on the right, and that of St. Peter on the left side, is a question which has occasioned many different conjectures.

Waxen BULLS are said to have been first brought into England by the Normans. They were in frequent use among the Greek emperors, who thus sealed letters to their wives, mothers, and sons. Of these there were two sorts, viz. red, and green.

BULLA, or DIPPER, in zoology, a genus belonging to the order of vermes testaceæ. It is an animal of the snail-kind: the shell consists of one valve, convoluted, and without any prickles; the aperture is narrowish, oblong, longitudinal, and entire at the base; the colomella is smooth and oblique. There are 23 species; four of them found in the British seas; the rest chiefly natives of the Asiatic and Atlantic oceans.

BULLÆ, in antiquity, a kind of ornaments much in use among the ancient Romans. Mr. Whitaker, in his History of Manchester, vol. i. p. 79, states it as his opinion, that they were originally formed of leather among all ranks of people; and it is certain that they continued so to the last among the commonalty. He also imagines, that at first the bulla was intended as an amulet rather than an ornament; as a proof of which he tells us, that the bullæ were frequently impressed with the figure of the sexual parts. It is universally asserted by the critics, that the bullæ were made hollow for the reception of an amulet; but this Mr. Whitaker contradicts from the figure of a golden one lately found at Manchester, which had no aperture whereby an amulet could have been introduced.—Pliny refers the original of the bulla to the elder Tarquin, who gave one with the prætexta to his son, because at the age of 14 he had with his own hand killed an enemy; and in imitation of him

was afterwards assumed by other patricians. Others affirm that the bulla was given by that king to the sons of all the patricians who had borne civil offices. Lastly, others allege that Romulus first introduced the bulla, and gave it to Tullus Hostilius, the first child born of the rape of the Sabines.—As to the form of the bullæ, Mr. Whitaker informs us that they were originally made in the shape of hearts; but they did not always retain the form of an heart, any more than they were always made of leather. As the wealth of the state and the riches of individuals increased, the young patricians distinguished themselves by a bulla of gold, while the common people wore the amulet of their ancestors. The figure of an heart was not strictly observed, this form having occasionally varied from a complete circle to that of a segment: this indeed was the shape of the bulla found at Manchester.

Bullæ was also the denomination given to various other metalline ornaments made after the same form; and in this sense *bullæ* seem to include all gold and silver ornaments of a roundish form, whether worn on the habits of men, the trappings of horses, or the like. Such were those decorations used by the ancients on their doors and belts. The bullæ of doors were a kind of large-headed nails fastened on the doors of the rich, and kept bright with great care. The doors of temples were sometimes adorned with golden bullæ. Mr. Bandelot takes the bullæ worn by soldiers on their belts to be something more than mere ornaments. They seem to have been considered as preservatives from dangers and diseases, and even means of acquiring glory, and other advantages. The like may perhaps be extended to the bullæ on doors, which were probably placed there as a security to them from being broken or violated.

Bullæ also denoted a table hung up in the public courts, to distinguish which days were fasti, and which nefasti; answering in some measure to our kalendar.

BULLET, an iron or leaden ball or shot, with which fire-arms are loaded. Leaden bullets are cast in iron moulds, consisting of two concave hemispheres, with a handle whereby to hold them; and between them is a hole, called *the gate*, at which to pour in the melted metal. The chaps or hemispheres of bullet-moulds are first punched, being blood-red hot, with a round ended punch, of the shape and nearly the size of the intended bullets. To cleanse the insides, they make use of a bullet bore, which consists of a steel shank, having a globe at one end, wherewith to bore the inside of a mould clean, and of the intended size.

BULLIALDUS (Ismael), an eminent astronomer, was born at Laon in the isle of France in 1605. He travelled in his youth for the sake of improvement; and afterwards published several works, among which are, 1. *De natura lucis.* 2. *Philolaus.* 3. *Astronomia philolaica, opus novum, in quo motus planetarum per novam et veram hypothesin demonstrantur.* 4. *Astronomiæ philolaicæ fundamenta clarius explicata et asserta adversus Zethi Wardi impugnationem.* He also wrote a piece or two upon Geometry and Arithmetic. In 1661, he paid Hevelius a visit at Dantzic, for the sake of seeing his optical and astronomical apparatus. Afterwards he became a presbyter at Paris, and died there in 1694.

BULLINGER (Henry), born at Bremgarten in Switzerland in 1504, was an eminent Zuinglian minister, a great supporter of the reformation, and employed in many ecclesiastical negotiations. He composed many books, one against Luther in particular. He died in 1575.

BULLION, uncoined gold or silver in the mass. Those metals are called so, either when smelted from the native ore, and not perfectly refined; or when they are perfectly refined, but melted down in bars or ingots, or in any unwrought body, of any degree of fineness. When gold and silver are in their purity, they are so soft and flexible, that they cannot well be brought into any fashion for use, without being first reduced and hardened with an alloy of some other baser metal. To prevent these abuses, which some might be tempted to commit in the making of such alloys, the legislators of civilized countries have ordained, that there shall be no more than a certain proportion of a baser metal to a particular quantity of pure gold or silver, in order to make them of the fineness of what is called the standard gold or silver of such a country. According to the laws of England, all sorts of wrought plate in general ought to be made to the legal standard; and the price of our standard gold and silver is the common rule whereby to set a value upon their bullion, whether the same be ingots, bars, dust, or foreign specie: whence it is easy to conceive that the value of bullion cannot be exactly known, without being first essayed, that the exact quantity of pure metal therein contained may be determined, and consequently whether it be above or below the standard. Silver and gold, whether coined or uncoined (though used for a common measure of other things), are no less a commodity than wine, tobacco, or cloth: and may, in many cases, be exported as much to the national advantage as any other commodity.

BULLOCK, the same with an ox, or gelded bull. See Bos.

BULTER, a term used to denote the refuse of meal after dressing, or the cloth wherein it is dressed, otherwise called *bulter-cloth*.

BULWARK, in the ancient fortification. See Rampart.

BUMICILLI, a religious sect of Mahometans in Egypt and Barbary, who pretend to fight with devils, and commonly appear in a fright and covered with wounds and bruises. About the full moon they counterfeit a combat in the presence of all the people, which lasts for two or three hours, and is performed with assagaias, or javelins, till they fall down quite spent; in a little time, however, they recover their spirits, get up, and walk off.

BUNDLE, a collection of things wrapped up together. Of baste-ropes, harness-plates, and glovers knives, ten make a bundle; of Hamburgh yarn, twenty skeans; of basket rods, three feet the band.

BUNEL (Peter), a native of Toulouse, was one of the most elegant writers of the Latin tongue in the 16th century, but was still more conspicuous for the regularity of his manners. He did not seek either for riches or lucrative employments; but, contented with the bare necessaries of life, applied himself wholly to the improvement of his mind. He died at Turin in 1547, aged 47; and has left behind him some Latin epistles, which are written with the utmost purity. The magistrates of Toulouse have a bust of him in marble, placed in their town-house. The most correct edition of his Letters is that of Henry Stephens in 1581.

BUNGAY, a market-town of Suffolk, situated on the river Waveny, about 32 miles north-east of Bury. E. long. 1. 33. N. lat. 52. 35.

BUNIAS, in botany; a genus of the 39th natural order, *Siliquosæ*, belonging to the tetradynamia class of plants, for which there is no English name. The silicula is deciduous, four-sided, muricated, or shagreened with unequal pointed angles. There are eight species; all of them annual plants, but none of them possessed of any remarkable property.

BUNIUM, *pig-nut*, or *earth-nut*, in botany; a genus of the digynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The corolla is uniform, the umbel thick, and the fruit ovate. There is but one species, the bulbocastanum, with a globular root. This grows naturally in moist pastures in many parts of Britain. It hath a tuberous solid root, which

lies deep in the ground. The leaves are finely cut, and lie near the ground. The ftalk rifes a foot and an half high; is round, channelled, and folid; the lower part being naked; but above, where it branches out, there is one leaf placed below every branch. The flowers are white, and fhaped like thofe of other umbelliferous plants; the feeds are fmall, oblong, and when ripe are channelled. The roots of this fort are frequently dug up, and by fome people eaten raw. They have much refemblance in tafte to a chefnut, whence the plant obtains the name of *bulbocaftanum*.

BUNT *of a* SAIL, denotes the middle part of it, formed defignedly into a bag or cavity, that the fail may gather more wind. It is ufed moftly in top-fails, becaufe courfes are generally cut fquare, or with but fmall allowance for bunt or compafs. The bunt holds much leeward wind; that is, it hangs much to leeward.

BUNT-*Lines* are fmall lines made faft to the bottom of the fails, in the middle part of the bolt-rope, to a cringle, and fo are reeved through a fmall block, feized to the yard. Their ufe is to trice up the bunt of the fail for the better furling it up.

BUNTING, in ornithology. See EMBERIZA.

BUNTINGFORD, a town of Hertfordfhire, with a market on Mondays, and two fairs, on June 29th and November 30th, for pedlars ware. It is a good thoroughfare town, but fmall, and is accounted only a large hamlet. W. long. 0. 6. N. lat. 51. 55.

BUNTZEL, or BUNTZLAU, a town of Silefia, in the duchy of Jauer. Moft of the houfes are built with ftone, and there were formerly rich mines in the neighbourhood. It is in the common road to Leipfic; and their trade is in earthen ware, of which they make great quantities. E. long. 15. 50. N. lat. 51. 12.

BUNYAN (John), author of the Pilgrim's Progrefs, was born at Elftow, near Bedford, in 1628. He was the fon of a tinker; and, in the early part of his life, was a great reprobate, and a foldier in the parliament army: but being at length deeply ftruck with a fenfe of his guilt, he laid afide his profligate courfes, became remarkable for his fobriety, and applied himfelf to obtain fome degree of learning. About the year 1655, he was admitted a member of a Baptift congregation at Bedford, and was foon after chofen their preacher: but, in 1660, being taken up, and tried for prefuming to preach, he was cruelly fentenced to perpetual banifhment. In the mean time he was committed to jail, where neceffity obliged him to learn to make long-tagged thread-laces for his fupport; and to add to his diftrefs, he had a wife and feveral children, among whom was a daughter who was blind. In this unjuft and cruel confinement he was detained twelve years and a half, and during that time wrote many of his tracts; but he was at length difcharged, by the humane interpofition of Dr. Barlow. When king James's declaration for liberty of confcience was publifhed, he was chofen paftor of a congregation at Bedford. He at length died of the fever at London, on the 31ft of Auguft 1688, aged 60. He alfo wrote an allegory, called *The Holy War*. His *Pilgrim's Progrefs* has been tranflated into moft European languages; and his works have been collected together, and printed in two volumes folio.

BUONOCARSI, or PIERINO DEL VAGA. See PIERINO.

BUOY, in fea-affairs, a fort of clofe cafk, or block of wood, faftened by a rope to the anchor, to determine the place where the anchor is fituated, that the fhip may not come too near it, to entangle her cable about the ftock or the flukes of it.—BUOYS are of various kinds; as,

Can-BUOYS: thefe are in the form of a cone; and of this conftruction are all the buoys which are floated over dangerous banks and fhallows, as a warning to paffing fhips, that they may avoid them. They are extremely large, that they may be feen at a diftance; and are faftened by ftrong chains to the anchors which are funk for this purpofe at fuch places. See Pl. 57. fig. 5.

Nun-BUOYS are fhaped like the middle fruftum of two cones, abutting upon one common bafe, being cafks, which are large in the middle, and tapering nearly to a point at each end. See Pl. 57. fig. 6.

Wooden BUOYS are folid pieces of timber, fometimes in the fhape of a cylinder, and fometimes in that of a nun-buoy; they are furnifhed with one or two holes, in which to fix a fhort piece of rope, whofe two ends, being fpliced together, make a fort of circle or ring called the *ftrop*.

Cable-BUOYS, are common cafks employed to buoy up the cables in different places from rocky ground. In the harbour of Alexandria, in Egypt, every fhip is moored with at leaft three cables, and has three or four of thefe buoys on each cable for this purpofe.

Slings of the BUOY, the ropes which are faftened about it, and by which it is hung: they are curioufly fpliced round it, fomething refembling the braces of a drum.

To ftream the BUOY, is to let it fall from the fhip's fide into the water; which is always done before they let go the anchor, that it may not be retarded by the buoy-rope as it finks to the bottom.

BUOY-*Rope*, the rope which faftens the buoy to the anchor: it fhould be little more than equal in length to the depth of the water where the anchor lies, as it is intended to float near, or immediately above, the bed of it, that the pilot may at all times know the fituation of the anchor. The buoy-rope is often extremely ufeful otherwife, in drawing up the anchor when the cable is broke. It fhould always therefore be of fufficient ftrength for this purpofe, or elfe the anchor may fome time or other be loft.

BUOY *of the Nore*, is a buoy placed at the mouth of the river Thames, to direct mariners how to avoid a dangerous fand.

BUOYANT, fomething, which, by its aptnefs to float, bears up other more ponderous and weighty things.

BUPALUS, a celebrated fculptor, and native of the ifland of Chios, was fon, grandfon, and great-grandfon of fculptors. He had a brother, named *Athenis*, of the fame profeffion. They flourifhed in the 60th Olympiad; and were cotemporary with Hipponax, a poet of an ugly and defpicable figure. Our fculptors diverted themfelves in reprefenting him under a ridiculous form. But Hipponax wrote fo fharp a fatire againft them, that they hanged themfelves, as fome fay. Pliny, however, does not allow this; but fays, on the contrary, that, after Hipponax had taken his revenge, they made feveral fine ftatues in feveral places; particularly a Diana at Chios, which was placed very high, and appeared with a frowning countenance to thofe that came in, and with a pleafant one to thofe that went out. There were feveral ftatues at Rome made by them; and they worked only in the white marble of the ifle of Paros. Paufanias mentions Bupalus as a good architect as well as fculptor; but fays nothing of Athenis.

BUPHAGA, in ornithology, a genus belonging to the order of picæ. See Pl. 58. The beak is ftraight and quadrangular; the mandibles are gibbous, entire, and the gibbofity is greater on the outfide. The feet are of the ambulatory kind. The body is greyifh above, and of a dirty yellow below; the tail is fhaped like a wedge. There is but one fpecies, viz. the africana, a native of Senegal. It frequently perches upon oxen, and picks out the worms from their backs.

BUPHONIA (from βȣς ox, and φονη *flaughter)*, in antiquity, an Athenian feaft or ceremony, denominated from a bullock flain therein, with quaint formalities. For the origin of the buphonia, we are told it was forbidden by the laws of

Attica to kill an ox: but it once happened, at the feaft of the *diipolia*, that an ox ate the corn, others fay the cakes, which had been dreffed for the facrifice. Thaulon the prieft, enraged at this, prefently killed him, and fled for it. On which the Athenians, fearing the refentment of the gods, and feigning themfelves ignorant who had committed the fact, brought the bloody axe before the judges, where it was folemnly arraigned, tried, found guilty, and condemned. And, in memory of this event, a feaft was inftituted under the denomination of *bupbonia*, in which it was ftill cuftomary for the prieft to fly, and judgment to be given about the flaughter of the ox.

BUPHTHALMUM, OX-EYE; a genus of the polygamia fuperflua order, belonging to the fyngenefia clafs of plants; and in the natural method ranking under the 49th order, *Compofitæ*. The receptacle is paleaceous; the pappus an indifferent rim; the feeds, efpecially thofe of the radius, emarginated on the fides; the ftigmata of the hermaphrodite florets undivided. There are ten *fpecies*; of which the following are the moft remarkable. 1. The *helianthoides*, a native of North America. This has a perennial root, and an annual ftalk, which rifes fix or eight feet high, garnifhed at each joint with two oblong heart-fhaped leaves, which have three longitudinal veins, and the bafe on one fide fhorter than the other. The flowers come out at the extremities of the branches, and are of a bright yellow colour, refembling a fmall fun-flower. 2. The *arborefcens*, rifes with feveral woody ftems to the height of eight or ten feet, garnifhed with leaves very unequal in fize; fome are narrow and long, others are broad and obtufe; thefe are intermixed at the fame joint, and often at the intermediate one; they are green, and placed oppofite. The flowers are produced at the ends of the branches; they are of a pale yellow colour, and have fcaly empalements. Both thefe fpecies may be propagated by feeds; and thofe which cannot, by parting their roots, or cutting of their branches. Some of the fpecies are tender, and require to be raifed on a hot-bed.

BUPLEURUM, HARE'S-EAR, or *Thorough-Wax*; a genus of the digynia order, belonging to the pentandria clafs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The involucra of the partial umbels are large in proportion, and pentaphyllous; the petals involuted or rolled inwards; the fruit roundifh, compreffed, and ftriated. The principal fpecies is the *fruticofum*, or fhrubby Ethiopian hartwort. This rifes with a fhrubby ftem, dividing into numerous branches, forming a bufhy head five or fix feet high, adorned with oblong, oval, entire leaves of a pale green colour, placed alternate, with yellow flowers in umbels at the ends of the branches, which appear in July and Auguft, and are fometimes fucceeded by ripe feeds. It may be propagated by cuttings.

BUPRESTIS, in zoology, a genus of infects belonging to the order of coleoptera. See Pl. 51. The antennæ are fetaceous, and as long as the thorax: the head is half drawn back within the thorax; to which may be added, that the antennæ are ferrated: the mouth is armed with jaws, and furnifhed with palpi: the elytra are margined, and cover the abdomen; and the tarfi have five articulations: the feet are faltatorii. There are 27 fpecies of this infect, moft of them natives of the Indies. The French have given the name of *Richard* to this genus, on account of the beautiful rich colours with which moft of the infects belonging to it are adorned. Infects of this genus are not common in England. They are of the higheft fplendour; and fome appear, when alive, to be united in colour with the refulgent particles of emeralds, rubies, diamonds, and gold. Applied to the microfcope, the fplendour is fo great as to dazzle the eye. The *guttata* is one of the moft oblong fpecies. The whole body is green and gold, with a blueifh caft underneath; but what diftinguifhes it, are four white dents or depreffed fpots that are feen upon the elytra, two upon each end. One of thofe dots is on the outward rim of the elytrum, about the middle of it, near the abdomen, and is the larger one. The other is on the inner edge, clofe to the future, about three-fourths of that future downwards, and exactly oppofite its fellow on the other elytrum. This latter one is the fmaller. The whole upper part of the infect, viewed through a glafs, appears finely dotted. This fpecies has been found in timber-yards.

BUQUOI, a town of Artois, in the French Netherlands, fituated on the confines of the former province of Picardy. E. long. 2. 40. N. lat. 50. 12.

BUR, a broad ring of iron, behind the place made for the hand on the fpears ufed formerly in tilting; which bur was brought to reft, when the tilter charged his fpear.

BURBAS, in commerce, a fmall coin at Algiers, with the arms of the dey ftruck on both fides: it is worth half an afper.

BURCHAUSEN, a town of Germany, in the Lower Bavaria, fituated on the river Saltz. E. long. 13. 25. N. lat. 48. 5.

BURDEN, or BURDON, in mufic, the drone or bafs, and the pipe or ftring which plays it: hence that part of a fong, that is repeated at the end of every ftanza, is called the *burden* of it.—A chord which is to be divided, to perform the intervals of mufic, when open and undivided, is alfo called the *burden*.

BURDEN properly fignifies a heavy weight or load. Ringelberg recommends the bearing burdens as the beft fort of exercife; efpecially to ftrengthen men of ftudy. To this end, he had a gown lined with plates of lead, which he could juft lift with both his hands. This load he bore fix or feven days together, either increafing or diminifhing it as he found occafion; by which means he could both write and exercife at the fame time.

BURDEN alfo denotes a fixed quantity of certain commodities. A burden of gad-fteel is two fcore, or 120 pounds.

BURDEN *of a Ship* is its contents, or the number of tons it will carry. The burden of a fhip may be determined thus: Multiply the length of the keel, taken within board, by the breadth of the fhip, within board, taken from the midfhip-beam, from plank to plank; and multiply the product by the depth of the hold, taken from the plank below the keelfon, to the under part of the upper deck plank; and divide the laft product by 94: the quotient is the content of the tonnage required. See FREIGHT.

BURDOCK, in botany. See ARCTIUM and XANTHIUM.

BURELL, or CIVITA BURRELLA, a town of Italy in the kingdom of Naples, and in Abruzzo Citra, near the river Sangro. E. long. 15. 5. N. lat. 41. 56.

BUREN, a town of the United Provinces, in Guelderland. E. long. 5. 22. N. lat. 52. 0.

BUREN, a town of Germany, in the circle of Weftphalia, and bifhopric of Paderborn. It is feated on the river Alme, five miles fouth of Paderborn. E. long. 8. 25. N. lat. 51. 35.

BURFORD, a town of Oxfordfhire, feated on an afcent on the river Windrufh, is a handfome place, chiefly noted for the making of faddles. The Downs near it, noted for horfe-races, are of great advantage to the town. Burford is an earldom in the family of St. Albans. It is 23 miles weft-north-weft of Banbury, and 85 weft of London. W. long. 1. 45. N. lat. 51. 40.

BURG, BURGH, or DUN, in northern topography. See DUN.

BURG, a town of Lincolnfhire, feated in a marfh, 12 miles fouth-eaft of Bofton, and 127 north of London. E. long. 0. 5. N. lat. 53. 12.

BURG, a town of the Dutch Netherlands, in Zutphen, feated

on the old Iſſel, 18 miles eaſt of Nimeguen. E. long. 16. 12. N. lat. 52. 0.

Burg-*Caſtle*, or *Borough-Caſtle*, a fortreſs on the edge of the county of Suffolk, three miles weſt of Yarmouth, where the rivers Yare and Waveny meet. It was formerly a delightful place; but now only the ruins of its walls remain, near which Roman coins are often dug up.

BURGAGE, or *Tenure in* Burgage, is where the king, or other perſon, is lord of an ancient borough, in which the tenements are held by a rent certain. It is indeed only a kind of town ſoccage; as common ſoccage, by which other lands are holden, is uſually of a rural nature. See Soccage. A borough is diſtinguiſhed from other towns by the right of ſending members to parliament; and where the right of election is by burgage-tenure, that alone is a proof of the antiquity of the borough. Tenure in burgage, therefore, or burgage-tenure, is where houſes or lands which were formerly the ſcite of houſes in an ancient borough, are held of ſome lord in common ſoccage, by a certain eſtabliſhed rent. And theſe ſeem to have withſtood the ſhock of the Norman encroachments principally on account of their inſignificancy, which made it not worth while to compel them to an alteration of tenure, as 100 of them put together would ſcarce have amounted to a knight's fee. Beſides, the owners of them, being chiefly artificers, and perſons engaged in trade, could not with any tolerable propriety be put on ſuch a military eſtabliſhment as the tenure in chivalry was. The free ſoccage, therefore, in which theſe tenements are held, ſeems to be plainly a remnant of Saxon liberty; which may alſo account for the great variety of cuſtoms affecting many of theſe tenements ſo held in ancient burgage; the principal and moſt remarkable of which is that called *Borough-Engliſh*. See the article Borough-*Engliſh*.

BURGAU, in natural hiſtory, the name of a large ſpecies of ſea ſnail, of the lunar or round-mouthed kind. It is very beautifully lined with a coat, of the nature of the mother of pearl; and the artificers take this out, to uſe under the name of mother of pearl, though ſome call it after the name of the ſhell they take it from, *burgaudine*.

BURGAUDINE, the name given by the French artificers to what we call mother of pearl. In their works, they do not uſe the common nacre-ſhell for this, but the lining of the American burgau. Hence ſome call the mother of pearl *burgaudine*, and others the *burgaudine* mother of pearl.

BURGDORF, a handſome and pretty large town of Switzerland, in the canton of Bern, ſeated on an eminence. The river Emma is about a piſtol-ſhot from the town; and as it often changes its bed, it frequently does a great deal of miſchief. It runs at the foot of a rock of a prodigious height, and there is a ſtone-bridge over it. Near the town there is a ſulphureous ſpring that ſupplies their baths with water, which is good againſt palſies and diſeaſes of the nerves. E. long. 7. 35. N. lat. 47. 6.

BURGEON, in gardening, a knot or button put forth by the branch of a tree in the ſpring. The word is formed from the French *bourgeon*, which ſignifies the ſame, formed from the Latin *burrio*, of *burra*. Bourgeon amounts to the ſame with what is otherwiſe called eye, bud, or germ. Froſts are chiefly dangerous when the burgeons begin to appear. The burgeons have the ſame ſkin, ſame pith, ſame ligneous body, and the ſame inſertions as the ſtalk; that is, all the parts are the ſame in both, only more contracted in the former.

BURGESS, an inhabitant of a borough, or walled town, or one who poſſeſſes a tenement therein. The word is alſo applied to the magiſtrates of ſome towns; as the bailiff and burgeſſes of Leominſter. Anciently, burgeſſes were held in great contempt; being reputed ſervile, baſe, and unfit for war; ſo that the gentry were not allowed to intermarry in their families, or fight with them; but, in lieu thereof, were to appoint champions. A burgeſs's ſon was reputed of age, when he could diſtinctly count money, meaſure cloth, &c.

Burgess is now ordinarily uſed for the repreſentative of a borough-town in parliament. Burgeſſes are ſuppoſed to repreſent the mercantile part or trading intereſt of the nation. They were formerly allowed, by a rate eſtabliſhed in the reign of Edward III. two ſhillings a day as wages. It is much to be regretted, that the members for boroughs bear above a quadruple proportion to thoſe for counties. The right of election of burgeſſes depends on ſeveral local charters and cuſtoms; though, by 2 Geo. II. ch. 24. the right for the future ſhall be allowed according to the laſt determination of the houſe of commons concerning it: and by 3 Geo. III. c. 15. no freeman, except ſuch as claim by birth, ſervitude, or marriage, ſhall be intitled to vote, unleſs he has been admitted to his freedom twelve months before. No perſon is eligible as a burgeſs, who has not a clear eſtate of 300l. a-year.

BURGGRAVE, properly denotes the hereditary governor of a caſtle, or fortified town, chiefly in Germany. The word is compounded of *bourg*, town, and *graf*, or *grave*, count. The burggraves were originally the ſame with what we otherwiſe call *caſtellans*, or *comites caſtellani*; but their dignity was conſiderably advanced under Rudolph of Hapſburgh; before his time they were ranked only as counts, and below the princes, but under him began to be eſteemed on a footing with princes. In ſome parts the dignity is much degenerated, eſpecially in the palatinate. There were formerly, according to Leti, fifteen families who enjoyed the title of burggraves, thirteen of which are now extinct. But this is differently repreſented by others. In Bohemia the title of burggrave is given to the chief officer, or to him that commands in quality of viceroy. In Pruſſia, the burggrave is one of the four chief officers of the province.

BURGH. See Borough.

Burgh, or Dun. See Dun.

Burgh-*Bote* ſignifies a contribution towards the building or repairing of caſtles, or walls, for the defence of a borough or city. By the law of king Athelſtan, the caſtles and walls of towns were to be repaired, and burgh-bote levied every year within a fortnight after rogation days. No perſon whatever was exempt from this ſervice; the king himſelf could not exempt a man from burgh-bote: yet, in after-times, exemptions appear to have been frequently granted; inſomuch that, according to Cowel, the word *burgh-bote* came to be chiefly uſed to denote, not the ſervice but the liberty or exemption from it.

Burgh-*Breche*, or *brech*, a fine impoſed on the community of a town, or burgh, for the breach of peace among them.

Burgh *Mails*, were yearly payments to the crown of Scotland, introduced by Malcolm III. and reſembling the fee *farm* rents of burghs in England. See Mail.

Burgh-*Maſter*, an officer in the tin mines, who directs and lays out the meers for the workmen, &c. otherwiſe denominated bailiff and bar-maſter.

BURGHERMASTER. See Burgomaster.

BURGHMOTE, the court of a borough. By the laws of king Edgar, the burghmote was to be held thrice in the year; by thoſe of Henry I. 12 times.

BURGLARY, or nocturnal house-breaking *(burgi latrocinium)*, which by the ancient Engliſh law was called *hameſucken*, a word alſo uſed in the law of Scotland, but in a ſomewhat different ſenſe, has always been looked upon as a very heinous offence; not only becauſe of the abundant terror it carries with it, but alſo as it is a forcible invaſion and diſturbance of that right of habitation which every individual might acquire even in a ſtate of nature; an invaſion which,

in ſuch a ſtate, would be ſure to be puniſhed with death, unleſs the aſſailant were ſtronger. But, in civil ſociety, the laws come in to the aſſiſtance of the weaker party: and, beſides that they leave him this natural right of killing the aggreſſor if he can, they alſo protect and avenge him in caſe the aſſailant is too powerful. And the law has ſo particular and tender a regard to the immunity of a man's houſe, that it ſtyles it his *caſtle*, and will never ſuffer it to be violated with impunity; agreeing herein with the ſentiments of ancient Rome. For this reaſon no outward doors can in general be broken open to execute any civil proceſs; though in criminal caſes the public ſafety ſuperſedes the private. Hence alſo in part ariſes the animadverſion of the law upon eaves-droppers, nuſancers, and incendiaries: and to this principle it muſt be aſſigned, that a man may aſſemble people together lawfully (at leaſt if they do not exceed 11), without danger of raiſing a riot, rout, or unlawful aſſembly, in order to protect his houſe; which he is not permitted to do in any other caſe.

The definition of a burglar, as given us by Sir Edward Coke, is, "he that by night breaketh and entereth into a manſion-houſe, with intent to commit a felony." In this definition there are four things to be conſidered; the *time*, the *place*, the *manner*, and the *intent*. 1. The *time* muſt be by night, and not by day; for in the day-time there is no burglary; *i. e.* if there be day-light or crepuſculum enough, begun or left, to diſcern a man's face withal. But this does not extend to moonlight; for then many midnight burglaries would go unpuniſhed: and beſides, the malignity of the offence does not conſiſt ſo much in its being done in the dark, as at the dead of night; when all the creation, except beaſts of prey, are at reſt; when ſleep has diſarmed the owner, and rendered his caſtle defenceleſs. 2. As to the *place*. It muſt be, according to Sir Edward Coke's definition, in a manſion-houſe: for no diſtant barn, warehouſe, or the like, are under the ſame privileges, nor looked upon as a man's caſtle of defence; nor is a breaking open of houſes wherein no man reſides, and which for the time being are not manſion-houſes, attended with the ſame circumſtances of midnight terror. A houſe, however, wherein a man ſometimes reſides, and which the owner hath left only for a ſhort ſeaſon, *animo revertendi*, is the object of burglary, though no one be in it at the time of the fact committed. And if the barn, ſtable, or warehouſe, be parcel of the manſion-houſe, though not under the ſame roof or contiguous, a burglary may be committed therein; for the capital houſe protects and privileges all its branches and appurtenants, if within the curtilage or homeſtall. A chamber in a college, or an inn of court, where each inhabitant hath a diſtinct property, is, to all other purpoſes as well as this, the manſion-houſe of the owner. So alſo is a room or lodging in any private houſe, the manſion for the time being of the lodger; if the owner doth not himſelf dwell in the houſe, or if he and the lodger enter by different outward doors. But if the owner himſelf lies in the houſe, and hath but one outward door at which he and his lodgers enter, ſuch lodgers ſeem only to be inmates, and all their apartments to be parcel of the one dwelling-houſe of the owner. 3. As to the *manner* of committing burglary: there muſt be both a breaking and an entry to complete it. But they need not be both done at once; for if a hole be broken one night, and the ſame breakers enter the next night through the ſame, they are burglars. There muſt be an actual breaking; as, at leaſt, by breaking or taking out the glaſs of, or otherwiſe opening, a window; picking a lock, or opening it with a key; nay, by lifting up the latch of a door, or unlooſing any other faſtening which the owner has provided. But if a perſon leaves his doors or windows open, it is his own folly and negligence; and if a man enters therein, it is no burglary; yet, if he afterwards unlocks an inner or chamber door, it is ſo. But to come down a chimney is held a burglarious entry; for that is as much cloſed as the nature of things will permit. So alſo, to knock at a door, and, upon opening it, to ruſh in with a felonious intent; or, under pretence of taking lodgings, to fall upon the landlord and rob him; or to procure a conſtable to gain admittance in order to ſearch for traitors, and then to bind the conſtable and rob the houſe; all theſe entries have been adjudged burglarious, though there was no actual breaking: for the law will not ſuffer itſelf to be trifled with by ſuch evaſions, eſpecially under the cloak of legal proceſs. As for the *entry*, any the leaſt degree of it, with any part of the body, or with an inſtrument held in the hand, is ſufficient: as, to ſtep over the threſhold, to put a hand or hook in at a window to draw out goods, or a piſtol to demand one's money, are all of them burglarious entries. The entry may be before the breaking, as well as after: for by ſtatute 12 Anne c. 7. if a perſon enters into the dwelling-houſe of another, without breaking in either by day or by night, with an intent to commit felony, or, being in ſuch houſe, ſhall commit any felony; and ſhall in the night break out of the ſame; this is declared to be burglary. 4. As to the *intent*; it is clear that ſuch breaking and entry muſt be with a felonious intent, otherwiſe it is only a treſpaſs. And it is the ſame whether ſuch intention be actually carried into execution, or only demonſtrated by ſome attempt or overt act, of which the jury are to judge.

Burglary is a felony at common law, but within the benefit of clergy. Burglary in any houſe belonging to the plate-glaſs company, with intent to ſteal the ſtock or utenſils, is by ſtatute 13 Geo. III. c. 38. declared to be ſingle felony, and puniſhed with tranſportation for ſeven years.

BURGOMASTER, Burghermaster, *Bourgermeſter*, or *Burgmeſter*, the chief magiſtrate of the great towns in Flanders, Holland, and Germany. The power and juriſdiction of the burgomaſter is not the ſame in all places, every town having its particular cuſtoms and regulations. At Amſterdam there are four choſen by the voices of all thoſe people in the ſenate who have either been burgomaſters or echevins. They diſpoſe of all under offices that fall in their time, keep the key of the bank, and enjoy a ſalary but of 500 guildres; all feaſts, public entertainments, &c. being defrayed out of the common treaſury. The word is formed from the two Flemiſh words, *borger*, *burgeſs*, or *citizen*; and *meſter*, *maſter*. Some expreſs it in Latin by *conſul*, others by *ſenator*.—M. Bruneau obſerves, that *burghermaſter* in Holland anſwers to what is called *alderman* and *ſheriff* in England, *attorney* at Compeigne, *capitoul* at Tholouſe, *conſul* at Languedoc, &c.

BURGOO, or Burgout, a ſea-faring diſh, made of whole oatmeal, or groats, boiled in water till they burſt: then mixed with butter. It is a cheap and ſtrengthening diet. Burgoo, otherwiſe called *loblolly*, is held by Cockburn very proper to correct that unwholeſome diſpoſition to coſtiveneſs to which the other diet of ſailors much inclines them. Yet the burgoo victualling is the leaſt liked of all their proviſions, becauſe of the ſcanty allowance of butter to it. The ſame author thinks it might be worth the conſideration of thoſe to whom the care of the ſeamen is committed, to contrive to render this food more agreeable to them.

BURGOS, a city of Spain the capital of Old Caſtile, with an archbiſhop's ſee, erected in 1574. It is ſurrounded with mountains, which render the air very cold nine months in the year, and the other three exceſſively hot. It is ſeated on the declivity of a hill, on the top of which there is a ſtrong caſtle, and the lower part of the town is watered by the river Alançon. The principal avenue to the city is by a handſome bridge over this river, which leads to a beautiful gate, adorned with the ſtatues of ſeveral kings of Spain. The town is large and populous; but the houſes are ill built, and the ſtreets are narrow

and dirty, except ſome few, eſpecially that which leads to the cathedral. There are ſeveral ſquares, adorned with fountains and ſtatues. The great ſquare in the middle of the city is ſurrounded with fine houſes, with piazzas to each. The cathedral church is a maſter-piece of Gothic architecture, and one of the fineſt in all Spain. The church of the Auguſtines is remarkable for its beautiful and rich chapel of the holy crucifix. There are ſeveral fine convents and nunneries; one of which laſt contains 150 nuns, who muſt all be of noble extraction. They have likewiſe a royal hoſpital, very richly endowed; and at this place they ſpeak the beſt Caſtilian, that is, the pureſt Spaniſh in the kingdom. W. long. 4. 7. N. lat. 42. 20.

BURGUNDIONES, a part or branch of the Vindili or Wandili. Cluverius places them about the Warta, a river of Poland: though the conjectures on the ſeat of theſe people are doubtful; and no wonder, becauſe the Roman expeditions terminated at the Elbe. They afterwards removed to the Ciſalpine, Germany, and at length to Celtic Gaul, and gave name to the duchy and county of Burgundy.

BURGUNDY, a late province of France; bounded on the E. by Franche Comté, on the W. by Bourbonnois and Nivernois, on the S. by Lyonois, and on the N. by Champagne. Its length from north to ſouth is about 45 leagues, and its breadth from eaſt to weſt about 30. It is very fertile in corn, wine, fruit, and tobacco; being watered by the Seine, the Dehune which falls into the Soane, the Brebince or Bourbince, the Armançon, the Oucke, and the Tille. There are ſome noted mineral ſprings in it, with ſubterraneous lakes, and plenty of ochre. The principal places are Dijon, Auxerre, Autun, Bourbon, L'Ancy, &c.

BURIAL, the interment of a deceaſed perſon. The rites of burial are looked upon in all countries, and at all times, as a debt ſo ſacred, that ſuch as neglected to diſcharge it were thought accurſed: hence the Romans called them *juſta*, and the Greeks νομιμα, δικαια, οσια, words implying the inviolable obligations which nature has laid upon the living to take care of the obſequies of the dead. Nor are we to wonder, that the ancient Greeks and Romans were extremely ſolicitous about the interment of their deceaſed friends, ſince they were ſtrongly perſuaded, that their ſouls could not be admitted into the Elyſian fields till their bodies were committed to the earth; and if it happened that they never obtained the rites of burial, they were excluded from the happy manſions for the term of 100 years. For this reaſon it was conſidered as a duty incumbent upon all travellers who ſhould meet with a dead body in their way, to caſt duſt or mould upon it three times; and of theſe three handfuls one at leaſt was caſt upon the head. The ancients likewiſe conſidered it as a great misfortune if they were not laid in the ſepulchres of their fathers; for which reaſon, ſuch as died in foreign countries had uſually their aſhes brought home, and interred with thoſe of their anceſtors. But notwithſtanding their great care in the burial of the dead, there were ſome perſons whom they thought unworthy of that laſt office, and to whom therefore they refuſed it: ſuch were, 1. Public or private enemies. 2. Such as betrayed or conſpired againſt their country. 3. Tyrants, who were always looked upon as enemies to their country. 4. Villains guilty of ſacrilege. 5. Such as died in debt, whoſe bodies belonged to their creditors. And, 6. Some particular offenders, who were puniſhed with death.

Of ſuch as were allowed the rites of burial, ſome were diſtinguiſhed by particular circumſtances of diſgrace attending their interment: thus perſons killed by lightning were buried apart by themſelves, being thought odious to the gods; thoſe who waſted their patrimony forfeited the right of being buried in the ſepulchres of their fathers; and thoſe who were guilty of ſelf-murder were privately depoſited in the ground, without the accuſtomed ſolemnities. Among the Jews, the privilege of burial was denied only to ſelf-murderers, who were thrown out to rot upon the ground. In the Chriſtian church, though good men always deſired the privilege of interment, yet they were not, like the heathens, ſo concerned for their bodies, as to think it any detriment to them, if either the barbarity of an enemy, or ſome other accident, deprived them of this privilege. The primitive Chriſtian church denied the mere ſolemn rites of burial only to unbaptized perſons, ſelf-murderers, and excommunicated perſons who continued obſtinate and impenitent, in a manifeſt contempt of eccleſiaſtical cenſures.

Among the Jews it was never preciſely determined what was the place of burial. They had graves in town and country, on the highways, in gardens, and upon mountains. Among the Greeks, the temples were made repoſitories for the dead in the primitive ages; yet the general cuſtom in latter ages, with them, as well as with the Romans and other heathen nations, was to bury their dead without their cities, and chiefly by the highways. Among the primitive Chriſtians, burying in cities was not allowed for the firſt 300 years, nor in churches for many ages after, the dead bodies being firſt depoſited in the atrium or churchyard, and porches and porticos of the church: hereditary burying-places were forbidden till the 12th century. As to the time of burial, with all the ceremonies accompanying it, ſee the article FUNERAL-*Rites*.

BURICK, a town of Germany, in the circle of Weſtphalia, and duchy of Cleves, ſubject to the king of Pruſſia. In 1672, the fortifications were demoliſhed by the French. It is agreeably ſeated on the river Rhine, over againſt Weſel, in E. long. 6. 8. N. lat. 51. 38.

BURIDAN (John), a native of Bethune, in Artois, was one of the moſt celebrated philoſophers of the 14th century. He taught in the univerſity of Paris with great reputation; and wrote commentaries on logic, morality, and Ariſtotle's metaphyſics. Aventinus relates, that he was a diſciple of Ockam; and that, being expelled Paris by the power of the Realiſts, which was ſuperior to that of the Nominaliſts, he went into Germany, where he founded the univerſity of Vienna. From him came the proverb of the *aſs of Buridan*, ſo famous in the ſchools. Buridan ſuppoſed an hungry aſs fixed at an exactly equal diſtance between two buſhels of oats; or an aſs, as much preſſed by thirſt as hunger, between a buſhel of oats and a pail of water, each of them acting equally on his ſenſes. Having made this ſuppoſition, he deſired to know what the aſs would do? If he was anſwered that he would remain immoveable, then he concluded he would die of hunger between two buſhels of oats, or of both hunger and thirſt, with both corn and water within his reach. This appeared abſurd, and brought the laughter on his ſide; but if it was replied, that the aſs would not be ſo ſtupid as to die of hunger or thirſt in ſuch a ſituation, Then (ſaid he), the aſs has free will, or is it poſſible that of two equal weights one ſhould outweigh the other? Theſe two conſequences appeared equally abſurd: and thus Buridan, by this ſophiſm, perplexed the philoſophers, and his aſs became famous in the ſchools.

BURKET (William), a celebrated commentator on the New Teſtament, was born at Hitcham in Northamptonſhire, July 25, 1650, and educated at Pembroke-hall, Cambridge. He was a pious and charitable man. He made great collections for the French Proteſtants in the year 1687, &c. and by his great care, pains, and charges, procured a worthy miniſter to go and ſettle at Carolina. Beſides a Commentary on the New Teſtament, written in the ſame plain, practical, and affectionate manner in which he preached, he wrote a volume, entitled, *The poor man's help, and rich man's guide.*

BURLAW. See BY-*Law*.

BURLESQUE, a ſpecies of compoſition, which, though a great engine of ridicule, is not confined to that ſubject; for it is clearly diſtinguiſhable into burleſque that excites laughter merely, and burleſque that excites deriſion or ridicule. A grave ſubject, in which there is no impropriety, may be brought down by a certain colouring ſo as to be riſible, as in Virgil traveſtie; the author firſt laughs at every turn, in order to make his readers laugh. The Lutrin is a burleſque poem of the other ſort, laying hold of a low and trifling incident to expoſe the luxury, indolence, and contentious ſpirit of a ſet of monks. Boileau, the author, turns the ſubject into ridicule, by dreſſing it in the heroic ſtyle, and affecting to conſider it as of the utmoſt dignity and importance. Though ridicule is the poet's aim, he always carries a grave face, and never once betrays a ſmile. The oppoſition between the ſubject and the manner of handling it, is what produces the ridicule; and therefore, in a compoſition of this kind, no image profeſſedly ludicrous ought to have quarter, becauſe the contraſt is deſtroyed by ſuch images.

Although the burleſque that aims at ridicule, produces its effects by elevating the ſtyle far above the ſubject; yet the poet ought to confine himſelf to ſuch images as are lively, and readily apprehended. A ſtrained elevation, ſoaring above the ordinary reach of fancy, makes an unpleaſant impreſſion. The mind is ſoon diſguſted by being kept long on the ſtretch. Machinery may be employed in a burleſque poem, ſuch as the Lutrin, the Diſpenſary, or Hudibras, with more ſucceſs and propriety than in any other ſpecies of poetry: for burleſque poems, though they aſſume the air of hiſtory, give entertainment chiefly by their pleaſant and ludicrous pictures. It is not the aim of ſuch a poem to raiſe ſympathy; and for that reaſon, a ſtrict imitation of nature is not neceſſary. And hence, the more extravagant the machinery in a ludicrous poem, the more it affords laughter.

BURLINGTON, a ſea-port town in the eaſt riding of Yorkſhire, ſituated on the German ocean, about 37 miles north-eaſt of York. E. long. 10. and N. lat. 54. 15. It gave the title of *earl* to a branch of the noble family of Boyle, but the earldom is now extinct.

New BURLINGTON, the capital of New Jerſey, in North America; ſituated in an iſland of Delawar river, about 20 miles north of Philadelphia. W. long. 74. 0. N. lat. 40. 40.

BURMAN (Francis), a Proteſtant miniſter, and learned profeſſor of divinity at Utrecht, was born at Leyden in 1628; and died on the 10th of November 1679, after having publiſhed a courſe of divinity, and ſeveral other works. This writer is not to be confounded with *Francis Burman*, his ſon; or with *Peter Burman*, a laborious commentator on Phædrus, Lucan, Petronius, and other profane authors, who died in the year 1741.

BURN, in ſurgery, an injury received on any part of the body by the application of fire to it. See SURGERY.

BURNET (Gilbert), biſhop of Saliſbury in the latter end of the 16th century, was born at Edinburgh, in 1643, of an ancient family in the ſhire of Aberdeen. His father being bred to the law, was, at the reſtoration of king Charles II. appointed one of the lords of ſeſſion, with the title of *lord Crimond*, in reward for his conſtant attachment to the royal party during the troubles of Great Britain. Our author, the youngeſt ſon of his father, was inſtructed by him in the Latin tongue: at ten years of age he was ſent to continue his ſtudies at Aberdeen, and was admitted M. A. before he was 14. His own inclination led him to the ſtudy of the civil and feudal law; and he uſed to ſay, that it was from this ſtudy he had received more juſt notions concerning the foundations of civil ſociety and government, than thoſe which ſome divines maintain. About a year after, he changed his mind, and began to apply to divinity, to the great ſatisfaction of his father. He was admitted preacher before he was 18; and Sir Alexander Burnet, his couſin-german, offered him a benefice, which he refuſed.

In the year 1663, about two years after the death of his father, he came into England; and after ſix months ſtay at Oxford and Cambridge, returned to Scotland; which he ſoon left again to make a tour for ſome months, in 1664, in Holland and France. At Amſterdam, by the help of a Jewiſh rabbi, he perfected himſelf in the Hebrew language; and likewiſe became acquainted with the leading men of the different perſuaſions tolerated in that country: as Calviniſts, Arminians, Lutherans, Anabaptiſts, Browniſts, Papiſts, and Unitarians; amongſt each of which he uſed frequently to declare, he met with men of ſuch unfeigned piety and virtue, that he became fixed in a ſtrong principle of univerſal charity, and an invincible abhorrence of all ſeverities on account of religious doctrines.

When he returned from his travels, he was admitted miniſter of Salton: in which ſtation he ſerved five years in the moſt exemplary manner. He drew up a memorial, in which he took notice of the principal errors in the conduct of the Scots biſhops, which he obſerved not to be conformable to the primitive inſtitution; and ſent a copy of it to ſeveral of them. This expoſed him to their reſentments: but, to ſhow he was not actuated by the ſpirit of ambition, he led a retired courſe of life for two years; which ſo endangered his health, that he was obliged to abate his exceſſive application to ſtudy. In 1669, he publiſhed his "Modeſt and free conference between a conformiſt and nonconformiſt." He became acquainted with the ducheſs of Hamilton, who communicated to him all the papers belonging to her father and her uncle; upon which he drew up the "Memoirs of the dukes of Hamilton." The duke of Lauderdale, hearing he was about this work, invited him to London, and introduced him to king Charles II. He returned to Scotland, and married the lady Margaret Kennedy, daughter of the earl of Caſſilis; a lady of great piety and knowledge, highly eſteemed by the preſbyterians, to whoſe ſentiments ſhe was ſtrongly inclined. As there was ſome diſparity in their ages, that it might remain paſt diſpute that this match was wholly owing to inclination, and not to avarice or ambition, the day before their marriage our author delivered the lady a deed, whereby he renounced all pretenſions to her fortune, which was very conſiderable, and muſt otherwiſe have fallen into his hands, ſhe herſelf having no intention to ſecure it. The ſame year he publiſhed his "Vindication of the authority, conſtitution, and laws of the church and ſtate of Scotland;" which at that juncture was looked upon as ſo great a ſervice, that he was again offered a biſhopric, and a promiſe of the next vacant archbiſhopric; but did not accept of it, becauſe he could not approve of the meaſures of the court, the grand view of which he ſaw to be the advancement of the Romiſh church.

Mr. Burnet's intimacy with the dukes of Hamilton and Lauderdale occaſioned him to be frequently ſent for by the king and the duke of York, who had converſations with him in private. But Lauderdale conceiving a reſentment againſt him on account of the freedom with which he ſpoke to him, repreſented at laſt to the king, that Dr. Burnet was engaged in an oppoſition to his meaſures. Upon his return to London, he perceived that theſe ſuggeſtions had entirely thrown him out of the king's favour, though the duke of York treated him with greater civility than ever, and diſſuaded him from going to Scotland. Upon this, he reſigned his profeſſorſhip at Glaſgow, and ſtaid in London. About this time the living at Cripplegate being vacant, the dean and chapter of St. Paul's (in whoſe gift it was), hearing of his circumſtances, and the hardſhips he had undergone, ſent him an offer of the benefice; but as

he had been informed of their first intention of conferring it on Dr. Fowler, he generously declined it. In 1675, at the recommendation of lord Hollis, whom he had known in France, ambassador at that court, he was, by Sir Harbottle Grimstone, master of the rolls, appointed preacher of the chapel there, notwithstanding the opposition of the court. He was soon after chosen a lecturer of St. Clement's, and became one of the preachers that were most followed in town. In 1697, he published his *History of the reformation*, for which he had the thanks of both houses of parliament. The first part of it was published in 1679, and the second in 1681; and the next year an abridgement of these two parts appeared.

About this time Mr. Burnet happened to be sent for to a woman in sickness, who had been engaged in an amour with the earl of Rochester. The manner in which he treated her during her illness, gave that lord a great curiosity for being acquainted with him. Whereupon, for a whole winter, he spent one evening in a week with Dr. Burnet, who discoursed with him upon all those topics upon which sceptics and men of loose morals attack the Christian religion. The happy effect of these conferences occasioned the publication of his account of the life and death of that earl. In 1682, when the administration was changed in favour of the duke of York, being much resorted to by persons of all ranks and parties, in order to avoid returning visits, he built a laboratory, and went for above a year through a course of chemical experiments. Not long after, he refused a living of 300l. a year offered him by the earl of Essex, on the terms of his not residing there, but in London. When the inquiry concerning the popish plot was on foot, he was frequently sent for and consulted by king Charles with relation to the state of the nation. His majesty offered him the bishopric of Chichester, then vacant, if he would engage in his interests; but he refused to accept it on these terms. He preached at the Rolls till 1684, when he was dismissed by order of the court. About this time he published several pieces of great merit.

On James's accession to the throne, having obtained leave to go out of the kingdom, he first went to Paris, and lived in great retirement, till contracting an acquaintance with brigadier Stouppe, a Protestant gentleman in the French service, he made a tour with him into Italy. He met with an agreeable reception at Rome. Pope Innocent II. hearing of our author's arrival, sent the captain of the Swiss guards to acquaint him he would give him a private audience in bed, to avoid the ceremony of kissing his Holiness's slipper. But Dr. Burnet excused himself as well as he could. Some disputes which our author had here concerning religion, beginning to be taken notice of, made it proper for him to quit the city; which, upon an intimation given him by prince Borghese, he accordingly did.

Pursuing his travels now through Switzerland and Germany; in 1688, he came to Utrecht, and intended to settle in some of the seven provinces. There he received an invitation from the prince and princess of Orange (to whom their party in England had recommended him) to come to the Hague, which he accepted. He was soon made acquainted with the secret of their counsels, and advised the fitting out of a fleet in Holland sufficient to support their designs and encourage their friends. This, and the *Account of his travels*, in which he endeavoured to blend popery and tyranny together, and represent them as inseparable, with some papers reflecting on the proceedings of England, that came out in single sheets, and were dispersed in several parts of England, most of which Mr. Burnet owned himself the author of, alarmed king James; and were the occasion of his writing twice against him to the princess of Orange, and insisting, by his ambassador, on his being forbid the court; which, after much importunity, was done, though he continued to be trusted and employed as before, the Dutch minister consulting him daily. To put an end to these frequent conferences with the ministers, a prosecution for high treason was set on foot against him both in England and Scotland. But Burnet receiving the intelligence before it arrived at the States, he avoided the storm, by petitioning for, and obtaining without any difficulty, a bill of naturalization, in order to effect a marriage with Mary Scot, a Dutch lady of considerable fortune, who, with the advantage of birth, had those of a fine person and many accomplishments.

His union with this lady, legally entitled him to the protection of Holland; and when Mr. Burnet found king James plainly subverting the constitution, he omitted no method to support and promote the design the prince of Orange had formed of delivering Great Britain, and came over with him in quality of chaplain. He was soon advanced to the see of Salisbury. He declared for moderate measures with regard to the clergy who scrupled to take the oaths, and many were displeased with him for declaring for the toleration of nonconformists. His pastoral letter concerning the oaths of allegiance and supremacy to king William and queen Mary, 1689, happening to touch upon the right of conquest, gave such offence to both houses of parliament, that it was ordered to be burnt by the hands of the common executioner. In 1698 he lost his wife by the small-pox; and, as he was almost immediately after appointed preceptor to the duke of Gloucester, in whose education he took great care, this employment, and the tender age of his children, induced him the same year to supply her loss by a marriage with Mrs. Berkely, eldest daughter of Sir Richard Blake, knight. In 1699 he published his Exposition of the 39 articles; which occasioned a representation against him in the lower house of convocation in the year 1701; but he was vindicated by the upper house. His speech in the house of lords in 1704 against the bill to prevent occasional conformity was severely attacked. He died in 1715, and was interred in the church of St. James, Clerkenwell, where he has a monument erected to him. He formed a scheme for augmenting the poor livings; which he pressed forward with such success, that it ended in an act of parliament passed in the 2d of queen Anne, "for the augmentation of the livings of the poor clergy."

Burnet (Thomas), a polite and learned writer in the end of the 17th century, was born in Scotland, but educated in Cambridge under the tuition of Tillotson, afterwards archbishop of Canterbury. In the beginning of 1685, he was made master of Sutton's hospital in London, after which he entered into holy orders. During the reign of king James, he made a noble stand in his post as master of the charter-house against the encroachments of that monarch, who would have imposed one Andrew Popham, a papist, as a pensioner upon the foundation of that house. In 1680 he published his *Telluris theoria sacra*, so universally admired for the purity of the style and beauty of the sentiments, that king Charles gave encouragement to a translation of it into English. This theory was however attacked by several writers. In 1692 he published his *Archæologia philosophica*, dedicated to king William, to whom he was clerk of the closet. He died in 1715. Since his death has been published, his book *De statu mortuorum et resurgentium*, and also his treatise *De fide et officiis Christianorum*.

Burnet, in botany. See Poterium and Sanguisorba.

BURNHAM, a market town of Norfolk in England, situated in E. long. 0. 50. N. lat. 53. 0.

BURNING, the action of fire on some pabulum or fuel, by which the minute parts thereof are put into a violent motion, and some of them, assuming the nature of fire themselves, fly off *in orbem*, while the rest are dissipated in form of vapour or reduced to ashes. See Ignition. We are told of instances of persons being burnt by fire kindled within their own bodies.

A woman at Paris, who ufed to drink brandy to excefs, was one night reduced to afhes by a fire from within, all but her head and the ends of her fingers. Signora Corn. Zangari, or, as others call her, *Corn. Bandi*, an aged lady, of an unblemifhed life, near Cefena in Romagna, underwent the fame fate in March 1731. She had retired in the evening into her chamber fomewhat indifpofed; and in the morning was found in the middle of the room reduced to afhes, all except her face, legs, fkull, and three fingers. The ftockings and fhoes fhe had on were not burnt in the leaft. The afhes were light; and, on preffing between the fingers, vanifhed, leaving behind a grofs ftinking moifture with which the floor was fmeared; the walls and furniture of the room being covered with a moift cineritious foot, which had not only ftained the linen in the chefts, but had penetrated into the clofet, as well as into the room overhead, the walls of which were moiftened with the fame vifcous humour.—We have various other relations of perfons burnt to death in this unaccountable manner, and many have written treatifes to account for the caufe of fo extraordinary a phenomenon; but their opinions are not worth repeating.

Burning, or *Brenning*, in our old cuftoms, denotes an infectious difeafe, got in the ftews by converfing with lewd women, and fuppofed to be the fame with what we now call the *venereal difeafe*. In a manufcript of the vocation of John Bale to the bifhopric of Offory, written by himfelf, he fpeaks of Dr. Hugh Wefton, who was dean of Windfor in 1556, but deprived by cardinal Pole for adultery, thus: "At this day is leacherous Wefton, who is more practifed in the arts of breechburning, than all the whores of the ftews. He not along ago brent a beggar of St. Botolph's parifh." See Bawdy-house and Stews.

Burning, in antiquity, a way of difpofing of the dead, much practifed by the ancient Greeks and Romans, and ftill retained by feveral nations in the Eaft and Weft Indies. The antiquity of this cuftom rifes as high as the Theban war, where we are told of the great folemnity accompanying this ceremony at the pyre of Menœceus and Archemorus, who were cotemporary with Jair the eighth judge of Ifrael. Homer abounds with funeral obfequies of this nature. In the inward regions of Afia, the practice was of very ancient date, and the continuance long: for we are told, that, in the reign of Julian, the king of Chionia burnt his fon's body, and depofited the afhes in a filver urn. Coeval almoft with the firft inftances of this kind in the eaft, was the practice in the weftern parts of the world. The Herulians, the Getes, and the Thracians, had all along obferved it; and its antiquity was as great with the Celtæ, Sarmatians, and other neighbouring nations. The origin of this cuftom feems to have been out of friendfhip to the deceafed: their afhes were preferved as we preferve the hair, or a ring, or feal, of a deceafed friend.

The bodies of kings were burnt in a cloth made of afbeftos, that their afhes might be preferved from any mixture with the fuel and other matters thrown on the funeral pile. The fame method is ftill obferved with the princes of Tartary. Among the Greeks, the body was placed on the top of a pile, on which were thrown divers animals, and even flaves and captives, befides unguents and perfumes. In the funeral of Patroclus we find a number of fheep and oxen thrown in, then four horfes, followed by two dogs, and laftly by 12 Trojan prifoners. The like is mentioned by Virgil in the funerals of his Trojans; where, befides oxen, fwine, and all manner of cattle, we find eight youths condemned to the flames. The firft thing was the fat of the beafts wherewith the body was covered, that it might confume the fooner; it being reckoned great felicity to be quickly reduced to afhes. For the like reafon, where numbers were to be burned at the fame time, care was taken to mix with the reft fome of humid conftitutions, which they thought more inflammable. Thus we are affured by Plutarch and Macrobius, that for every ten men it was cuftomary to put in one woman. Soldiers ufually had their arms burnt with them. The garments worn by the living were alfo thrown on the pile, with other ornaments and prefents; a piece of extravagance which the Athenians carried to fo great a height, that fome of the law-givers were forced to reftrain them, by fevere penalties, from defrauding the living by their liberality to the dead.—In fome cafes, burning was exprefsly forbidden among the Romans, and even looked upon as the higheft impiety. Thus infants, who died before the breeding of teeth, were intombed unburnt in the ground, in a particular place fet apart for this purpofe, called *fuggrundarium*. The like was practifed with regard to thofe who had been ftruck dead with lightning, who were never to be burnt again. Some fay that burning was denied to fuicides.—The manner of burning among the Romans was not unlike that of the Greeks: the corpfe, being brought out without the city, was carried directly to the place appointed for burning it; which, if it joined to the fepulchre, was called *buftum*; if feparate from it, *uftrina*; and there laid on the *rogus* or *pyra*, a pile of wood prepared on which to burn it, built in fhape of an altar, but of different height according to the quality of the deceafed. The wood ufed was commonly from fuch trees as contain moft pitch or rofin; and if any other were ufed, they fplit it for the more eafy catching fire. Round the pile they fet cyprefs trees, probably to hinder the noifome fmell of the corpfe. The body was not placed on the bare pile, but on the couch or bed whereon it lay. This done, the next of blood performed the ceremony of lighting the pile; which they did with a torch, turning their faces all the while the other way, as if it were done with reluctance. During the ceremony, decurfions and games were celebrated; after which came the *offilegium*, or gathering together of the bones and afhes; alfo wafhing and anointing them, and depofiting them in urns.

Burning, among furgeons, denotes the application of an actual cautery, that is, a red-hot iron inftrument, to the part affected; which is otherwife denominated *cauterization*.—The whole art of phyfic among the Japanefe lies in the choice of places proper to be burnt; which are varied according to the difeafe. In the country of the Mogul, the colic is cured by an iron ring applied red-hot about the patient's navel. Certain it is, that fome very extraordinary cures have been performed accidentally by burning. The following cafe was communicated to Mr. Homberg by a phyfician at Bruges. A woman, who for feveral years had her legs and thighs fwelled in an extraordinary manner, found fome relief from rubbing them before the fire with brandy every morning and evening. One evening the fire chanced to catch the brandy fhe had rubbed herfelf with, and flightly burnt her. She applied fome brandy to her burn; and in the night all the water her legs and thighs were fwelled with was entirely difcharged by urine, and the fwelling did not again return. The ancients had recourfe to this remedy very frequently, and with a degree of advantage that ought to have deterred modern furgeons from relinquifhing the practice fo abfolutely as they have done.

Burning *Bufh*. See Bush.

Burning-*Glafs*, or *Burning-Mirror*, a machine by which the fun's rays are collected into a point; and by that means their force and effect are extremely heightened, fo as to burn objects placed in it.

Burning-glaffes are of two kinds, *convex* and *concave*. The convex ones are lenfes, which acting according to the laws of refraction, incline the rays of light towards the axis, and unite them in a point or focus. The concave ones are mirrors or reflectors, whether made of polifhed metal or filvered glafs, and

which acting by the laws of reflection, throw the rays back into a point or focus before the glaſs.

The uſe of burning-glaſſes it appears is very ancient, many of the old authors relating ſome effects of them. Diodorus Siculus, Lucian, Dion, Zonaras, Galen, Anthemius, Euſtatius, Tzetzes, and others, relate that by means of them Archimedes ſet fire to the Roman fleet at the ſiege of Syracuſe. Tzetzes is ſo particular in his account of this matter, that his deſcription ſuggeſted to Kircher the method by which it was probably accompliſhed. That author ſays, that "Archimedes ſet fire to Marcellus's navy by means of a burning-glaſs compoſed of ſmall ſquare mirrors, moving every way upon hinges; which, when placed in the ſun's rays, directed them upon the Roman fleet, ſo as to reduce it to aſhes at the diſtance of a bow-ſhot." And the burning power of reflectors is mentioned in Euclid's Optics, theor. 31. Again, Ariſtophanes, in his comedy of The Clouds, introduces Socrates as examining Strepſiades about a method he had diſcovered of getting clear of his debts. He replies, that "he thought of making uſe of a burning-glaſs which he had hitherto uſed in kindling his fire; for ſhould they bring a writ againſt me, I'll immediately place my glaſs in the ſun at ſome little diſtance from it, and ſet it on fire." Pliny and Lactantius have alſo ſpoken of glaſſes that burn by refraction. The former calls them *balls* or *globes* of *cryſtal* or *glaſs*, which being expoſed to the ſun, tranſmit a heat ſufficient to ſet fire to cloth, or corrode the dead fleſh of thoſe patients who ſtand in need of cauſtics; and the latter, after Clemens Alexandrinus, obſerves that fire may be kindled by interpoſing glaſſes filled with water between the ſun and the object, ſo as to tranſmit the rays to it.

Among the ancients the moſt celebrated burning mirrors were thoſe of Archimedes and Proclus; by the former was burnt the fleet of Marcellus, as above mentioned; and by the latter, the navy of Vitellius, beſieging Byzantium, according to Zonaras was burnt to aſhes.

Among the moderns, the moſt remarkable burning-glaſſes are thoſe of Magine, of 20 inches diameter: of Sepatala of Milan, near 42 inches diameter, and which burnt at the diſtance of 15 feet; of Settala of Villette, of Tſchirnhauſen, of Buffon, of Trudaine, and of Parker.

Villette, a French artiſt at Lyons, made a large mirror, which was bought by Tavernier, and preſented to the king of Pruſſia; a ſecond, bought by the king of Denmark; a third, preſented to the Royal Academy by the king of France; and a 4th came to England, and was publicly ſhewn. This mirror is 47 inches wide, being a ſegment of a ſphere of 76 inches radius; ſo that its focus is about 38 inches from the vertex; and its ſubſtance is a compoſition of tin, copper, and tin-glaſs. Some of its effects were as follow:

	ſec.
A ſilver ſixpence melted in - - -	$7\frac{1}{2}$
A George the 1ſt's halfpenny in - - -	16
and runs with a hole in - - -	34
Tin melts in - - - - -	3
Caſt iron in - - - - -	16
Slate in - - - - -	3
A foſſil ſhell calcines in - - - -	7
Piece of Pompey's pillar vitrifies, the black part in	50
the white part in	54
Copper ore in - - - - -	8
Bone calcines in 4, and vitrifies in - -	33

An emerald melts into a ſubſtance like a torquois ſtone; a diamond weighing 4 grains loſes $\frac{7}{8}$ of its weight: the aſbeſtos vitrifies; as all other bodies will do if kept long enough in the focus; but when once vitrified, the mirror can go no farther with them. Philoſ. Tranſ. vol. iv. pa. 198.

Tſchirnhauſen's reflecting mirrors produced equally ſurpriſing effects; as they may be ſeen deſcribed in the Acta Erudit. for 1687, pa. 52. And other perſons have made very good ones of wood, ſtraw, paper, ice, and other ſubſtances capable of taking a proper form and poliſh.

Every lens, whether convex, plano-convex, or convexo-convex, collects the ſun's rays, diſperſed over its convexity, into a point by refraction; and it is therefore a burning-glaſs. The moſt conſiderable of this kind is that made by Tſchirnhauſen, and deſcribed in the ſame Acta Erudit. The diameters of his lenſes are from 3 to 4 feet, having the focus at the diſtance of 12 feet, and its diameter an inch and a half. To make the focus more vivid, the rays are collected a ſecond time, by a ſecond lens parallel to the firſt, and placed at ſuch a diſtance that the diameter of the cone of rays formed by the firſt lens is equal to the diameter of the ſecond; ſo that it receives them all; and the focus is reduced from an inch and a half to half the quantity, and conſequently its force is quadrupled. This glaſs vitrifies tiles, ſlates, pumice-ſtones, &c. in a moment. It melts ſulphur, pitch, and all roſins under water; the aſhes of vegetables, woods and other matters, are tranſmuted into glaſs; and every thing applied to its focus is either melted, changed into a calx, or into fumes. The author obſerves that it ſucceeds beſt when the matter applied is laid on a hard charcoal well burnt.—But though the force of the ſolar rays be thus found ſo ſurpriſing, yet the rays of the full moon, collected by the ſame burning-glaſs, do not ſhew the leaſt increaſe of heat.

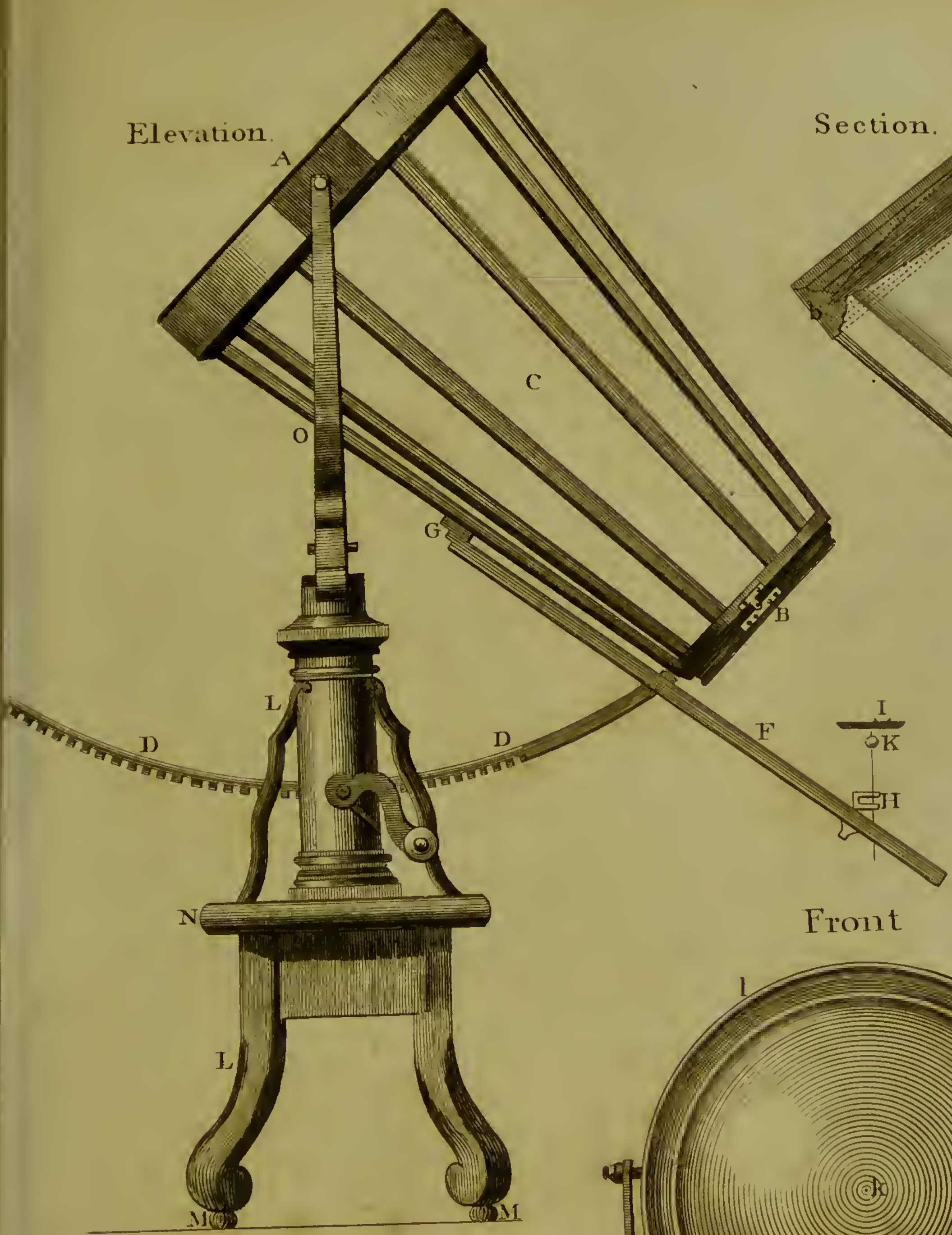
Sir Iſaac Newton preſented a burning-glaſs to the Royal Society, conſiſting of 7 concave glaſſes, ſo placed that all their foci join in one phyſical point. Each glaſs is about $11\frac{1}{2}$ inches diameter; ſix of them are placed contiguous to, and round the ſeventh, forming a kind of ſpherical ſegment, whoſe ſubtenſe is about $34\frac{1}{2}$ inches: the common focus is about $22\frac{1}{2}$ inches diſtant, and about an inch in diameter. This glaſs vitrifies brick or tile in 1 ſecond, and melts gold in 30 ſeconds.

M. Buffon alſo made a variety of very powerful burning-glaſſes, both as mirrors and as lenſes; but at length concluded with one which is probably of the ſame nature with that of Archimedes, and conſiſted of 400 mirrors reflecting their rays all to one point, and with which he could melt lead and tin at the diſtance of 140 feet; and with others he conſumed ſubſtances at the diſtance of 210 feet.

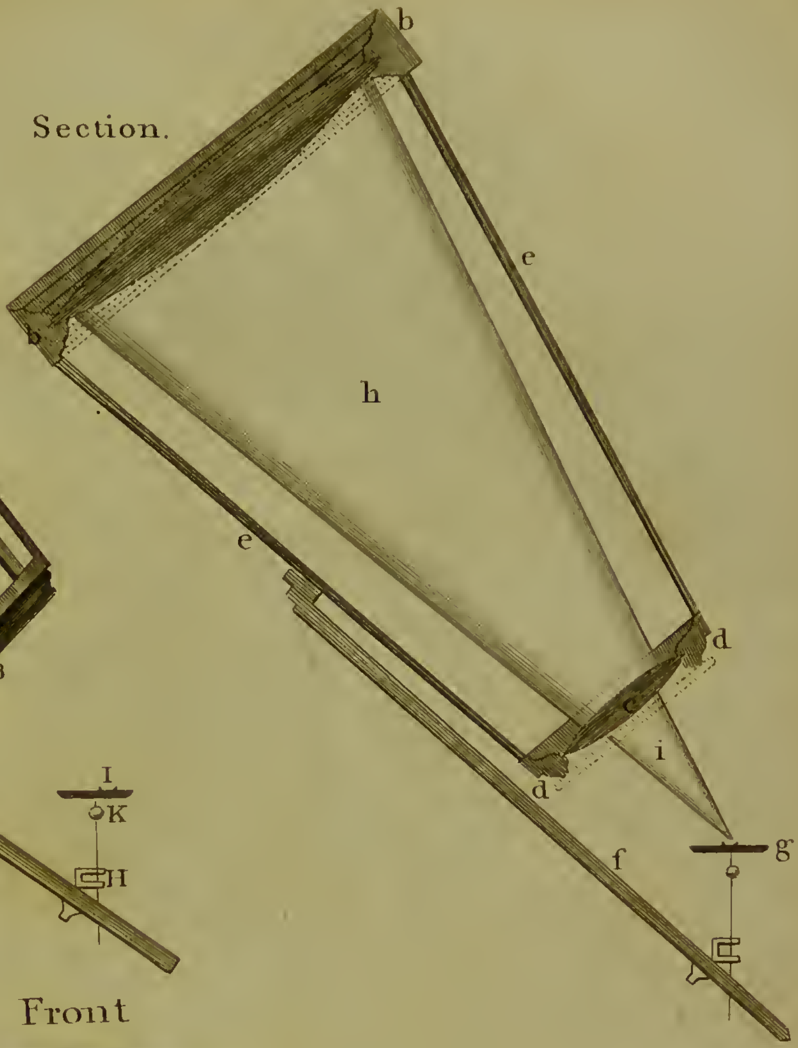
In Plate 60. fig. 1. we have given a repreſentation of M. Buffon's burning mirror. Each of the ſmall mirrors which compoſe it is moveable by a contrivance on the back part of the frame, ſo that their reflections may all coincide in one point. By this means they are capable of being accommodated to various heights of the ſun, and to different diſtances. The adjuſting them in this manner takes up a conſiderable time; but after they are ſo adjuſted, the focus will continue unaltered for an hour or more.

Fig. 2. repreſents a contrivance of M. Buffon's for diminiſhing the thickneſs of very large refracting lenſes. He obſerves, that in large lenſes of this kind, and which are moſt convenient for many purpoſes, the thickneſs of the glaſs in the middle is ſo great as very much to diminiſh their force. For this reaſon he propoſes to form a burning-glaſs of concentric circular pieces of glaſs, each reſting upon the other, as repreſented in the figure. His method is to divide the convex arch of the lens into three equal parts. Thus, ſuppoſe the diameter to be 26 inches, and the thickneſs in the middle to be three inches: By dividing the lens into three concentric circles, and laying the one over the other, the thickneſs of the middle piece need only be one inch; at the ſame time that the lens will

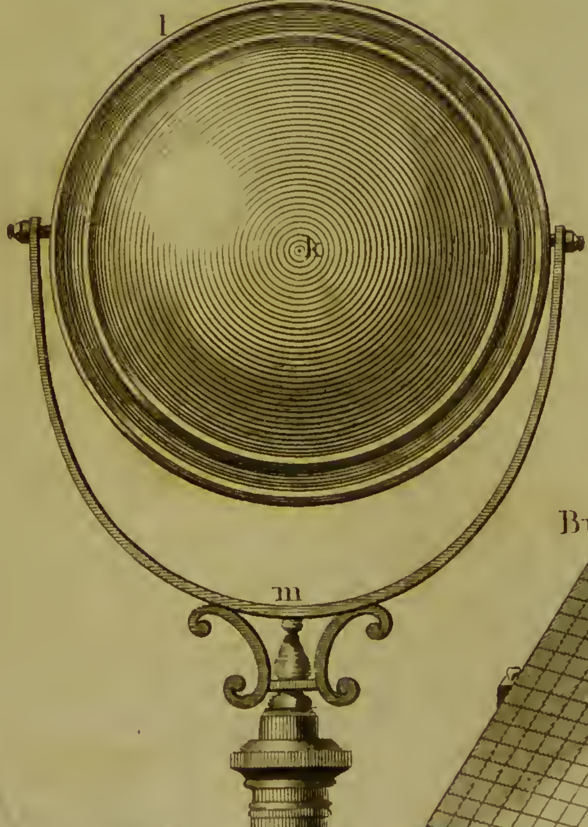
Elevation.



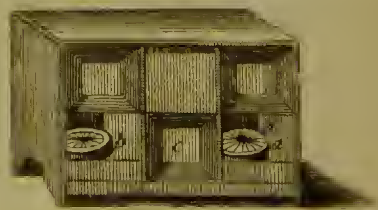
Section.

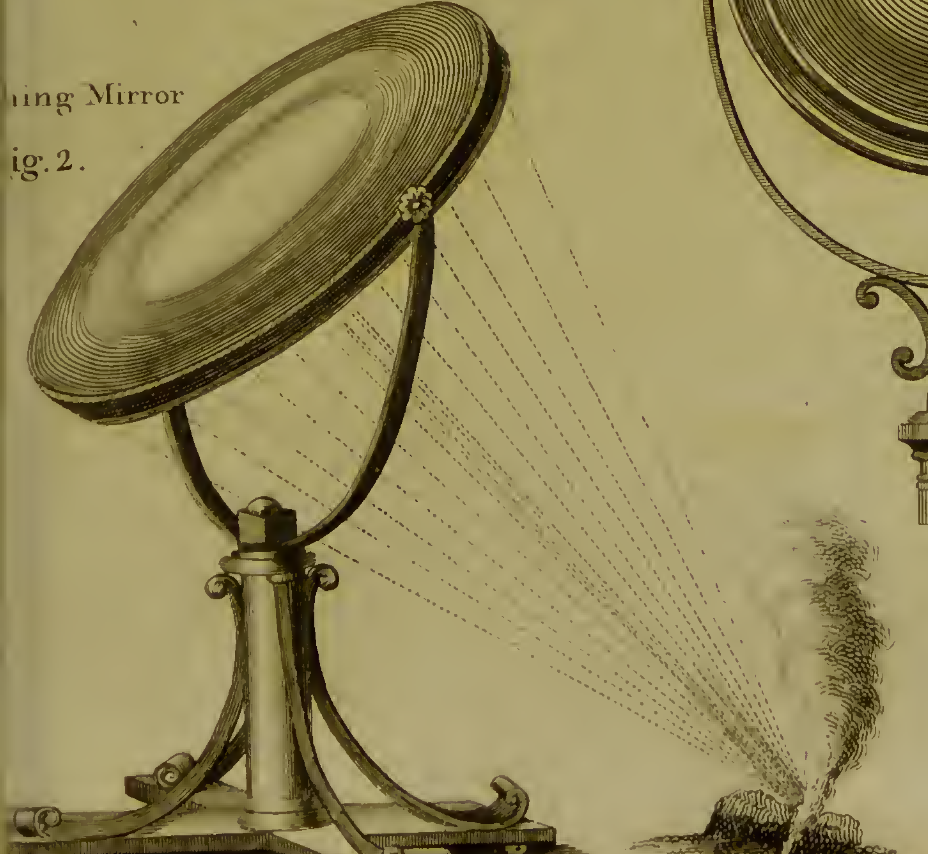


Front



Binnacle.



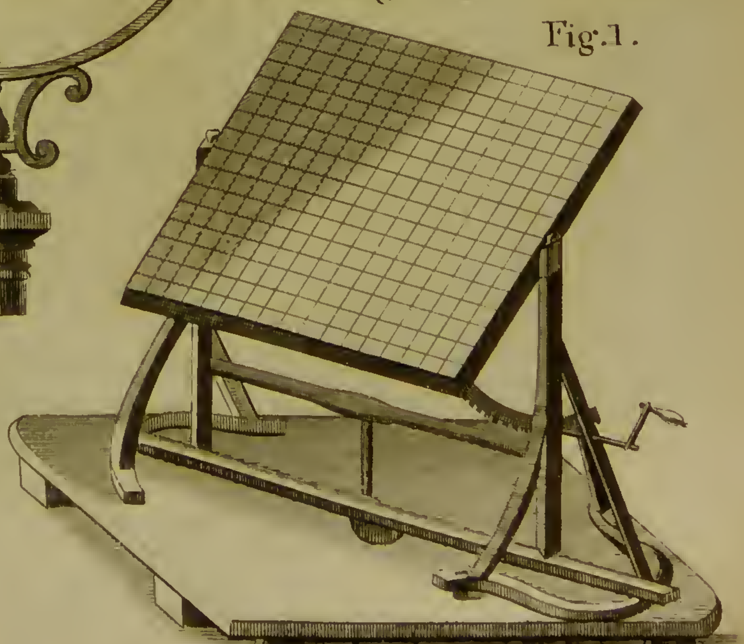


…ing Mirror

…ig. 2.

Burning Mirror of M.Buffon

Fig. 1.



have the fame convexity, and almoft the fame focal diftance, as in the other cafe; while the effects of it muft be much greater on account of the greater thinnefs of the glafs.

From a great number of experiments made with this lens, the following are felected to ferve as fpecimens of its powers:

Subftances fufed; with their weight, and time of fufion.	Time in fec	Wgt. in grs.
Scoria of wrought iron	2	12
Common flate	2	10
Silver, pure	3	20
Platina, pure	3	10
Nickell	3	16
Caft Iron, a cube	3	10
Kearfh	3	10
Gold, pure	4	20
Cryftal pebble	6	7
Cauk, or terra ponderofa	7	10
Lava	7	10
Afbeftos	10	10
Bar Iron, a cube	12	10
Steel, a cube	12	10
Garnet	17	10
Copper, pure	20	33
Onyx	23	10
Zeolites	23	10
Pumice Stone	24	10
Oriental Emerald	25	2
Jafper	25	10
White Agate	30	10
Flint, oriental	30	10
Topaz, or Chryfolite	45	3
Common Limeftone	55	10
White rhomboidal Spar	60	10
Volcanic Clay	60	10
Cornifh Moorftone	60	10
Rough Cornelian	75	10
Rotten Stone	80	10

In the *Elevation* reprefented in the plate, A is the lens of the diameter mentioned: thicknefs in the centre, 3 inches and one fourth: weight, 212 pounds: length of the focus, 6 feet 8 inches; diameter of ditto, 1 inch. B, a fecond lens, whofe diameter in the frame is 16 inches, and fhows in the clear 13 inches: thicknefs in the centre, 1 inch five eighths: weight 21 pounds: length of focus, 29 inches: diameter of ditto, three-eighths of an inch. When the two above lenfes are compounded together, the length of the focus is 5 feet 3 inches; diameter of ditto, half an inch. C, a truncated cone, compofed of 21 ribs of wood; at the larger end is fixed the great lens A, at the fmaller extremity the leffer lens B: near the fmaller end is alfo fixed a rack, D, paffing through the pillar L, moveable by a pinion turning in the faid pillar, by means of the handle E, and thus giving a vertical motion to the machine. F, a bar of wood, fixed between the two lower ribs of the cone at G; having, within a chaced mortice in which it moves, an apparatus, H, with the iron plate, I, fixed thereto; and this part turning on a ball and focket, K, a method is thereby obtained of placing the matter under experiment, fo as to be acted upon by the focal rays in the moft direct and powerful manner. L L, a ftrong mahogany frame, moving on caftors, MM. Immediately under the table N are three friction wheels, by which the machine moves horizontally. O, a ftrong iron bow, in which the lens and the cone hang.

In the *Section*, *a* is the great lens marked A in the elevation. *b*, The frame which contains the lens. *c*, The fmall lens marked B. *d*, The frame which contains the fmall lens. *e*, The truncated cone, marked C. *f*, The bar on which the apparatus marked F moves. *g*, The iron plate marked I. *h*, the cone of rays formed by the refraction of the great lens *a*, and falling on the lens *c*. *i*, The cone of rays formed by the refraction of the lens *c*. *Front-view*. *k*, The great lens. *l*, The frame containing it. *m*, The ftrong iron bow in which it hangs.

Burning Mountains. See Ætna, Etna, Hecla, Vesuvius, and Volcano, with the plates accompanying them.

Burning Springs. Of thefe there are many in different parts of the world; particularly one in Dauphiny near Grenoble; another near Hermanftadt in Tranfylvania; a third at Chermay, a village near Switzerland; a fourth in the canton of Friburg; and a fifth not far from the city of Cracow in Poland. There alfo is, or was, a famous fpring of the fame kind at Wigan in Lancafhire, which upon the approach of a lighted candle, would take fire and burn like fpirit of wine for a whole day. But the moft remarkable thing of this kind, or at leaft that of which we have the moft particular defcription, was difcovered in 1711 at Brofely in Shropfhire. An account of this extraordinary fpring was publifhed by the reverend Mr. Mafon, Woodwardian profeffor at Cambridge, in 1746. The caufe of this phenomenon is eafily explained, when we reflect, that the mud of a common pit when ftirred with a ftick, will fend up large bubbles of inflammable air, which would burn rapidly, if a candle were applied to it.

Burning *of Colours*, among painters. There are feveral colours that require burning; as, 1. Lamp-black, which is a colour of fo greafy a nature, that, except it is burnt, it will require a long time to dry. The method is, to put it into a crucible over a clear fire, and letting it remain till no manner of fmoke arifes from it. 2. Umber, which if intended for colouring a horfe, or as a fhadow for gold, fhould be put into the naked fire, in large lumps, and not taken out till it is thoroughly red hot. Some indeed prefer burning it in a crucible. 4. To make ivory black, fill two crucibles with pieces or fhavings of ivory, then clap their two mouths together, and bind them faft with an iron wire, and lute the joints clofe with clay, falt, and horfe-dung, well beaten together; then fet it over the fire, covering it all over with coals; let it remain in the fire till the matter inclofed is thoroughly red-hot: then take it out of the fire, but do not open the crucibles till they are perfectly cold; for were they opened while hot, the matter would turn to afhes; and fo it will be if the joints are not luted clofe. Common bone treated after this manner will make a very good black.

BURNISHER, a round polifhed piece of fteel, ferving to fmooth and give a luftre to metals. Of thefe there are different kinds of different figures, ftraight, crooked, &c. Half burnifhers are ufed to folder filver, as well as to give a luftre. Burnifhers for gold and filver are commonly made of a dog's or wolf's tooth, fet in the end of an iron or wooden handle. Of late, agates and pebbles have been introduced, which many prefer to the dog's tooth. The burnifhers ufed by engravers in copper, ufually have one end to burnifh with and the other to fcrape.

BURNISHING, is the art of fmoothing or polifhing a metalline body, by a brifk rubbing of it with a burnifher. Book binders burnifh the edges of their books, by rubbing them with a dog's tooth.

BURNLEY, a town of Lancafhire in England, fituated in W. long. 2. 5. N. lat. 51. 38.

BURNTWOOD, a town of Effex in England, fituated on a hill, in E. long. 0. 25. N. lat. 51. 38.

BURR, the round knob of a horn next a deer's head.

Burr-*Pump*, or Bildge-*Pump*. See Bildge.

BURRE, Bouree, or *Boree*, a kind of dance compofed of

three steps joined together in two motions, begun with a crotchet rising. The first couplet contains twice four measures, the second twice eight. It consists of a balance and coupee.

BURROCK, a small wier, or dam, where wheels are laid in a river, for the taking of fish.

BURROUGHS's MACHINE, for grinding and polishing plate glass; and for which the Society for the encouragement of arts gave the inventor a premium of 70l.

This machine consists of a cog-wheel A, Pl. 57. fig. 1. 12 feet in diameter, carrying 72 cogs; which turn a trundle-head B, one foot four inches in diameter, and furnished with eight rounds; and also an horizontal spur-wheel C, of 12 cogs, and one foot eight inches in diameter. The trundle-head B turns a spur-wheel D of ten cogs, and two feet eight inches in diameter. This spur-wheel has two cranks, *a b*, in its shaft; one of which *a* gives motion to a wooden frame *c*, about 34 inches long and 19 broad. On the under side of this frame are fastened by screws twelve pieces of polished metal, each five inches and a half long, and three broad, covered with leather; and underneath these polishers, a glass plate cemented in another frame is placed on the bench *d*, and polished with tripoli by the motion given to the upper frame by the crank *a*. The nuts of the screws which fasten the polishers to the upper frame are not screwed close to the wood, in order to give the frame room to play: by which contrivance the perpendicular rise of the crank is avoided, and the motion of the polishers always parallel and equal. The under frame may be moved by the hand in any direction without stopping the machine; by which means the plate, when larger than the polishing frame can cover in its motion, will be equally polished in every part.

The other crank *b* gives motion to two other polishers marked *n*, *o*, which have an alternate motion by the bending of the crank; they move upon the same plate, and have an equal number of polishers as that already described. The same crank also gives motion to a contrivance represented at *e* for polishing spectacle-glasses. It consists of two segments of the same sphere; one concave and the other convex. On the latter the glasses are cemented; and polished by the former, which is moved by the crank *b*. The convex segment may be moved round by the hand without stopping the machine, so that all the glasses on its superficies will be equally polished.

The other spur-wheel C, by means of a crank in its shaft, gives motion to another frame *g*, employed in grinding the glass plates. The rod *b*, extended from the crank *f* to the frame *g*, is fastened to the latter by means of a pivot, in order to admit of a rotatory motion, as well as that given it by the crank in a longitudinal direction. This rotatory motion is effected by means of a rod of iron *i*, called a *trigger*, sharp at the extremity next the frame, where it touches the teeth of an horizontal spur-wheel, or circular piece of wood, fixed on the grinding-plate, while the other end is extended three feet two inches to the centre of motion.

But this contrivance, in which the merit of the machine principally consists, will be much better conceived from a small delineation of it by itself (fig. 2.), where F is the crank marked *f* in fig. 1. and turned by the spur-wheel C in the same figure. G is the trigger, three feet two inches long. I, a roll fixed on the trigger for the rod to slide on. H, the horizontal spur-wheel, eleven inches in diameter, fixed on the grinding-plate, the teeth of which is touched by the trigger; but with a very unequal force, as it will wholly depend upon the grinding-plate's being farther from, or nearer to, the centre of motion of the trigger. By this simple contrivance, the grinding-plate has a very compound motion, never moving exactly in the same rack, and therefore must grind the plates equally in every part. Several attempts have been made by others for producing the same effect, but without success; the grinding-plate always following the same track, consequently the plates were ground unequally.

BURROW (Sir James), master of the crown office, was elected F. R. S. and F. A. S. in 1751. On the death of Mr. West in 1772, he was prevailed on to fill the president's chair at the Royal Society till the anniversary election, when he resigned it to Sir John Pringle; and August 10, 1773, when the Society presented an address to his Majesty, he received the honour of knighthood. He published two volumes of Reports in 1766; two others in 1771 and 1776; and a volume of Decisions of the Court of King's Bench upon settlement cases from 1732 to 1772 (to which was subjoined An Essay on Punctuation), in three parts, 4to, 1768, 1772, 1776. The essay was also printed separately in 4to, in 1773. He published, without his name, "A few Anecdotes and Observations relating to Oliver Cromwell and his family, serving to rectify several errors concerning him," published by Nicol. Comn. Papadopoli, in his *Historia Gymnasii Patavini*, 1763, 4to. He died in the year 1782.

BURROWS, holes in a warren, serving as a covert for rabbits, &c. A coney's coming out of her burrow is called *bolting*. To catch coneys, they sometimes lay purse-nets over the burrows, then put in a terrier close muzzled, which making the creature bolt, she is caught in the net.

BURROWSTOUNNESS, or BORROWSTOUNNESS, a seaport town of West Lothian, situated on the Forth, 18 miles west from Edinburgh. It is a small town, but has a considerable trade, and a very commodious harbour. Its exports in salt and coals are very great, and it has also several vessels employed in the Greenland fishery.

BURSA, or PRUSA, in geography, the capital of Bithynia in Asia Minor, situated in a fine fruitful plain, at the foot of mount Olympus, about 100 miles south of Constantinople. E. long. 29. 0. N. lat. 40. 30.

BURSA *Pastoris*, in botany. See THLASPI.

BURSA, *Burse*, originally signifies a purse. In middle-age writers it is more particularly used for a little college or hall in an university, for the residence of students, called *bursales* or *bursarii*. In the French universities it still denotes a foundation for the maintenance of poor scholars in their studies. The nomination to burses is in the hands of the patrons and founders. The burses of colleges, however, are not benefices, but mere places assigned to certain countries and persons. A burse becomes vacant by the burser's being promoted to a cure.

BURSÆ MUCOSÆ; small glands which secrete a mucus to lubricate the parts on which they are situated. See ANATOMY.

BURSAR, or BURSER, (*Bursarius*), is used in middle age writers for a treasurer or cash-keeper. In this sense we meet with bursars of colleges. Conventual bursars were officers in monasteries, who were to deliver up their accounts yearly on the day after Michaelmas. The word is formed from the Latin *bursa*, whence also the English word *purse*; hence also the officer, who in a college is called *bursar*, in a ship is called *purser*.

BURSARS, or *Bursors*, (*Bursarii*), also denote those to whom stipends are paid out of a burse or fund appointed for that purpose.

BURSARIA, the bursary, or exchequer of collegiate and conventual bodies; or the place of receiving, paying, and accounting by the bursarii or bursars.

BURSE, in matters of commerce, denotes a public edifice in certain cities, for the meeting of merchants to negotiate bills, and confer on other matters relating to money and trade. In this sense, burse amounts to the same with what we otherwise call an *exchange*. The first place of this kind to which the name *Burse* was given, Guicchardin assures us was at

Bruges: and it took its denomination from an hotel adjoining to it, built by a lord of the family de la Bourse, whose arms, which are three purses, are still found on the crowning over the portal of the house. Cattel's account is somewhat different, *viz.* that the merchants of Bruges bought a house or apartment to meet in, at which was the sign of the purse. From this city the name was afterwards transferred to the like places in others, as in Antwerp, Amsterdam, Bergen in Norway, and London. This last, anciently known by the name of the *common burse of merchants*, had the denomination since given it by queen Elizabeth, of the *royal exchange*. The most considerable burse is that of Amsterdam, which is a large building 230 feet long and 130 broad, round which runs a peristyle 20 feet wide. The columns of the peristyle, which are 46, are numbered, for the conveniency of finding people. It will hold 4500 persons. In the time of the Romans there were public places for the meeting of merchants in most of the trading cities of the empire; that built at Rome, in the 259th year after its foundation, under the consulate of Appius Claudius and Publius Servilius, was denominated the *college of merchants*; some remains of it are still to be seen, and are known by the modern Romans under the name *loggia*. The Hans towns, after the example of the Romans, gave the name of *colleges* to their burses.

BURSERA, in botany; a genus of the monogynia order, belonging to the hexandria class of plants. The calyx is triphyllous; the corolla tripetalous; the capsule, carnous, trivalved, and monospermous. There is but one species, the gummifera, or gum elemi. This is frequent in woods in most of the Bahama islands, and grows speedily to a great height and thickness. The bark is brown, and very like the birch of Britain. The wood is soft and useless, except when pieces of the limbs are put into the ground as fences, when it grows readily, and becomes a durable barrier. The leaves are pinnate, the middle rib five or six inches long, with the pinnæ set opposite to one another on footstalks half an inch long. It has yellow flowers, male and female on different trees. These are succeeded by purple-coloured berries bigger than large peas, hanging in clusters on a stalk of about five inches long, to which each berry is joined by a footstalk of half an inch long. The seed is hard, white, and of a triangular figure, inclosed within a thin capsule, which divides in three parts, and discharges the seed. The fruit, when cut, discharges a clear balsam or turpentine, esteemed a good medicine, particularly for horses. On wounding the bark, a thick milky liquor is obtained, which soon concretes into a resin no way different from the *gum elemi* of the shops. See AMYRIS, and Pl. 5. Dr. Browne, and after him Linnæus, have, according to Dr. Wright, mistaken the bark of the roots for the simarouba, which is a species of QUASSIA.

BURTON *upon* TRENT, a town of Staffordshire, in England. It had formerly a large abbey; and over the river Trent it has now a famous bridge of free stone, about a quarter of a mile in length, supported by 37 arches. It consists chiefly of one long street, which runs from the place where the abbey stood to the bridge; and has a good market for corn and provisions. Burton ale is reckoned the best of any brought to London. E. long. 1. 36. N. lat. 52. 48.

BURTON, a town of Lincolnshire in England, seated on a hill near the river Trent. It is but a small place, and situated in W. long. 0. 30. N. lat. 53. 40.

BURTON, a town of Westmoreland in England, seated in a valley near a large hill called *Farleton-knot-hill*. It is pretty well built, and lies on the great road from Lancaster to Carlisle. W. long. 2. 35. N. lat. 54. 10.

BURTON (Robert), known to the learned by the name of *Democritus junior*, was younger brother to William Burton, who wrote "The antiquities of Leicestershire;" and born of an ancient family at Lindley, in that county, upon the 8th of February 1576. He was a man of general learning; a great philosopher; an exact mathematician; and (what makes the peculiarity of his character) a very curious calculator of nativities. He was extremely studious, and of a melancholy turn; yet an agreeable companion, and very humorous. *The anatomy of melancholy*, by *Democritus junior*, as he calls himself, shows, that these different qualities were mixed together in his composition. This book was printed first in 4to, afterwards in folio, in 1624, 1632, 1638, and 1652, to the great emolument of the bookseller, who, as Mr. Wood tells us, got an estate by it. Some circumstances attending his death occasioned strange suspicions. He died in his chamber at or very near the time which, it seems, he had some years before predicted from the calculation of his nativity; and this exactness made it whispered about, that for the glory of astrology, and rather than his calculation should fail, he became indeed a *felo de se*. This, however, was generally discredited; he was buried with due solemnity in the cathedral of Christ-church, and had a fair monument erected to his memory. He left behind him a very choice collection of books. He bequeathed many to the Bodleian library; and 100l. to Christ-church, the interest of which was to be laid out yearly in books for their library. According to an account published in the Transactions of the Literary and Philosophical Society of Manchester, by Dr. Ferriar, it appears, that the celebrated Sterne borrowed many of his most beautiful passages from the Anatomy of Melancholy.

BURTON (John), D. D. a late worthy and learned divine, was born in 1696, at Wembworth, in Devonshire, his father being rector of that parish; and was educated at Corpus Christi college, Oxford. In 1725, being then pro-proctor and master of the schools, he spoke a Latin oration before the determining bachelor, which is intitled "*Heli*; or, An instance of a magistrate's erring through unseasonable lenity;" written and published with a view to encourage the salutary exercise of academical discipline. When the settling of Georgia was in agitation, Dr. Bray, justly revered for his institution of parochial libraries, Dr. Stephen Hales, Dr. Berriman, and other learned divines, entreated Mr. Burton's pious assistance in that undertaking. This he readily gave, by preaching before the society in 1733. About the same time, on the death of Dr. Edward Littleton, he was presented by Eton college to the vicarage of Maple-Derham, in Oxfordshire. Here a melancholy scene, which too often appears in the mansions of the clergy, presented itself to his view, a widow, with three infant daughters, without a home, without a fortune. From his compassion arose love, the consequence of which was marriage; for Mrs. Littleton was handsome, elegant, accomplished, ingenious, and had great sweetness of temper. In 1760, he exchanged his vicarage of Maple-Derham, for the rectory of Worplesdon in Surry. In his advanced age, finding his eyes begin to fail him, he collected and published, in one volume, all his scattered pieces, under the title of *Opuscula miscellanea*; and soon after died, February 11th, 1771.

BURTON, in the sea-language, a small tackle consisting of two single blocks, that may be made fast any where at pleasure, for hoisting small things in and out.

BURY, is sometimes used to denote the hole or den of some animal under ground. In this sense we say the *bury* of a mole, a tortoise, or the like. The grillotalpa, or mole-cricket, digs itself a bury with its forefeet, which are made broad and strong for that purpose. Naturalists speak of a kind of urchins in the island of Maraguan, which have two entries to their buries, one towards the north, the other to the south, which they open and shut alternately as the wind happens to lie.

Bury, in geography, a market town of Lancashire, about 30 miles south-east of Lancaster. It is a barony in the family of Albemarle. W. long. 2. 20. N. lat. 53. 36.

Bury (St. Edmund's), or *St. Edmund's bury*, the county town of Suffolk, about 12 miles east of New-market, and 70 north-east of London. E. long. 0. 45. N. lat. 52. 20.

BURYING, the same with interment or Burial. *Burying Alive* was the punishment of a vestal who had violated her vow of virginity. The unhappy priestess was let down into a deep pit, with bread, water, milk, oil, a lamp burning, and a bed to lie on. But this was only for shew; for the moment she was let down, they began to cast in the earth upon her till the pit was filled up. Some middle age writers seem to make burying alive (*defossio*) the punishment of a woman thief. Lord Bacon gives instances of the resurrection of persons who have been buried alive. The famous Duns Scotus is of the number; who, having been seized with a catalepsis, was thought dead, and laid to sleep among his fathers, but raised again by his servant in whose absence he had been buried. Bartholin gives an account of a woman, who, on recovering from an apoplexy, could not be convinced but that she was dead, and solicited so long and so earnestly to be buried, that they were forced to comply; and performed the ceremonies, at least in appearance. The famous emperor Charles V. after his abdication, took it in his head to have his burial celebrated in his lifetime, and assisted at it.

Burying *Place*. The ancients buried out of cities and towns; an usage which we find equally among Jews, Greeks, and Romans. Among the last, burying within the walls was expressly prohibited by a law of the 12 tables. The usual places of interment were in the suburbs and fields, but especially by the way-sides. We have instances, however, of persons buried in the city; but it was a favour allowed only to a few of singular merit in the commonwealth. Plutarch says, those who had triumphed were indulged in it. Be this as it will, Val. Publicola and C. Fabricius are said to have had tombs in the forum; and Cicero adds Tubertus to the number. Lycurgus allowed his Lacedemonians to bury their dead within the city and around their temples, that the youth, being inured to such spectacles, might be the less terrified with the apprehension of death. Two reasons are alleged why the ancients buried out of cities: the first, an opinion, that the sight, touch, or even neighbourhood, of a corpse defiled a man, especially a priest; whence that rule in A. Gellius, that the *flamen Dialis* might not on any account enter a place where there was a grave: the second, to prevent the air from being corrupted by the stench of putrefied bodies, and the buildings from being endangered by the frequency of funeral fires. Burying in churches was not allowed for the first 300 years after Christ; and the same was severely prohibited by the Christian emperors for many ages afterwards. The first step towards it appears to have been the practice of erecting churches over the graves of some martyrs in the country, and translating the relics of others into churches in the city: the next was, allowing kings and emperors to be buried in the atrium or church-porch. In the 6th century, the people began to be admitted into the church-yards; and some princes, founders, and bishops, into the church. From that time the matter seems to have been left to the discretion of the bishop of the diocese.

BUSBEC (Augur Gislen, lord of), a person illustrious on account of his embassies, was born at Comines, in the year 1522; and educated at the most famous universities, at Louvain, at Paris, at Venice, at Bologna, and at Padua. He was engaged in several important employments and negotiations. His Discourse of the state of the Ottoman empire, and his Relation of his two journeys to Turkey are much esteemed. He died in 1592.

BUSBY (Dr. Richard), son of a gentleman in Westminster, was born at Lutton in Lincolnshire, in 1606. He passed through the classes in Westminster school, as king's scholar; and completed his studies at Christ-church, Oxford. In 1640, he was appointed master of Westminster school; and by his skill and diligence in the discharge of this important and laborious office, for the space of 55 years, bred up the greatest number of eminent men in church and state that ever at one time adorned any age or nation. He was extremely severe in his school; though he applauded wit in his scholars, even when it reflected on himself. This great man, after a long and healthy life purchased by temperance, died in 1695, aged 89; and was buried in Westminster abbey, where there is a fine monument erected for him, with a Latin inscription. He composed several books for the use of his school.

BUSH (Paul), the first bishop of Bristol, became a student in the university of Oxford about the year 1513, and in 1518 took the degree of bachelor of arts. He afterwards became a brother of the order called *bonhoms*; of which, after studying some time among the friars of St. Austin (now Wadham college), he was elected provincial. In that station he lived many years; till at length king Henry VIII. being informed of his great knowledge in divinity and physic, made him his chaplain, and in 1542 appointed him to the new episcopal see of Bristol: but having in the reign of Edward VI. taken a wife, he was, on the accession of Mary, deprived of his dignity, and spent the remainder of his life in a private station at Bristol, where he died in the year 1558, aged 68, and was buried on the north side of the choir of the cathedral. Wood says, that while he was a student at Oxford, he was numbered among the celebrated poets of that university; and Pits gives him the character of a faithful catholic, his want of chastity notwithstanding. He wrote, 1. An exhortation to Margaret Burges, wife to John Burges, clothier, of King's-wood, in the county of Wilts. Lond. printed in the reign of Edward VI. 8vo. 2. Notes on the Psalms. 3. Treatise in praise of the cross. 4. Answer to certain queries concerning the abuses of the mass. Records, No. 25. 5. Dialogues between Christ and the Virgin Mary. 6. Treatise of salves and curing remedies. 7. A little treatise in English, called *The extirpation of ignorancy*, &c. in verse, Lond. by Pinson, 4to. 8. *Carmina diversa*.

BUSH, a term used for several shrubs of the same kind growing close together: thus we say, a *furze-bush*, *bramble-bush*, &c. The term is sometimes used, in a more general sense, for any assemblage of thick branches interwoven and mixed together.

Bush also denotes a coronated frame of wood hung out as a sign at taverns. It takes the denomination from hence, that, anciently, signs where wine was sold were *bushes* chiefly of ivy, cypress, or the like plant, which keeps its verdure long. And hence the English proverb, "Good wine needs no *bush*."

Burning-Bush, that bush wherein the Lord appeared to Moses at the foot of mount Horeb, as he was feeding his father-in-law's flocks.

BUSHEL, a measure of capacity for things dry; as grains, pulse, dry fruits, &c. containing four pecks, or eight gallons, or one-eighth of a quarter. Du Cange derives the word from *bussellus*, *bustellus*, or *bissellus*, a diminutive of *buz*, or *buza*, used in the corrupt Latin for the same thing; others derive it from *bussulus*, an *urn*, wherein lots were cast; which seems to be a corruption from *buxulus*. *Bussellus* appears to have been first used for a liquid measure of wine, equal to eight gallons. *Octo libræ faciunt galonem vini, & octo galones vini faciunt* bussellum *London, quæ est octava pars quarterii.* It was soon after transferred to the dry measure of corn of the same quantity.—*Pondus octo librarum frumenti facit* bussellum, *de quibus octo consistit quarterium.*

By 12 Hen. VII. cap. 5. a bufhel is to contain eight gallons of wheat; the gallon eight pounds of wheat troy-weight; the pound twelve ounces troy-weight; the ounce twenty fterlings; and the fterling thirty-two grains, or corn of wheat, growing in the midft of the ear. This ftandard bufhel is kept in the Exchequer; when being filled with common fpring water, and the water meafured before the houfe of commons in 1696, in a regular parallelopiped, it was found to contain 2145,6 folid inches; and the faid water being weighed, amounted to 1131 ounces and 14 penny weights troy. Befides the ftandard or legal bufhel, we have feveral local bufhels, of different dimenfions in different places. At Abingdon and Andover, a bufhel contains nine gallons; at Appleby and Penrith, a bufhel of peafe, rye, and wheat, contains 16 gallons; of barley, big, malt, mixt malt, and oats, 20 gallons. A bufhel contains, at Carlifle, 24 gallons; at Chefter, a bufhel of wheat, rye, &c. contains 32 gallons, and of oats 40; at Dorchefter, a bufhel of malt and oats contains 10 gallons; at Falmouth, the bufhel of ftricken coals is 16 gallons, of other things 20, and ufually 21 gallons; at Kingfton upon Thames, the bufhel contains eight and a half; at Newbury, 9; at Wycomb and Reading, eight and three-fourths; at Stamford, 16 gallons. Houghton Collect. tom. i. n. 46. p. 42. See MEASURE and WEIGHT.

BUSKIN, a kind of fhoe, fomewhat in manner of a boot, and adapted to either foot, and worn by either fex. This part of drefs, covering both the foot and mid-leg, was tied underneath the knee; it was very rich and fine, and principally ufed on the ftage by actors in tragedy. It was of a quadrangular form; and the fole was fo thick, as that, by means thereof, men of the ordinary ftature might be raifed to the pitch and elevation of the heroes they perfonated. The colour was generally purple on the ftage; herein it was diftinguifhed from the fock worn in comedy, that being only a low common fhoe. The bufkin feems to have been worn not only by actors but by girls, to raife their height; travellers and hunters alfo made ufe of it, to defend themfelves from the mire. In claffic authors, we frequently find the bufkin ufed to fignify tragedy itfelf, in regard it was a mark of tragedy on the ftage. It was alfo to be underftood for a lofty ftrain or high ftyle.

BUSS, in maritime affairs, a fmall fea-veffel, ufed by us and the Dutch in the herring fifhery, commonly from 48 to 60 tons burden, and fometimes more: a bufs has two fmall fheds or cabins, one at the prow and the other at the ftern; that at the prow ferves for a kitchen. Every bufs has a mafter, an affiftant, a mate, and feamen in proportion to the veffel's bignefs; the mafter commands in chief, and without his exprefs orders the nets cannot be caft nor taken up; the affiftant has the command after him; and the mate next, whofe bufinefs it is to fee the feamen manage their rigging in a proper manner, to mind thofe who draw in their nets, and thofe who kill, gut, and cure the herrings, as they are taken out of the fea: the feamen do generally engage for a whole voyage in the lump. The provifion which they take on board the buffes, confifts commonly of bifket, oat-meal, and dried or falt fifh; the crew being content for the reft with what frefh fifh they catch. See FISHERIES.

BUST, or BUSTO, in Sculpture, denotes the figure or portrait of a perfon in relievo, fhowing only the head, fhoulders, and breaft, the arms being lopped off; ordinarily placed on a pedeftal, or confole. In fpeaking of an antique, we fay the head is marble, and the buft porphyry, or bronze, that is, the breaft and fhoulders. Felibien obferves, that though in painting, one may fay a figure appears in bufto, yet it is not properly called a *buft*, that word being confined to things in relievo. The buft is the fame with what the Latins called *Herma*, from the Greek Hermes, Mercury, the image of that god being frequently reprefented in this manner among the Athenians.—Buft is alfo ufed, efpecially by the Italians, for the trunk of an human body, from the neck to the hips.

BUSTA *Gallica*, was a place in ancient Rome, wherein the bones of the Gauls, who firft took the city, and were flain by Camillus, were depofited. It differed from

BUSTA *Gallorum*, a place on the Apennines, thus called by reafon of many thoufands of Gauls killed there by Fabius.

BUSTARD, in ornithology. See OTIS.

BUSTUARIÆ MOECHÆ, according to fome, women that were hired to accompany a funeral and lament the lofs of the deceafed: but others are of opinion, that they were rather the more common proftitutes, that ftood among the tombs, graves, and other fuch lonely places.

BUSTUARII, in Roman antiquity, gladiators who fought about the buftum or funeral pile of a perfon of diftinction, that the blood which was fpilt might ferve as a facrifice to the infernal gods, and render them more propitious to the manes of the deceafed. This cuftom was introduced in the room of the more inhuman one of facrificing captives at the buftum, or on the tombs of warriors.

BUSTUM, in antiquity, denotes a pyramid or pile of wood, whereon were anciently placed the bodies of the deceafed, in order to be burnt. The Romans borrowed the cuftom of burning their dead from the Greeks. The deceafed, crowned with flowers, and dreffed in his richeft habits, was laid on the buftum. Some authors fay, it was only called *buftum*, after the burning, *quafi bene uftum*: before the burning it was more properly called *pyra*; during it, *rogus*: and afterwards, *buftum*. When the body was only burnt there, and buried elfewhere, the place was not properly called *buftum*, but *uftrina*, or *uftrinum*.

BUSTUM, in the Campus Martius, was a ftructure whereon the emperor Auguftus firft, and, after him, the bodies of his fucceffors were burnt. It was built of white ftone, furrounded with an iron palifade, and planted withinfide with alder trees.

BUSTUM was alfo figuratively applied to denote any tomb. Whence thofe phrafes, *facere buftum*, *violare buftum*, &c.

BUSTUM *of an altar*, was the hearth or place where the fire was kindled.

BUTCHER, a perfon who flaughters cattle for the ufe of the table, or who cuts up and retails the fame. Among the ancient Romans, there were three kinds of eftablifhed butchers, whofe office it was to furnifh the city with the neceffary cattle, and to take care of preparing and vending their flefh. The fuarii provided hogs; the pecuarii or boarii, other cattle, efpecially oxen; and under thefe was a fubordinate clafs, whofe office was to kill, called *lanii*, and *carnifices*.

To exercife the office of butcher among the Jews with dexterity, was of more reputation than to underftand the liberal arts and fciences. They have a book concerning fhamble-conftitution; and in cafe of any difficulty, they apply to fome learned rabbi for advice: nor was any allowed to practife this art, without a licence in form; which gave the man, upon evidence of his abilities, a power to kill meat, and others to eat what he killed; provided he carefully read every week for one year, and every month the next year, and once a quarter during his life, the conftitution abovementioned.

We have fome very good laws for the better regulation and preventing the abufes committed by butchers. A butcher that fells fwine's flefh meafled, or dead of a diftemper, for the firft offence fhall be amerced; for the fecond, have the pillory; for the third, be imprifoned, and make fine; and for the fourth, abjure the town. Butchers not felling meat at reafonable prices, fhall forfeit double the value, leviable by warrant of two juftices of the peace. No butcher fhall kill any flefh in his fcalding-houfe, or within the walls of London, on pain to

forfeit for every ox fo killed, 12d. and for every other beaft 8d. to be divided betwixt the king and the profecutor.

Butcher-*Bird*, in ornithology. See Lanius.

Butcher-*Broom*, in botany. See Ruscus.

Butcher's-*Ifland*, in the Eaft Indies, a fmall ifland about two miles long, and fcarcely one broad. It has its name from cattle being kept there for the ufe of Bombay, from which it is about three miles diftant. It has a fmall fort, but of very little confequence.

BUTESHIRE, a county of Scotland, confifting of the iflands of Bute, Arran, and Inchmarnoc, which lie in the frith of Clyde. to the S. of Argylefhire. They are fertile in corn and paftures, and there is a confiderable herring-fifhery. This fhire fends a member to parliament alternately with Caithnefs, though that county lies at the diftance of above 150 miles to the N. E.

BUTEO, in ornithology, the trivial name of a fpecies of Falco.

BUTLER (Charles), a native of Wycomb in the county of Bucks, and a mafter of arts in Magdalen college, Oxford, publifhed a book with this title, "The principles of mufic in finging and fetting; with the two-fold ufe thereof, ecclefiaftical and civil." Quarto, London 1636. The author of this book was a perfon of fingular learning and ingenuity, which he manifefted in fundry other works enumerated by Wood in the *Athen. Oxon.*

Butler (Samuel), a celebrated poet of the laft century, was the fon of a reputable Worcefterfhire farmer, and born in 1612. He paffed fome time at Cambridge, but was never matriculated in that univerfity. Returning to his native country, he lived fome years as clerk to a juftice of peace; where he found fufficient time to apply himfelf to hiftory, poetry, and painting. Being recommended to Elizabeth countefs of Kent, he enjoyed in her houfe, not only the ufe of all kinds of books, but the converfation of the great Mr. Selden, who often employed Butler to write letters, and tranflate for him. He lived alfo fome time with Sir Samuel Luke, a gentleman of an ancient family in Bedfordfhire, and a famous commander under Oliver Cromwell: and he is fuppofed at this time to have written, or at leaft to have planned, his celebrated *Hudibras*; and under that character to have ridiculed the knight. The poem itfelf furnifhes this key; where, in the firft canto, Hudibras fays,

> " 'Tis fung, there is a valiant mamaluke
> " In foreign land yclep'd — —
> " To whom we oft have been compar'd
> " For perfon, parts, addrefs, and beard."

After the reftoration, Mr. Butler was made fecretary to the earl of Carbury, lord-prefident of Wales, who appointed him fteward of Ludlow caftle, when the court was revived there. No one was a more generous friend to him than the earl of Dorfet and Middlefex, to whom it was owing that the court relifhed his *Hudibras*. He had promifes of a good place from the earl of Clarendon, but they were never accomplifhed; though the king was fo much pleafed with his poem, as often to quote it pleafantly in converfation. It is indeed faid, that Charles ordered him a gift of 3000l. but the fum being expreffed in figures, fomebody through whofe hands the order paffed, by cutting off a cypher, reduced it to 300l. which, though it paffed the offices without fees, proved not fufficient to pay what he then owed; fo that Butler was not a fhilling the better for the king's bounty. He died in 1680: and though he met with many difappointments, was never reduced to any thing like want, nor did he die in debt. Mr. Granger obferves, that Butler "ftands without rival in burlefque poetry. His Hudibras (fays he) is, in its kind, almoft as great an effort of genius, as the Paradife Loft itfelf. It abounds with uncommon learning, new rhimes, and original thoughts. Its images are truly and naturally ridiculous. There are many ftrokes of temporary fatire, and fome characters and allufions which cannot be difcovered at this diftance of time."

Butler (Jofeph), bifhop of Durham, a prelate of moft diftinguifhed piety, born 1692. His deep learning and comprehenfive mind appear fufficiently in his writings, particularly in his work intituled, "The Analogy of Religion natural and revealed to the conftitution and courfe of Nature." He died in 1752.

Butler, the name anciently given to an officer in the court of France, being the fame as the grand echanfon, or great cupbearer of the prefent times.

Butler, in the common acceptation of the word, is an officer in the houfes of princes and great men, whofe principal bufinefs is to look after the wine, plate, &c.

BUTLERAGE of wine, is a duty of 2s. for every ton of wine imported by merchants ftrangers; being a compofition in lieu of the liberties and freedoms granted to them by king John and Edward I. by a charter called *charta mercatoria*. Butlerage was originally the only cuftom that was payable upon the importation of wines, and was taken and received by virtue of the regal prerogative, for the proper ufe of the crown. But for many years paft, there having been granted by parliament fubfidies to the kings of England, and the duty of butlerage not repealed, but confirmed, they have been pleafed to grant the fame away to fome nobleman, who, by virtue of fuch grant, is to enjoy the full benefit and advantage thereof, and may caufe the fame to be collected in the fame manner that the kings themfelves were formerly wont to do.

BUTMENT. Butments of arches are the fame with buttreffes. They anfwer to what the Romans call *fublicas*, the French *culées* and *butées*.

Butments, or *Abutments*, of a bridge, denote the two maffives at the end of a bridge, whereby the two extreme arches are fuftained and joined with the fhore on either fide. See Architecture.

BUTOMUS, the flowering-rush, or *water-gladiole*: a genus of the hexagynia order, belonging to the enneandria clafs of plants. There is no calyx, but it has fix petals, and as many monofpermous capfules. There is but one fpecies, *viz.* the umbellatus; of which there are two varieties, the one a white, the other with a rofe-coloured flower. Though common plants, they are very pretty, and are worth propagating in a garden where there is conveniency for an artificial bog, or where there are ponds of ftanding water, as is many times the cafe. Where thefe conveniences are wanting, they may be planted in cifterns, which fhould be kept filled with water, with about a foot thicknefs of earth in the bottom; and into this earth the roots fhould be planted, or the feeds fown as foon as they are ripe.

BUTRINTO, a port-town of Epirus, or Canina, in Turkey in Europe, fituated oppofite to the ifland of Corfu, at the entrance of the gulph of Venice. E. long. 20. 40. N. lat. 39. 45.

BUTT is ufed for a veffel, or meafure of wine, containing two hogfheads, or 126 gallons; otherwife called a *pipe*. A butt of currants is from 1500 to 2200 weight.

Butt, or *Butt-ends*, in the fea-language, are the fore-ends of all planks under water, as they rife, and are joined one end to another.—Butt-ends in great fhips are moft carefully bolted; for if any one of them fhould fpring or give way, the leak would be very dangerous, and difficult to ftop.

Butts, the place where archers meet with their bows and arrows to ſhoot at a mark, which we call ſhooting at the *butts*: (See Archery.)—*Butts* are alſo the ſhort pieces of land in arable ridges and furrows.

BUTTER, a fat unctuous ſubſtance, prepared from milk by beating or churning. It was late before the Greeks attained any notion of butter; their poets make no mention of it, and yet are frequently ſpeaking of milk and cheeſe. The Romans uſed butter no otherwiſe than as a medicine, never as a food. The ancient Chriſtians of Egypt burnt butter in their lamps inſtead of oil; and in the Roman churches, it was anciently allowed, during Chriſtmas time, to burn butter inſtead of oil, on account of the great conſumption of it otherwiſe.

Butter is the fat, oily, and inflammable part of the milk. This kind of oil is naturally diſtributed through all the ſubſtance of the milk in very ſmall particles, which are interpoſed betwixt the caſeous and ſerous parts, amongſt which it is ſuſpended by a ſlight adheſion, but without being diſſolved. It is in the ſame ſtate in which oil is in emulſions: hence the ſame whiteneſs of milk and emulſions; and hence, by reſt, the oily parts ſeparate from both theſe liquors to the ſurface, and form a cream. When butter is in the ſtate of cream, its proper oily parts are not yet ſufficiently concentrated to form an homogeneous maſs. Whilſt ſeparated by the interpoſition of a large quantity of ſerous particles, the butter cannot be completely formed, but by preſſing out theſe heterogeneous parts by means of continued percuſſion by the well-known operation of churning, it then becomes an uniform ſoft maſs.

Freſh butter, which has undergone no change, has ſcarcely any ſmell; its taſte is mild and agreeable, it melts with a weak heat, and none of its principles are diſengaged by the heat of boiling water. Theſe properties prove, that the oily part of butter is of the nature of mild oils obtained from many vegetable ſubſtances by expreſſion. Butter is conſtantly uſed in food; but to be wholeſome, it muſt be very freſh and free from rancidity; neither ſhould it be fried or burnt, otherwiſe it cannot fail of diſordering the ſtomach. Some perſons indeed have ſtomachs ſo delicate, that they are even affected with inconveniences by the uſe of freſh butter and milk; and this obſervation is alſo applicable to all kinds of oil, fat, chocolate, and in general to all ſimilar matters.

After churning ſufficiently, the butter ſhould be taken out with both hands from the butter-milk, and laid in a clean bowl, or earthen pan. If the butter be deſigned to be uſed ſweet, fill the pan with clear water, and work the butter in it to and fro, till it is brought to a firm conſiſtence; after which it muſt be ſcotched and ſliced through and through with the point of a knife in every direction, in order to fetch out hairs, motes, or bits of rag, that may have happened to fall into it. It is then to be ſpread thin in a bowl, and worked well together, with ſuch a quantity of ſalt, as you think fit, afterwards making it up into pounds, half pounds, &c.

The trade in butter is very conſiderable. Some compute 50,000 tons annually conſumed in London. It is chiefly made within 40 miles round the city. Fifty thouſand firkins are ſaid to be ſent yearly from Cambridge and Suffolk alone; each firkin containing 56 lbs. Utoxeter in Staffordſhire is a market famous for good butter, inſomuch that the London merchants have eſtabliſhed a factory there for that article. It is bought by the pot, of a long cylindrical form, weighing 14 lb. But no butter is eſteemed equal to that which is made in the county of Eſſex, well known by the name of Epping butter, and which in almoſt every ſeaſon of the year yields at London from one ſhilling to 14d. per pound avoirdupois. The following directions concerning the making and management of butter, including the Epping method, are extracted from the 3d volume of the Bath Society's Papers.

It is for the moſt part to be obſerved, that the greater the quantity of butter made from a few cows, the greater will be the farmer's profit; therefore he ſhould never keep any cows but what are eſteemed good milkers. A bad cow will be equally expenſive in her keep, and will not perhaps, by the butter and cheeſe that is made from her, bring in more than from three to ſix pounds a-year; whereas a good one will bring from ſeven to ten pounds per annum; therefore it is obvious that bad cows ſhould be parted with, and good ones purchaſed in their room. When ſuch are obtained, a good ſervant ſhould be employed to milk them; as through the neglect and miſmanagement of ſervants, it frequently happens that the beſt cows are ſpoiled. Farmers however ſhould never truſt entirely to ſervants, but ſometimes ſee themſelves that their cows are milked clean; for if any milk is ſuffered to remain in the udder, the cow will daily give leſs, till at length ſhe will become dry before the proper time, and the next ſeaſon ſhe will ſcarcely give milk ſufficient to pay for her feed.

It ſometimes happens that ſome of a cow's teats may be ſcratched or wounded ſo as to produce foul milk: when this is the caſe, we ſhould by no means mix it with the clean milk, but give it to the pigs; and that which is conveyed to the dairy-houſe ſhould remain in the pail till it is nearly cool, before it be ſtrained, that is, if the weather be warm; but in froſty weather it ſhould be immediately ſtrained, and a ſmall quantity of boiling water may be mixed with it, which will cauſe it to produce cream in abundance, and the more ſo if the pans employed have a large ſurface.

During the hot ſummer-months, it is right to riſe with or before the ſun, that the cream may be ſkimmed from the milk ere the dairy becomes warm; nor ſhould the milk at that ſeaſon ſtand longer in the pans than 24 hours, nor be ſkimmed in the evening till after ſun-ſet. In winter, milk may remain unſkimmed for 36 or 48 hours: the cream ſhould be depoſited in a deep pan, which ſhould be kept during the ſummer in the coldeſt part of the dairy; or in a cool cellar, where a free air is admitted, which is ſtill better. Where people have not an opportunity of churning every other day, they ſhould ſhift the cream daily into clean pans, which will keep it cool, but they ſhould never fail to churn at leaſt twice in the week in hot weather; and this work ſhould be done in a morning before the ſun appears, taking care to fix the churn where there is a free draught of air. If a pump-churn be to be uſed, it may be plunged a foot-deep into a tub of cold water, and ſhould remain there during the whole time of churning, which will very much harden the butter. A ſtrong rancid flavour will be given to butter, if we churn ſo near the fire as to heat the wood in the winter ſeaſon.

After the butter is churned, it ſhould be immediately waſhed in many different waters till it is perfectly cleanſed from the milk. Butter will require more working in winter than in ſummer; but it is remarked, that no perſon whoſe hand is warm by nature makes butter to look well to the eye.

Thoſe who uſe a pump-churn muſt endeavour to keep a regular ſtroke; nor ſhould they admit any perſon to aſſiſt them, except they keep nearly the ſame ſtroke: for if they churn more ſlowly, the butter will in the winter *go back*, as it is called; and if the ſtroke be more quick and violent in the ſummer, it will cauſe a fermentation, by which means the butter will imbibe a very diſagreeable flavour. Where people keep many cows, a barrel-churn is to be preferred; but if this be not kept very clean, the bad effects will be diſcovered in the butter; nor muſt we forget to ſhift the ſituation of the churn when we uſe it, as the ſeaſons alter, ſo as to fix it in a warm place in winter, and where there is a free air in ſummer. There are ſome improved churns that are not unworthy of the farmer's attention. See the article Churn.

In many parts of this kingdom they colour their butter in

winter, but this adds nothing to its goodnefs; and it rarely happens that the farmers in or near Epping ufe any colour, but when they do, it is very innocent. They procure fome found carrots, whofe juice they exprefs through a fieve, and mix with the cream when it enters the churn, which makes it appear like May butter; nor do they at any time ufe much falt, though a little is abfolutely neceffary.

As they make in that country but very little cheefe, fo of courfe very little whey-butter is made: nor indeed fhould any perfon make it, except for prefent ufe, as it will not keep good more than two days; and the whey will turn to better account to fatten pigs with. Nothing feeds thefe fafter, nor will any thing make them fo delicately white. At the fame time it is to be obferved, that no good bacon can be made from pigs thus fatted; where much butter is made, good cheefe for fervants may be obtained from fkimmed milk, and the whey will afterwards do for ftore pigs.

The foregoing rules will fuffice for making good butter in any country; but as fome people are partial to the weft-country method, it fhall be defcribed as briefly as poffible.—In the firft place, they depofit their milk in earthen pans in their dairy-houfe, and (after thefe have ftood twelve hours in the fummer, and double that fpace in the winter) they remove them to ftoves made for that purpofe, which ftoves are filled with hot embers; on thefe they remain till bubbles arife, and the cream changes its colour; it is then deemed heated enough, and this they call fcalded cream; it is afterwards removed fteadily to the dairy, where it remains twelve hours more, and is then fkimmed from the milk and put into a tub or churn. If it be put into a tub, it is beaten well with the hand, and thus they obtain butter; but a cleanlier way is to make ufe of a churn. Some fcald it over the fire, but then the fmoke is apt to affect it; and in either cafe, if the pans touch the fire, they will crack or fly, and the milk and cream will be wafted.

The Cambridgefhire falt butter is much efteemed, and is made nearly after the fame method as the Epping; and by wafhing and working the falt from it the cheefemongers in London often fell it at a high price for frefh butter. They depofit it when made into wooden tubs or firkins, which they expofe to the air for two or three weeks, and often wafh them; but a readier way is to feafon them with unflaked lime; or a large quantity of falt diffolved in water will do: with this they muft be fcrubbed feveral times, and afterwards thrown into cold water, where they fhould remain three or four days, or till they are wanted; then they fhould be fcrubbed as before, and well rinfed with cold water; but before they receive the butter, care muft be taken to rub every part of the firkin with falt; then if the butter be properly made, and perfectly fweet, it may be gently preffed into the firkin: but it muft be well falted when it is made up, and the falt fhould be equally diftributed through the whole mafs, and a good handful of falt muft be fpread on the top of the firkin before it is headed, after which the head fhould be immediately put on.

They purfue nearly the fame method in Suffolk and Yorkfhire; nor is the butter that is made in thefe counties much inferior to that made in Cambridgefhire; indeed it is often fold in London for Cambridge butter; and no people make more butter from their cows than the Yorkfhire farmers do, which is certainly owing to the care they take of them in the winter; as at that feafon they houfe them all, feed them with good hay, and never fuffer them to go out (except to water) but when the weather is very ferene; and when their cows calve, they give them comfortable malt mefhes for two or three days after; but thefe cows never anfwer if they are removed to other counties, except the fame care and attendance be given them, and then none anfwer better.

Land whereon cows feed does very often affect the tafte of butter. If wild garlic, charlock, or May-weed, be found in a pafture ground, cows fhould not feed there till after they have been mown, when fuch pernicious plants will appear no more till the following fpring; but thofe cows that give milk muft not partake of the hay made from thence, as that will alfo affect the butter.

Great part of the Epping butter is made from cows that feed during the fummer months in Epping foreft, where the leaves and fhrubby plants contribute greatly to the flavour of the butter. The mountains of Wales, the highlands of Scotland, and the moors, commons, and heaths in England, produce excellent butter where it is properly managed; and though not equal in quantity, yet far fuperior in quality to that which is produced from the richeft meadows; and the land is often blamed when the butter is bad only through mifmanagement.

Turnips and rape affect milk and butter, but brewers grains are fweet and wholefome food, and will make cows give abundance of milk; yet the cream on it will be thin, except good hay be given at the fame time, after every meal of grains. Coleworts and cabbages are alfo excellent food; and if thefe and favoys were cultivated for this purpofe, the farmers in general would find their account in it. Cows fhould never be fuffered to drink improper water; ftagnated pools, water wherein frogs fpawn, common fewers, and ponds that receive the drainings of ftables, are improper.

Many abufes are committed in the packing and falting of butter, to increafe its bulk and weight, againft which we have an exprefs ftatute. Pots are frequently laid with good butter for a little depth at the top, and with bad at the bottom; fometimes the butter is fet in rolls, only touching at top, and ftanding hollow at the bottom. To prevent thefe cheats, the factors at Utoxeter keep a furveyor, who, in cafe of fufpicion, tries the pots with an iron inftrument called a *butter-bore*, made like a cheefe-tafter, to be ftruck in obliquely to the bottom.

Shower of BUTTER. Naturalifts fpeak of fhowers and dews of a butyraceous fubftance. In 1695, there fell in Ireland, during the winter and enfuing fpring, a thick yellow dew, which had the properties and appearance of butter.

BUTTER, among chemifts, a name given before the introduction of the new nomenclature, to feveral medicines, on account of their confiftence refembling that of butter; as butter of antimony, &c.

BUTTER-*Bur*, in botany. See TUSSILAGO.

BUTTER-*Milk*, the milk which remains after the butter is got by churning. Butter-milk is efteemed an excellent food, in the fpring efpecially, and is particularly recommended in hectic fevers. Some make curds of butter-milk, by pouring into it a quantity of new milk hot.

BUTTER-*Wort*, in botany. See PINGUICULA.

BUTTERFLY, the Englifh name of a numerous genus of infects. See PAPILIO.

BUTTERFLY-*Shell*, in natural hiftory. See VOLUTA.

Method of preferving BUTTERFLIES. See INSECTS.

Method of making Pictures of BUTTERFLIES. In Edward's Hiftory of Birds, vol. ii. p. 122, we have the following inftructions on this fubject: "Take butterflies or field-moths, either thofe catched abroad, or fuch as are taken in caterpillars and nurfed in the houfe till they be flies; clip off their wings very clofe to their bodies, and lay them on clean paper, in the form of a butterfly when flying; then have ready prepared gum arabic that hath been fome time diffolved in water, and is pretty thick; if you put a drop of oxgall into a fpoonful of this, it will be better for the ufe; temper them well with your finger, and fpread a little of it on a piece of thin white paper, big enough to take both fides of your fly; when it begins to be

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clammy under your finger, the paper is in proper order to take the feathers from the wings of the fly; then lay the gummed fide on the wings, and it will take them up; then double your paper fo as to have all the wings between the paper; then lay it on a table, preffing it clofe with your fingers; and you may rub it gently with fome fmooth hard thing; then open the paper and take out the wings, which will come forth tranfparent: the down of the upper and under fide of the wings, fticking to the gummed paper, form a juft likenefs of both fides of the wings in their natural fhapes and colours. The nicety of taking off flies depends on a juft degree of moifture of the gummed paper: for if it be too wet, all will be blotted and confufed; and if too dry, your paper will ftick fo faft together, that it will be torn in feparation. When you have opened your gummed papers, and they are dry, you muft draw the bodies from the natural ones, and paint them in water-colours: you muft take paper that will bear ink very well for this ufe: for finking paper will feparate with the reft, and fpoil all."

BUTTERIS, in the manege, an inftrument of fteel, fitted to a wooden handle, wherewith they pare the foot, or cut off the hoof, of a horfe.

BUTTOCK *of a* SHIP, is that part of her which is her breadth right aftern, from the tack upwards; and a fhip is faid to have a broad or narrow buttock, according as fhe is built broad or narrow at the tranfum.

BUTTON, an article in drefs, whofe form and ufe are too well known to need defcription. They are made of various materials, as mohair, filk, horfe-hair, metal, &c. of thefe we fhall fpeak in their order: 1. *Common* BUTTONS are generally made of mohair; fome indeed are made of filk, and others of thread; but the latter are of a very inferior fort. In order to make a button, the mohair muft be previoufly wound on a bobbin; and the mould fixed to a board by means of a bodkin thruft through the middle of it. This being done, the workman wraps the mohair round the mould in three, four, or fix columns, according to the button.—2. *Horfe-hair* BUTTONS. The moulds of thefe are covered with a kind of ftuff compofed of filk and hair; the warp being balladine filk, and the fhoot horfe hair. This ftuff is wove with two felvedges, in the fame manner and in the fame loom as ribbands. It is then cut into fquare pieces proportional to the fize of the button, wrapped round the moulds, and their felvedges ftitched together, which form the under part of the button. It is here to be obferved, that a button is not finifhed when it comes from the maker's hands; for the fuperfluous hairs and hubs of filk muft be taken off, and the button rendered gloffy and beautiful before it can be fold. This is done in the following manner: A quantity of buttons are put into a kind of iron fieve, called by workmen a *fingeing box*. Then a little fpirit of wine being poured into a kind of fhallow iron difh, and fet on fire, the workman moves and fhakes the fingeing box, containing the buttons, brifkly over the flame of the fpirit, by which the fuperfluous hairs, hubs of filk, &c. are burnt off, without damaging the buttons. Great care, however, muft be taken that the buttons in the fingeing box be kept continually in motion; for if they are fuffered to reft over the flame, they will immediately burn. When all thefe loofe hairs, &c. are burnt off by the flame of the fpirit, the buttons are taken out of the fingeing box, and put, with a proper quantity of the crumbs of bread, into a leather bag, about three feet long, and of a conical fhape; the mouth or fmaller end of which being tied up, the workman takes one of the ends in one hand and the other in the other, and fhakes the hand brifkly with a particular jerk. This operation cleanfes the buttons, renders them very gloffy and fit for fale.—3. *Gold-twift* BUTTONS. The mould of thefe is firft covered in the fame way as with that of common buttons. This being done, the whole is covered with a thin plate of gold or filver, and then wrought over of different forms, with purle and gimp. The former is a kind of thread compofed of filk and gold-wire twifted together; and the latter, capillary tubes of gold or filver, about the tenth of an inch long. Thefe are joined together by means of a fine needle, filled with filk, thruft through their apertures, in the fame manner as beads or bugles.—4. *Metal*-BUTTONS. The metal with which the moulds are intended to be covered is firft caft into fmall ingots, and then rolled into thin plates or leaves; after which it is cut into fmall round pieces proportionable to the fize of the mould they are intended to cover, by means of proper punches on a block of wood covered with a thick plate of lead. Each piece of metal thus cut out of the plate is reduced into the form of a button, by beating it fucceffively in feveral cavities, or concave moulds, of a fpherical form, with a convex puncheon of iron, always beginning with the fhalloweft cavity or mould, and proceeding to the deeper, till the plate has acquired the intended form: and the better to manage fo thin a plate, they form ten, twelve, and fometimes even twenty-four, to the cavities, or concave moulds, at once; often nealing the metal during the operation, to make it more ductile. This plate is generally called by workmen the *cap of the button*.

The form being thus given to the plates or caps, they ftrike the intended impreffion on the convex fide, by means of a fimilar iron puncheon, in a kind of mould engraven *en creux*, either by the hammer or the prefs ufed in coining. The cavity or mould, wherein the impreffion is to be made, is of a diameter and depth fuitable to the fort of button intended to be ftruck in it; each kind requiring a particular mould. Between the puncheon and the plate is placed a thin piece of lead, called by workmen a *bob*, which greatly contributes to the taking off all the ftrokes of the engraving; the lead, by reafon of its foftnefs, eafily giving way to the parts that have relievo, and as eafily infinuating itfelf into the traces or indentures.

The plate thus prepared makes the cap or fhell of the button. The lower part is formed of another plate, in the fame manner, but much flatter, and without any impreffion. To the laft or under plate is foldered a fmall eye made of wire, by which the button is to be faftened. The two plates being thus finifhed, they are foldered together with foft folder, and then turned in a lathe. Sometimes indeed they ufe a wooden mould, inftead of the under plate; and in order to faften it, they pafs a thread or gut acrofs, through the middle of the mould, and fill the cavity between the mould and the cap with cement, in order to render the button firm and folid; for the cement entering all the cavities formed by the relievo of the other fide, fuftains it, prevents its flattening, and preferves its boffe or defign.

BUTTON, in the manege. Button of the reins of a bridle, is a ring of leather, with the reins paffed through it, which runs all along the length of the reins. To put a horfe under the button, is when a horfe is ftopped without a rider upon his back, the reins being laid on his neck, and the button lowered fo far down that the reins bring in the horfe's head, and fix it to the true pofture or carriage. It is not only the horfes which are managed in the hand that muft be put under the button; for the fame method muft be taken with fuch horfes as are bred between two pillars, before they are backed.

BUTTON-*Wood*. See CEPHALANTHUS.

BUTTON'S-*Bay*, the name of the north part of Hudfon's bay, in North America, whereby Sir Thomas Button attempted to find out a north-weft paffage to the Eaft Indies. It lies between 80° and 100° weft longitude, and between 60° and 66° north latitude.

BUTTON-*Stone*, in natural hiftory, a kind of figured ftone, fo denominated from its refembling the button of a garment. Dr. Hook gives the figure of three forts of button-ftones, which feem to have been nothing elfe but the filling up of three fe-

veral ſorts of ſhells. They are all of them very hard flints; and have this in common, that they conſiſt of two bodies, which ſeem to have been the filling up of two holes or vents in the ſhell. Dr. Plot deſcribes a ſpecies finely ſtriated from the top, after the manner of ſome hair buttons. This name is alſo given to a peculiar ſpecies of ſlate found in the marquiſate of Bareith, in a mountain called *Fichtelberg*; which is extremely different from the common ſorts of ſlate, in that it runs with great eaſe into glaſs in five or ſix hours time, without the addition of any ſalt or other foreign ſubſtance, to promote its vitrification, as other ſtones require. It contains in itſelf all the principles of glaſs, and really has mixed in its ſubſtance the things neceſſary to be added to promote the fuſion of other ſtony bodies. The Swedes and Germans make buttons of the glaſs produced from it, which is very black and ſhining, and it has hence its name *button-ſtone*. They make ſeveral other things alſo of this glaſs, as the handles of knives and the like, and ſend a large quantity of it unwrought, in round cakes as it cools from the fuſion, into Holland.

BUTTRESS, a kind of butment built archwiſe, or a maſs of ſtone or brick, ſerving to prop or ſupport the ſides of a building, wall, &c. on the outſide, where it is either very high, or has any conſiderable load to ſuſtain on the other ſide, as a bank of earth, &c.—Buttreſſes are uſed againſt the angles of ſteeples and other buildings of ſtone, &c. on the outſide, and along the walls of ſuch buildings as have great and heavy roofs, which would be ſubject to thruſt the walls out, unleſs very thick, if no buttreſſes were placed againſt them. They are alſo placed for a ſupport and butment againſt the feet of ſome arches, that are turned acroſs great halls in old palaces, abbeys, &c.

BUTZAW, a town in Lower Saxony, in Germany; it ſtands upon the river Varnow, on the road from Schwerin to Roſtock, lying in E. long. 13. 12. N. lat. 54. 50.

BUVETTE, or BEUVETTE, in the former French laws, an ſtabliſhed place in every court, where the lawyers and counſellors retired to warm themſelves, and take a glaſs of wine by way of refreſhment, at the king's charge. There was one for each court of parliament, but theſe were only for perſons belonging to that body; there were others in the *palais*, whither other perſons alſo reſorted.

BUXTON, a place on the peak of Derbyſhire, celebrated for its medicinal waters, and lying in W. long. 0. 20. N. lat. 53. 20. It has been always believed by our antiquaries, that the Romans were acquainted with theſe wells, and had frequented them much, as there is a military way ſtill viſible, called the *Bath-gate*, from Burgh to this place. This was verified about 50 years ago, when Sir Thomas Delves, of Cheſhire, in memory of a cure he received here, cauſed an arch to be erected; in digging the foundations for which, they came to the remains of a ſolid and magnificent ſtructure of Roman workmanſhip; and in other parts of the neighbourhood, very capacious leaden veſſels, and other utenſils, of Roman workmanſhip, have been diſcovered. Theſe waters have always been reckoned inferior to thoſe in Somerſetſhire; but ſeem never to have been totally diſuſed. They are mentioned by Leland, as well known 200 years ago; but it is certain they were brought into greater credit by Dr. Jones in 1572, and by George earl of Shrewſbury, who erected a building over the bath, then compoſed of nine ſprings. This building was afterwards pulled down, and a more commodious one erected at the expence of the earl of Devonſhire. In doing this, however, the ancient regiſter of cures drawn up by the bath-warden, or phyſician attending the baths, and ſubſcribed by the hands of the patients, was loſt.

The warm waters of Buxton are, the bath, conſiſting of nine ſprings, as already mentioned, St. Ann's well, and St. Peter's or Bingham well. St. Anne's well riſes at the diſtance of ſomewhat more than 32 yards north-eaſt from the bath. It is chiefly ſupplied from a ſpring on the north ſide, out of a rock of black limeſtone or baſtard marble. It formerly roſe into a ſtone baſon, ſhut up within an ancient Roman brick wall, a yard ſquare within, a yard high on three ſides, and open on the fourth. But, in 1709, Sir Thomas Delves, as already mentioned, erected an arch over it, which ſtill continues. It is 12 feet long, and as many broad, ſet round with ſtone ſteps on the inſide. In the midſt of this dome the water now ſprings up into a ſtone baſon two feet ſquare. St. Peter's or Bingham well riſes about 20 yards ſouth-eaſt of St. Ann's. It is alſo called *Leigh's well*, from a memorable cure received from it by a gentleman of that name. It riſes out of a black limeſtone, in a very dry ground; and is not ſo warm as St. Ann's well is found to be.

From the great reſort of company to the waters, this place has grown into a large ſtraggling town, which is daily increaſing. The houſes are chiefly, or rather ſolely, built for the reception of invalids; and many of them are not only commodious, but elegant. The duke of Devonſhire erected a moſt magnificent building in the form of a creſcent, with piazzas, under which the company walk in wet or cold weather. It is divided into different hotels, ſhops, &c. with a public coffee-room, and a very elegant room for aſſemblies and concerts.

The hot water, which reſembles that of Briſtol, has a ſweet and pleaſant taſte. It contains the calcareous earth, together with a ſmall quantity of ſea ſalt, and an inconſiderable portion of a purging ſalt; but no iron can be diſcovered in it. This water taken inwardly is eſteemed good in the diabetes; in bloody urine; in the bilious colic; in loſs of appetite, and other affections of the ſtomach; in contraction of the limbs, &c. &c. Inwardly and outwardly, it is ſaid alſo to be good in rheumatic and ſcorbutic complaints; in the gout; in inflammation of the liver and kidneys; alſo in conſumptions of the lungs; and in cutaneous diſeaſes.—Beſides the hot water, there is alſo a cold chalybeate water here, which reſembles that of Tunbridge in its virtues.

BUXTON (Jedediah), a prodigy with reſpect to ſkill in numbers. His father, William Buxton, was ſchool-maſter of the ſame pariſh, where he was born in 1704: yet Jedediah's education was ſo much neglected, that he was never taught to write; and with reſpect to any other knowledge but that of numbers, ſeemed always as ignorant as a boy of ten years of age. How he came firſt to know the relative proportions of numbers, and their progreſſive denominations, he did not remember; but to this he applied the whole force of his mind, and upon this his attention was conſtantly fixed, ſo that he frequently took no cognizance of external objects, and when he did it, it was only with reſpect to their numbers. If any ſpace of time was mentioned, he would ſoon after ſay it was ſo many minutes: and if any diſtance of way, he would aſſign the number of hairs breadths, without any queſtion being aſked, or any calculation expected by the company. When he once underſtood a queſtion, he began to work with amazing facility, after his own method, without the uſe of a pen, pencil, or chalk, or even underſtanding the common rules of arithmetic as taught in the ſchools. He would ſtride over a piece of land or a field, and tell you the contents of it almoſt as exactly as if you had meaſured it by the chain. In this manner he meaſured the whole lordſhip of Elmton, of ſome thouſand acres, belonging to Sir John Rhodes, and brought him the contents, not only in acres, roods, and perches, but even in ſquare inches. After this, for his own amuſement, he reduced them into ſquare hair-breadths, computing 48 to each ſide of the inch. His memory was ſo great, that, while reſolving a queſtion, he could leave off, and reſume the operation again where he left off the next morning, or at a week, a month, or at ſeveral months, and proceed regularly till it was completed. His memory

would doubtlefs have been equally retentive with refpect to other objects, if he had attended to other objects with equal diligence; but his perpetual application to figures prevented the fmalleft acquifition of any other knowledge. He was fometimes afked, on his return from church, whether he remembered the text, or any part of the fermon, but it never appeared that he brought away one fentence; his mind, upon a clofer examination, being found to have been bufied, even during divine fervice, in his favourite operation, either dividing fome time, or fome fpace, into the fmalleft known parts, or refolving fome queftion that had been given him as a teft of his abilities.

This extraordinary perfon living in laborious poverty, his life was uniform and obfcure. Time, with refpect to him, changed nothing but his age; nor did the feafons vary his employment, except that in winter he ufed a flail, and in fummer a ling-hook. In the year 1754, he came to London, where he was introduced to the royal fociety, who, in order to prove his abilities, afked him feveral queftions in arithmetic, and he gave them fuch fatisfaction, that they difmiffed him with a handfome gratuity. In this vifit to the metropolis, the only object of his curiofity, except figures, was his defire to fee the king and royal family; but they being juft removed to Kenfington, Jedediah was difappointed. During his refidence in London, he was taken to fee King Richard III. performed at Drury-lane playhoufe; and it was expected, either that the novelty and the fplendour of the fhow would have fixed him in aftonifhment, or kept his imagination in a continual hurry, or that his paffions would, in fome degree, have been touched by the power of action, if he had not perfectly underftood the dialogue. But Jedediah's mind was employed in the playhoufe juft as it was employed in every other place. During the dance, he fixed his attention upon the number of fteps; he declared, after a fine piece of mufic, that the innumerable founds produced by the inftruments had perplexed him beyond meafure; and he attended even to Mr. Garrick, only to count the words that he uttered, in which he faid he perfectly fucceeded. Jedediah returned to the place of his birth, where, if his enjoyments were few, his wifhes did not feem to be more. He applied to his labour, by which he fubfifted with cheerfulnefs; he regretted nothing that he left behind him in London; and it continued to be his opinion, that a flice of rufty bacon afforded the moft delicious repaft.

BUXTORF (John), a learned profeffor of Hebrew at Bafil, who, in the 17th century, acquired the higheft reputation for his knowledge of the Hebrew and Chaldee languages. He died of the plague at Bafil in 1629, aged 65. His principal works are, 1. A fmall but excellent Hebrew grammar; the beft edition of which is that of Leyden in 1701, revifed by Leufden. 2. A treafure of the Hebrew grammar. 3. An Hebrew concordance, and feveral Hebrew lexicons. 4. *Inftitutio epiftolaris Hebraica.* 5. *De abbreviaturis Hebræorum, &c.*

Buxtorf (John), the fon of the former, and a learned profeffor of the oriental languages at Bafil, diftinguifhed himfelf, like his father, by his knowledge of the Hebrew language, and his rabbinical learning. He died at Bafil in 1664, aged 65 years. His principal works are, 1. His tranflation of the *More Nevochim*, and the *Cozri*. 2. A Chaldee and Syriac lexicon. 3. An anticritic againft Cappel. 4. A treatife on the Hebrew points and accents, againft the fame Cappel.

BUXUS, the box-tree; a genus of the tetrandria order, belonging to the monœcia clafs of plants; and in the natural method ranking under the 38th order, *Tricoccæ.* The male calyx is triphyllous, the germen an embryo, or imperfect rudiment. The female calyx is tetraphyllous: there are three petals, and as many ftyles: the capfule three-beaked and trilocular, with three feeds. The *Species* are, 1. The *arborefcens*, with oval leaves. 2. The *anguftifolia*, or narrow-leaved box. Thefe two forts grow in great plenty upon Boxhill near Dorking in Surry in England. Here were formerly large trees of that kind; but now they are much fewer in number. There are two or three varieties of the firft fort which are propagated in gardens; one with yellow, and the other with white ftriped leaves. Another hath the tips of the leaves only marked with yellow, and is called *tipped box*. 3. The *fuffruticofa*, dwarf, or Dutch box, commonly ufed for bordering of flower-beds.

The two firft forts may be raifed from feeds; and may be alfo propagated by cuttings, which are to be planted in the autumn in a fhady border. The beft feafon for removing thefe trees is in October; though, if care be ufed to take them up with a good ball of earth, they may be tranfplanted almoft at any time except the middle of fummer. The dwarf box is increafed by parting the roots, or planting the flips: but as it makes fo great an increafe of itfelf, and fo eafily parts, it is hardly worth while to plant the flips that have no roots.

The tree or large box is proper to intermix in clumps of evergreens, &c. where it adds to the variety of fuch plantations. Box trees are a very great ornament to cold and barren foils where few other things will grow. The dwarf kind of box is ufed for bordering flower-beds, or other purpofes of that nature; and for this it far excels any other plant, being fubject to no injuries from cold or heat. It is of long duration; is eafily kept handfome; and, by the firmnefs of its rooting, keeps the mould in the borders from wafhing into the gravel walks more effectually than any plant whatever.—Boxwood is extremely hard and fmooth, and therefore well adapted to the ufe of the turner. Combs, mathematical inftruments, knife-handles, and button-moulds, are made of it. It may properly enough be fubftituted in default of ebony, the yellow alburnum of which it perfectly refembles. A decoction of box wood has been recommended by fome as a powerful fudorific, preferable even to guaiacum; but the tafte readily difcovers that it wants the qualities of that wood. Neither the wood nor the leaves of the box-tree at prefent are ufed for any medicinal purpofe.

BUYING, the act of making a purchafe, or of acquiring the property of a thing for a certain price. Buying ftands oppofed to felling, and differs from borrowing or hiring, as in the former the property of the thing is alienated for perpetuity, which in the latter is not. By the civil law, perfons are allowed to buy hope, *fpem pretio emere*, that is, to purchafe the event or expectation of any thing; for inftance, the fifh or birds a perfon fhall catch, or the money he fhall win in gaming. There are different fpecies of buying in ufe among traders; as, buying on one's own account, oppofed to buying on commiffion; buying for ready money, which is when the purchafer pays in actual fpecie on the fpot; buying on credit, or for a time certain, is when the payment is not to be prefently made, but, in lieu thereof, an obligation given by the buyer for payment at a future time; buying on delivery, is when the goods purchafed are only to be delivered at a certain future time.

Buying *the refufal*, is giving money for the right or liberty of purchafing a thing at a fixed price, in a certain time to come; chiefly ufed in dealing for fhares in ftock. This is fometimes alfo called by a cant name, *buying the bear*.

Buying *the fmall-pox*, is an appellation given to a method of procuring that difeafe by an operation fimilar to inoculation; frequent in South Wales, where it has obtained time out of mind. It is performed either by rubbing fome of the *pus* taken out of a puftule of a variolous perfon on the fkin, or by making a puncture in the fkin with a pin dipped in fuch pus.

BUYS, a town of the former province of Dauphiny in France. E. long. 5. 20. N. lat. 44. 25.

BUZANCOIS, a fmall town of the former province of Berry in France; fituated in E. long. 1. 29. N. lat. 46. 58

BUZBACH, a town of Germany, in Westeravia and the county of Holmes, one of the confines of Hanau. E. long. 10. 51. N. lat. 50. 22.

BUZET, a small town of France, in the former province of Languedoc, seated on the river Torne, in E. long. 1. 45. N. lat. 43. 47.

BUZZARD, in ornithology, the name of several species of the hawk kind. See FALCO.

BYCHOW, a small town of Lithuania in Poland, situated on the river Nieper, in E. long. 30. 2. N. lat. 53. 57.

BY-LAWS, are laws made *obiter*, or by the by; such as orders and constitutions of corporations for the governing of their members, of court leets, and courts baron; commoners, or inhabitants in vills, &c. made by common assent, for the good of those that made them, in particular cases whereunto the public law doth not extend; so that they bind farther than the common or statute law: guilds and fraternities of trades by letters patent of incorporation, may likewise make by-laws for the better regulation of trade among themselves or with others. In Scotland these laws are called laws of *birlaw*, or *burlaw*.

BYNG (George), lord viscount Torrington, was the son of John Byng, Esq. and was born in 1663. At the age of 15, he went volunteer to sea with the king's warrant. His early engagement in this course of life gave him little opportunity of acquiring learning or cultivating the polite arts; but by his abilities and activity as a naval commander he furnished abundant matter for the pens of others. After being several times advanced, he was in 1702 raised to the command of the Nassau, a third rate, and was at the taking and burning the French fleet at Vigo; and the next year he was made rear-admiral of the red. In 1704 he served in the grand fleet sent to the Mediterranean, under Sir Cloudesly Shovel, as rear-admiral of the red; and it was he who commanded the squadron that attacked, cannonaded, and reduced Gibraltar. He was in the battle of Malaga, which followed soon after; and for his behaviour in that action queen Anne conferred on him the honour of knighthood. In 1705, in about two months time, he took 12 of the enemy's largest privateers, with the Thetis, a French man of war of 44 guns; and also several merchant ships, most of them richly laden. The number of men taken on board was 2070, and of guns 334. In 1718, he was made admiral and commander in chief of the fleet; and was sent with a squadron into the Mediterranean for the protection of Italy, according to the obligation England was under by treaty, against the invasion of the Spaniards; who had the year before surprised Sardinia, and had this year landed an army in Sicily. In this expedition he dispatched captain Walton in the Canterbury, with five more ships in pursuit of six Spanish men of war, with galleys, fire-ships, bomb-vessels, and store-ships, who separated from the main fleet, and stood in for the Sicilian shore. The captain's laconic epistle on this occasion, dated 16th August 1718, is worthy of notice; as it showed that fighting was his talent as well as his admiral's, and not writing. It ran thus: "We have "taken and destroyed all the Spanish ships and vessels which "were upon the coast, as per margin.

"Canterbury, off Syracuse." "C. WALTON."

From the account referred to, it appeared that he had taken four Spanish men of war, with a bomb-vessel and a ship laden with arms; and burned four, with a fire-ship and bomb-vessel. The king made the admiral an handsome present, and sent him plenipotentiary powers to negotiate with the princes and the states of Italy as there should be occasion. He procured the emperor's troops free access into the fortresses that still held out in Sicily; sailed afterwards to Malta, and brought out the Sicilian gallies, and a ship belonging to the Turkey company. Soon after he received a gracious letter from the emperor Charles VI. written with his own hand, accompanied with a picture of his imperial majesty, set round with very large diamonds, as a mark of the grateful sense he had of his services. It was entirely owing to his advice and assistance that the Germans retook the city of Messina in 1719, and destroyed the ships that lay in the bason; which completed the ruin of the naval power of Spain. The Spaniards being much distressed, offered to quit Sicily; but the admiral declared, that the troops should never be suffered to quit the island till the king of Spain had acceded to the quadruple alliance. And to his conduct it was entirely owing that Sicily was subdued, and his Catholic majesty forced to accept the terms prescribed him by the quadruple alliance. After performing so many signal services, the king received him with the most gracious expressions of favour and satisfaction; made him rear-admiral of England and treasurer of the navy, one of his most honourable privy-council, baron Byng of Southill in the county of Bedford, viscount Torrington in Devonshire, and one of the knights companions of the Bath upon the revival of that order. In 1727, George II. on his accession to the crown, placed him at the head of his naval affairs, as first lord commissioner of the admiralty; in which high station he died January 15th, 1733, in the 70th year of his age, and was buried at Southill in the county of Bedford.

BYNG (the honourable George), Esq. the unhappy son of the former, was bred to sea, and rose to the rank of admiral of the blue. He gave many proofs of courage; but was at last shot, upon a dubious sentence of neglect of duty, in 1757.

BYROM (John), an ingenious poet of Manchester, born in 1691. His first poetical essay appeared in the Spectator, N° 603, beginning, "My time, O ye muses, was happily spent;" which, with two humorous letters on dreams, are to be found in the eighth volume. He was admitted a member of the royal society in 1724; and having originally entertained thoughts of practising physic, to which the title of *doctor* is incident, that was the appellation by which he was always known: but reducing himself to narrow circumstances by a precipitate marriage, he supported himself by teaching a new method of writing short-hand, of his own invention; until an estate devolved to him by the death of an elder brother. He was a man of lively wit; of which, whenever a favourable opportunity tempted him to indulge it, he gave many humorous specimens. He died in 1763; and a collection of his Miscellaneous Poems was printed at Manchester, in 2 vols. 8vo. 1773.

BYRRHUS, in zoology, a genus of insects belonging to the order of coleoptera. The feelers are clavated, pretty solid, and a little compressed. There are five species, all of which are to be found on particular plants; and principally distinguished from one another by the colour and figure of the elytra, or crustaceous wing-cases. The byrrhus *scrophulariæ*, which is very common upon flowers, it is very hard to describe properly. Its body is almost oval; the ground colour black; but the under part of the abdomen appears almost entirely white, owing to an infinite number of minute scales, of that colour with which it is covered. The head is small, and often drawn back under the thorax, which latter is broad, covered with white and reddish scales, through which the black ground in some places appears. The elytra are bent in, and even rather inclose the sides and under part of the body. They are black, with white and red scales, which form a kind of embroidered work. First, there is observable a white transversal stripe, somewhat broad on the top of the elytra; at the bottom of them, there are two white distinct spots near the suture, one upon each elytrum. The ruddy colour occupies chiefly the lower end of the suture of the elytra, and the upper part of them, near their connection with the thorax. This species is common in gardens. If rubbed, the small coloured scale comes off, and the

insect appears almost entirely black. The byrrhus *verbasci* is much smaller than the preceding species; its figure and form are however the same; only that the scales which cover the elytra are more numerous and closer set, so that the black colour, which constitutes the ground of the elytra, is no where to be seen. The scales form three stripes, white, transversal, and undulated, between which intervene stripes of a reddish brown shaped in the same manner. They are sometimes to be met with stripped of part of their scales, which renders them so different as not to be known for the same creatures. The larvæ of this insect, as also those of the preceding species, are extremely voracious, and much resemble those of the dermestæ. People who collect subjects of natural history, are greatly pestered, and but too well acquainted with them.

BYSSUS, in botany; a genus of the 57th natural order, viz. *Algæ*, belonging to the cryptogamia class of plants. It has a *down*, or very fine uniform powder. The character is taken from this circumstance, that they are covered with a simple capillary filament or down, resembling soft dust. There are 15 species, all natives of Britain, growing upon rotten wood, old walls, &c.

Byssus, or *Byssum*, a fine thready matter produced in India, Egypt, and about Elis in Achaia, of which the richest apparel was anciently made, especially that worn by the priests both Jewish and Egyptian. Some interpreters render the Greek Βυσσ©, which occurs both in the Old and New Testament, by *fine linen*. But other versions, as Calvin's, and the Spanish printed at Venice in 1556, explain the word by *silk*; and yet byssus must have been different from our silk, as appears from a multitude of ancient writers, and particularly from Jul. Pollux. M. Simon, who renders the word by fine linen, adds a note to explain it; viz. " that there was a fine kind of linen very dear, which the great lords alone wore in this country as well as in Egypt." This account agrees perfectly well with that given by Hesychius, as well as what is observed by Bochart, that the byssus was a finer kind of linen, which was frequently dyed of a purple colour. Some authors will have the byssus to be the same with our cotton; others take it for the *linum asbestinum*; and others for the lock or bunch of silky hair found adhering to the pinna marina, by which it fastens itself to the neighbouring bodies. Authors usually distinguish two sorts of byssus; that of Elis; and that of Judæa, which was the finest. Of this latter were the priestly ornaments made Bonfrerius notes, that there must have been two sorts of byssus, one finer than ordinary, by reason there are two Hebrew words used in Scripture to denote byssus; one of which is always used in speaking of the habit of the priests, and the other of that of the Levites.

Byssus *Asbestinus*, a species of asbestos or incombustible flax, composed of fine flexible fibres parallel to one another. It is found plentifully in Sweden, either white, or of different shades of green. At a copper mine in Westmannland it forms the greatest part of the vein out of which the ore is dug; and by the heat of the furnace which smelts the metal, is changed into a pure semitransparent slag or glass.

BYZANTIUM. See Constantinople.

BZOVIUS (Abraham), one of the most celebrated writers in the 17th century, with respect to the astonishing number of pieces composed by him. His chief work is the continuation of Baronius's Annals. He was a native of Poland, and a Dominican friar. Upon his coming to Rome, he was received with open arms by the Pope, and had an apartment assigned him in the Vatican. He merited that reception, for he has imitated Baronius to admiration in his design of making all things conspire to the despotic power and glory of the papal see. He died in the year 1637, aged 70.

C.

C THE third letter, and second consonant, of the alphabet, is pronounced like *k* before the vowels *a*, *o*, and *u*; and like *s* before *e*, *i*, and *y*. C is formed, according to Scaliger, from the κ of the Greeks, by retrenching the stem or upright line; though others derive it from the ב of the Hebrews, which has in effect the same form; allowing only for this, that the Hebrews, reading backwards, and the Latins, &c. forwards, each have turned the letter their own way. However, the C not being the same as to sound with the Hebrew *caph*, and it being certain the Romans did not borrow their letters immediately from the Hebrews or other orientals, but from the Greeks, the derivation from the Greek κ is the more probable. Add, that F. Montfaucon, in his Palæographia, gives us some forms of the Greek κ, which come very near that of our C; thus, for instance, ꓚ: and Suida calls the C the Roman kappa. The second sound of C resembles that of the Greek Σ; and many instances occur of ancient inscriptions, in which Σ has the same form with our C. All grammarians agree, that the Romans pronounced their Q like our C, and their C like our K. F. Mabillon adds, that Charles the Great was the first who wrote his name with a C; whereas all his predecessors of the same name wrote it with a K; and the same difference is observed in their coins.

As an abbreviature, C stands for Caius, Carolus, Cæsar, *condemno*, &c. and CC for *consulibus*.

As a numeral, C signifies 100, CC 200, &c.

C, in music, placed after the cliff, intimates that the music is in common time, which is either quick or slow, as it is joined with allegro, or adagio: if alone, it is usually adagio. If the C be crossed or turned, the first requires the air to be played quick, and the last very quick.

CAABA, or Caabah, properly signifies a square stone building; but it is particularly applied by the Mahometans to the temple of Mecca, built, as they pretend, by Abraham and Ishmael his son. Before the time of Mahomet, this temple was a place of worship for the idolatrous Arabs, and is said to have contained no less than 360 different images, equalling in number the days of the Arabian year. They were all destroyed by Mahomet, who sanctified the Caaba, and appointed it to be the chief place of worship for all true believers. The temple is in length from north to south about 24 cubits; its breadth from east to west is 23; and its height 27. The door, which

is on the eaſt ſide, ſtands about four cubits from the ground; the floor being level with the bottom of the door. In the corner next this door is the *black ſtone*, ſo much celebrated among the Mahometans. On the north ſide of the caaba, within a ſemicircular incloſure 50 cubits long, lies the *white ſtone*, ſaid to be the ſepulchre of Iſhmael, which receives the rain-water from the caaba by a ſpout formerly of wood, but now of gold. The black ſtone, according to the Mahometans, was brought down from heaven by Gabriel at the creation of the world; and originally of a white colour; but contracted the blackneſs that now appears on it from the guilt of thoſe ſins committed by the ſons of men. It is ſet in ſilver, and fixed in the ſouth-eaſt corner of the caaba, looking towards Baſra, about ſeven ſpans from the ground. This ſtone, upon which there is the figure of a human head, is held in the higheſt eſtimation among the Arabs; all the pilgrims kiſſing it with great devotion, and ſome even calling it the *right hand of God*. Its blackneſs, which is only ſuperficial, is probably owing to the kiſſes and touches of ſo many people. After the Karmatians had taken Mecca, they carried away this precious ſtone, and could by no means be prevailed upon to reſtore it; but finding at laſt that they were unable to prevent the concourſe of pilgrims to Mecca, they ſent it back of their own accord, after having kept it 22 years. This temple enjoys the privilege of an aſylum for all ſorts of criminals; but it is moſt remarkable for the pilgrimages made to it by the devout muſſulmans, who pay ſo great a veneration to it, that they believe a ſingle ſight of its ſacred walls, without any particular act of devotion, is as meritorious, in the ſight of God, as the moſt careful diſcharge of their duty, for the ſpace of a whole year, in any other temple.

CAAMINI, in botany, a name given by the Spaniards and others to the fineſt ſort of Paraguayan tea. It is the leaf of a ſhrub which grows on the mountains of Maracaya, and is uſed in Chili and Peru as tea is with us. The mountains where this ſhrub grows naturally are far from the inhabited parts of Paraguay: but the people of the place know ſo well the value and uſe of it, that they conſtantly furniſh themſelves with great quantities of it from the ſpot. They uſed to go out on theſe expeditions many thouſands together; leaving their country in the mean time expoſed to the inſults of their enemies, and many of themſelves periſhing by fatigue. To avoid theſe inconveniences, they have of late planted theſe trees about their habitations; but the leaves of theſe cultivated ones have not the fine flavour of thoſe that grow wild. The king of Spain has permitted the Indians of Paraguay to bring to the town of Saintfoy 12,000 arobes of the leaves of this tree every year, but they are not able to procure ſo much of the wild leaves annually: about half the quantity is the utmoſt they bring of this; the other half is made up of the leaves of the trees in their own plantations; and this ſells at a lower price, and is called *pabos*. The arobe is about 25lb. weight; the general price is four piaſtres; and the money is always divided equally among the people of the colony.

CAANA, or Kaana, a town in Upper Egypt, ſeated on the eaſtern banks of the river Nile, from whence they carry corn and pulſe for the ſupply of Mecca in Arabia. E. long. 32. 23. N. lat. 24. 30. Here are ſeveral monuments of antiquity yet remaining, adorned with hieroglyphics.

CAB, an Hebrew dry meaſure, being the 6th part of a ſeah or ſatum, and the 18th part of an ephah. A cab contained $2\frac{5}{6}$ pints of our corn-meaſure: a quarter cab was the meaſure of dove's dung, or more properly a ſort of chick-peaſe called by this name, which was ſold at Samaria, during the ſiege of that city, for five ſhekels.

CABAL, an apt name currently given to the infamous miniſtry of Charles II. compoſed of five perſons, Clifford, Aſhley, Buckingham, Arlington, and Lauderdale; the firſt letters of whoſe names, in this order, furniſhed the appellation by which they were diſtinguiſhed.

CABALIST, in French commerce, a factor or agent concerned in managing the trade of another.

CABALLARIA, in middle-age writers, lands held by the tenure of furniſhing a horſeman, with ſuitable equipage, in time of war, or when the lord had occaſion for his ſervices.

CABALLEROS, or Cavalleros, are Spaniſh wools, of which there is a pretty conſiderable trade at Bayonne in France.

CABALLINE, denotes ſomething belonging to horſes: thus caballine aloes is ſo called, from its being chiefly uſed for purging horſes: and common brimſtone has been called *ſulphur caballinum* for a like reaſon.

CABBAGE, in botany. See Brassica; and Husbandry. In the Georgical eſſays, we find this plant greatly recommended as an excellent food for cattle, producing much dung, and being an excellent ſubſtitute for hay. The author prefers the Scotch kind, as being moſt durable, and preferable on all other accounts. He alſo recommends autumn-ſowed plants in preference to thoſe ſowed in the ſpring; the former producing a much more weighty crop than the latter. The expence of raiſing an acre of good cabbages he values at 14l. 15s. and its produce at 34l.

Cabbage-*Tree*, or *True* Cabbage-Palm. See Areca.

Cabbage-bark *Tree*. See Geoffræa.

CABBALA, according to the Hebrew ſtyle, has a very diſtinct ſignification from that wherein we underſtand it in our language. The Hebrew cabbala ſignifies tradition; and the rabbins, who are called *cabbaliſts*, ſtudy principally the combination of particular words, letters, and numbers, and by this means pretend to diſcover what is to come, and to ſee clearly into the ſenſe of many difficult paſſages of ſcripture. There are no ſure principles of this knowledge, but it depends upon ſome particular traditions of the ancients; for which reaſon it is termed *cabbala*.—The cabbaliſts have abundance of names which they call *ſacred*; theſe they make uſe of in invoking of ſpirits, and imagine they receive great light from them. They tell us, that the ſecrets of the cabbala were diſcovered to Moſes on mount Sinai; and that theſe have been delivered down to them from father to ſon, without interruption, and without any uſe of letters; for to write them down, is what they are by no means permitted to do. This is likewiſe termed the *oral law*, becauſe it paſſed from father to ſon, in order to diſtinguiſh it from the written laws.—There is another cabbala, called *artificial*, which conſiſts in ſearching for abſtruſe and myſterious ſignifications of a word in Scripture, from whence they borrow certain explanations, by combining the letters which compoſe it: this cabbala is divided into three kinds, the gematrie, the notaricon, and the temura or themurah. The firſt of theſe conſiſts in taking the letters of a Hebrew word for ciphers or arithmetical numbers, and explaining every word by the arithmetical value of the letters whereof it is compoſed. The ſecond ſort of cabbala, called *notaricon*, conſiſts in taking every particular letter of a word for an entire diction; and the third, called *themura*, i. e. change, conſiſts in making different tranſpoſitions or changes of letters, placing one for the other, or one before the other.—Among Chriſtians, likewiſe, a certain ſort of magic is, by miſtake, called *cabbala*; which conſiſts in uſing improperly certain paſſages of Scripture for magic operations, or in forming magic characters or figures with ſtars and taliſmans. Some viſionaries among the Jews believe, that Jeſus Chriſt wrought his miracles by virtue of the myſteries of the cabbala.

CABBALISTS, the Jewiſh doctors who profeſs the ſtudy of the cabbala. In the opinion of theſe men, there is not a

word, letter, or accent in the law, without ſome myſtery in it. The Jews are divided into two general ſects; the karaites, who refuſe to receive either tradition or the talmud, or any thing but the pure texts of ſcripture; and the rabbiniſts, or talmudiſts, who, beſides this, receive the traditions of the ancients, and follow the talmud. The latter are again divided into two other ſects; pure rabbiniſts, who explain the ſcripture in its natural ſenſe, by grammar, hiſtory, and tradition; and cabbaliſts, who, to diſcover hidden myſtical ſenſes, which they ſuppoſe God to have couched therein, make uſe of the cabbala, and the myſtical methods above mentioned.

CABECA, or CABESSE, a name given to the fineſt ſilks in the Eaſt Indies, as thoſe from 15 to 20 *per cent.* inferior to them are called *barina*. The Indian workmen endeavour to paſs them off one with the other; for which reaſon, the more experienced European merchants take care to open the bales, and to examine all the ſkains one after another. The Dutch diſtinguiſh two ſorts of cabecas; namely, the moor cabeca, and the common cabeca. The former is ſold at Amſterdam for about 21½ ſchellinghen Flemiſh, and the other for about 18¼.

CABECA *de Vide*, a ſmall ſea-port town of Alentejo in Portugal, with good walls, and a ſtrong caſtle. W. long. 6. 43. N. lat. 39. 0.

CABENDA, a ſea-port of Congo in Africa, ſituated in E. long. 12. 2. S. lat. 4. 5.

CABES, or GABES, a town of Africa in the kingdom of Tunis, ſeated on a river near the gulf of the ſame name. E. long. 10. 55. N. lat. 33. 40.

CABEZZO, a province of the kingdom of Angola, in Africa; having Oacco on the north, Lubolo on the ſouth, the Coanza on the north-eaſt, and the Reinba on the ſouth-weſt. It is populous, and well ſtored with cattle, &c. and hath a mine of iron on a mountain from thence called the *iron mountain*, which yields great quantities of that metal; and this the Portugueſe have taught the natives to manufacture. This province is watered by a river called *Rio Longo*, and other ſmall rivulets, lakes, &c. The trees here are very large; and they have one ſort not unlike our apple-trees, the bark of which being ſlaſhed with a knife, yields an odoriferous reſin of the colour and conſiſtence of wax, and very medicinal in its nature, only a little too hot for Europeans, unleſs qualified by ſome cooling drug.

CABIDOS, or CAVIDOS, a long meaſure uſed at Goa, and other parts of the Eaſt Indies belonging to the Portugueſe, to meaſure ſtuffs, linens, &c. and equal to ¾ths of the Paris ell.

CABIN, a room or apartment in a ſhip where any of the officers uſually reſide. There are many of theſe in a large ſhip; the principal of which is deſigned for the captain or commander. In ſhips of the line this chamber is furniſhed with an open gallery in the ſhip's ſtern, as alſo a little gallery on each quarter. The apartments where the inferior officers or common ſailors ſleep and meſs are uſually called BIRTHS; which ſee. The bed-places built up for the ſailors at the ſhip's ſide in merchantmen are alſo called *cabins*.

CABINDA, the chief port of the kingdom of Angoy in Loangi in Africa. It is ſituated at the mouth of a river of the ſame name about five leagues north of Cape Palmerino, on the north ſide of the mouth of the river Zaire. The bay is very commodious for trade, wooding, and watering.

CABINET, the moſt retired place in the fineſt part of a building, ſet apart for writing, ſtudying, or preſerving any thing that is precious. A complete apartment conſiſts of a hall, anti-chamber, chamber, and cabinet, with a gallery on one ſide. Hence we ſay, a cabinet of paintings, curioſities, &c.

CABINET alſo denotes a piece of joiner's workmanſhip, being a kind of preſs or cheſt, with ſeveral doors and drawers.

CABINET is alſo uſed in ſpeaking of the more ſelect and ſecret councils of a prince or adminiſtration. Thus we ſay, the ſecrets, the intrigues of the cabinet. To avoid the inconveniences of a numerous council, the policy of Italy and practice of France firſt introduced cabinet councils. King Charles I. is charged with firſt eſtabliſhing this uſage in England. Beſides his privy council, that prince erected a kind of cabinet council, or junto, under the denomination of a council of ſtate; compoſed of archbiſhop Laud, the earl of Strafford, and lord Collington, with the ſecretaries of ſtate. Yet ſome pretend to find the ſubſtance of a cabinet council of much greater antiquity, and even allowed by parliament, who anciently ſettled a quorum of perſons moſt confided in, without whoſe preſence no arduous matter was to be determined; giving them power to act without conſulting the reſt of the council. As long ſince as the 28th of Henry III. a charter paſſed in affirmance of the ancient rights of the kingdom; which provided, that four great men, choſen by common conſent, who were to be conſervators of the kingdom, among other things, ſhould ſee to the diſpoſing of monies given by parliament, and appropriated to particular uſes; and parliaments were to be ſummoned as they ſhould adviſe. But even of theſe four, any two made a quorum; and generally the chief juſtice of England and chancellor were of the number of the conſervators. Matth. Par. 28 Hen. III. In the firſt of Henry VI. the parliament provides, that the quorum for the privy council be ſix, or four at leaſt; and that, in all weighty conſiderations, the dukes of Bedford and Glouceſter, the king's uncles, ſhould be preſent; which ſeems to be erecting a cabinet by law.

CABIRI, a term in the theology of the ancient Pagans, ſignifying great and powerful gods; being a name given to the gods of Samothracia. They were alſo worſhiped in other parts of Greece, as Lemnos and Thebes, where the cabiria were celebrated in honour of them; theſe gods are ſaid to be in number four, viz. Axieros, Axiocerſa, Axiocerſus, and Caſmilus.

CABIRIA, feſtivals in honour of the Cabiri, celebrated in Thebes and Lemnos, but eſpecially in Samothracia, an iſland conſecrated to the Cabiri. All who were initiated into the myſteries of theſe gods were thought to be ſecured thereby from ſtorms at ſea, and all other dangers. The ceremony of initiation was performed by placing the candidate, crowned with olive branches, and girded about the loins with a purple ribband, on a kind of throne, about which the prieſts and perſons before initiated, danced.

CABLE, a thick, large, ſtrong rope, commonly of hemp, which ſerves to keep a ſhip at anchor. There is no merchant-ſhip, however weak, but has at leaſt three cables: namely, the chief cable, or cable of the ſheet-anchor, a common cable, and a ſmaller one. This appellation is alſo given to ropes, which ſerve to raiſe heavy loads, by the help of cranes, pullies, and other engines. The name of *cable* is uſually given to ſuch as have, at leaſt, three inches in circumference: thoſe that are leſs are only called *ropes*, of different names, according to their uſe.

Every cable, of whatſoever thickneſs it be, is compoſed of three ſtrands; every ſtrand of three ropes; and every rope of three twiſts: the twiſt is made of more or leſs threads, according as the cable is to be thicker or thinner. In the manufacture of cables, after the ropes are made, they uſe ſticks, which they paſs firſt between the ropes of which they make the ſtrands, and afterwards between the ſtrands of which they make the cable, to the end that they may all twiſt the better, and be more regularly wound together: and alſo, to prevent them from untwining or entangling, they hang, at the end of each ſtrand and of each rope, a weight of lead or of ſtone. The number of threads each cable is compoſed of is always pro-

portioned to its length and thickneſs; and it is by this number of threads that its weight and value are aſcertained; thus, a cable of three inches circumference, or one inch diameter, ought to conſiſt of 48 ordinary threads, and to weigh 192 pounds; and on this foundation have been calculated tables very uſeful for all people engaged in marine commerce.

Sheet-Anchor CABLE, is the greateſt cable belonging to a ſhip. A *Stream* CABLE, is a hawſer or rope, ſomething ſmaller than the bowers, and uſed to moor the ſhip in a river or haven, ſheltered from the wind and ſea, &c.

To Serve or Plate the CABLE, is to bind it about with ropes, clouts, &c. to keep it from galling in the hawſe.

To Splice a CABLE, is to make two pieces faſt together, by working the ſeveral threads of the rope the one into the other.

Pay more CABLE, is to let more out of the ſhip. *Pay cheap the Cable*, is to hand it out apace. *Veer more Cable*, is to let more out, &c.

CABLE'S *Length*, is a meaſure of 120 fathoms, the uſual length of a cable.

CABLED, in heraldry, a term applied to a croſs formed of the two ends of a ſhip's cable; ſometimes alſo to a croſs covered over with rounds of rope; more properly called a *croſs corded*.

CABLED *Flute*, in architecture, ſuch flutes as are filled up with pieces in the form of a cable.

CABO DE ISTRIA, the capital town of the province of Iſtria, in the territory of Venice; and the ſee of a biſhop. It is ſeated on a ſmall iſland in the gulf of Venice, and is joined to the main land by draw-bridges. E. long. 14. 22. N. lat. 45. 49.

CABOCHED, in heraldry, is when the heads of beaſts are borne without any part of the neck, full-faced.

CABOLETTO, in commerce, a coin of the republic of Genoa, worth about 3d. of our money.

CABOT (Sebaſtian), the firſt diſcoverer of the continent of America, was the ſon of John Cabot a Venetian. He was born at Briſtol in 1477; and was taught by his father arithmetic, geometry, and coſmography. Before he was 20 years of age he made ſeveral voyages. The firſt of any conſequence ſeems to have been made with his father, who had a commiſſion from Henry VII. for the diſcovery of a north-weſt paſſage to India. They failed in the ſpring of 1497; and proceeding to the north-weſt they diſcovered land, which for that reaſon they called *Primaviſta*, or *Newfoundland*. Another ſmaller iſland they called *St. John*, from its being diſcovered on the feaſt of St. John Baptiſt; after which, they ſailed along the coaſt of America as far as Cape Florida, and then returned to England with a good cargo, and three Indians aboard. Stowe and Speed aſcribe theſe diſcoveries wholly to Sebaſtian, without mentioning his father. It is probable that Sebaſtian, after his father's death, made ſeveral voyages to theſe parts, as a map of his diſcoveries, drawn by himſelf, was hung up in the privy garden at Whitehall. However, hiſtory gives but little account of his life for near 20 years; when he went to Spain, where he was made pilot-major, and intruſted with reviewing all projects for diſcoveries, which were then very numerous. His great capacity and approved integrity induced many eminent merchants to treat with him about a voyage by the new found ſtraits of Magellan to the Moluccas. He therefore ſailed in 1525, firſt to the Canaries, and then to the Cape de Verd iſlands, St. Auguſtine and the iſland of Patos; but his ſervices at this period not having gained him the approbation of the court, he came to England; and being introduced to the duke of Somerſet, then lord protector, a new office was erected for him. He was made governor of the myſtery and company of the merchant-adventurers for the diſcovery of regions, dominions, iſlands, and places unknown; a penſion was granted him, by letters-patent, of 166l. 13s. 4d. per annum; and he was conſulted in all affairs relative to trade. In 1522, by his intereſt, the court fitted out ſome ſhips for the diſcovery of the northern parts of the world. This produced the firſt voyage the Engliſh made to Ruſſia, and the beginning of that commerce which has ever ſince been carried on between the two nations. The Ruſſia company was now founded by a charter granted by Philip and Mary; and of this company Sebaſtian was appointed governor for life. It is ſaid he was the firſt who took notice of the variation of the needle, and who publiſhed a map of the world. The exact time of his death is not known, but he lived to be above 70 years of age.

CABRA, a town of the kingdom of Tombut in Africa. It is a large town, but without walls; and is ſeated on the river Niger, about 12 miles from Tombut. The houſes are built in the ſhape of bells; and the walls are made with ſtakes or hurdles, plaſtered with clay, and covered with reeds after the manner of thatch. This place is very much frequented by negroes who come here by water to trade. The town is very unhealthy, which is probably owing to its low ſituation. The colour of the inhabitants is black, and their religion a ſort of Mahometaniſm. They have plenty of corn, cattle, milk, and butter; but ſalt is very ſcarce. The judge who decides controverſies is appointed by the king of Tombut. E. long. 0. 50. N. lat. 14. 21.

CABUL, or GABOUL, a city of Aſia, and capital of the province of Cabuliſtan. It lies in E. long. 68. 15. N. lat. 33. 30. on the frontiers of Great Bukharia, on the ſouth ſide of the mountains which divide the territories of the Mogul from that part of Great Tartary.

CABULISTAN, a province of Aſia, formerly belonging to the Great Mogul; but ceded in 1739 to Kouli Khan, who at that time governed Perſia. It is bounded on the north by Bukharia, on the eaſt by Caſchmire, on the weſt by Zabuliſtan and Candahar, and on the ſouth by Multan. It is 250 miles in length, 240 in breadth, and its chief town is Cabul.

CABURNS, on ſhip-board, are ſmall lines made of ſpun yarn, to bind cables, ſeize tackles, or the like.

CACALIA, in botany; a genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants. The receptacle is naked; the pappus hairy; the calyx cylindrical, oblong, and caliculated, or having a ſmall calyx of very ſhort ſcales only at the baſe.

The ſpecies are, 1. The *ſuaveolens*, with a herbaceous ſtalk, is a native of North America. It hath a perennial creeping root which ſends out many ſtalks, garniſhed with triangular ſpear-ſhaped leaves ſharply ſawed on their edges, of a pale green on their under ſide, but a deep ſhining green above, placed alternately. The ſtalks riſe to the height of ſeven or eight feet, and are terminated by umbels of white flowers, which are ſucceeded by oblong ſeeds covered with down. It flowers in Auguſt, and the ſeeds ripen in October. The ſtalks decay in autumn, and new ones riſe in the ſpring. This plant multiplies greatly by its ſpreading roots, as alſo by the ſeeds, which are ſpread to a great diſtance by the wind, the down which adheres to them being greatly aſſiſting to their conveyance. The roots which have been caſt out of Chelſea garden, being carried by the tide to a great diſtance, have fixed themſelves to the banks of the river, and increaſed ſo much, that in a few years this ſpecies may probably appear as a native of England. 2. The *ficoides* is a native of the Cape of Good Hope. It riſes with ſtrong round ſtalks to the height of ſeven or eight feet, woody at bottom, but ſoft and ſucculent upward, ſending out many irregular branches, garniſhed more than half their length with thick, taper, ſucculent leaves, a little compreſſed on two ſides, ending in points, covered with a whitiſh glaucous farina, which comes off when handled. Theſe, when broken, emit a ſtrong odour of turpentine, and are full of a viſcous

juice; at the extremity of the branches the flowers are produced in fmall umbels; they are white, tubulous, and cut into five parts at the top. The leaves of this plant are pickled by the French, who efteem them much; and in doing this they have a method of preferving the white farina upon them, which adds greatly to the beauty of the pickle when brought to table. 3. The *kleinia*, with a compound fhrubby ftalk, grows naturally in the Canary iflands, but has long been cultivated in the Englifh gardens. It rifes with a thick flefhy ftem divided at certain diftances, as it were, into fo many joints. Each of thefe divifions fwell much larger in the middle than they do at each end; and the ftalks divide into many irregular branches of the fame form, which, toward their extremities, are garnifhed with long, narrow, fpear-fhaped leaves of a glaucous colour ftanding all round the ftalks without order. As they fall off, they leave a fcar at the place, which always remains on the branches. The flowers are produced in large clufters at the extremity of the branches, which are tubulous, and of a faint carnation colour. They appear in Auguft and September, but continue great part of October, and are not fucceeded by feeds in this country. There have been ftones and foffils dug up at a very great depth in fome parts of England having very perfect impreffions of this plant upon them; from whence Dr. Woodward has fuppofed the plants were lodged there at the univerfal deluge; and finding the impreffions of many other plants and animals which are natives of thofe iflands, he concludes that the water flowed hither from the fouth-weft. This plant has been called the *cabbage-tree*, from the refemblance which the ftalk of it has to the cabbage: others have intitled it *carnation tree*, from the fhape of the leaves and the colour of the flowers. Befides thefe, there are feven other fpecies, viz. the alpina, with kidney-fhaped leaves; the glabra, with fmooth leaves; the atriplici-folia, with heart-fhaped finuated leaves; the papillaris, with a fhrubby ftalk guarded on every fide with broken rough foot-ftalks; the ante-euphorbium, with oblong oval leaves; the fonchifolia, with lyre-fhaped indented leaves; and the lutea, with leaves divided into five acute parts.

Thefe three fpecies are very eafily cultivated. The firft will propagate itfelf, as already mentioned, either by roots or feeds. The fecond is eafily propagated by cuttings during the fummer months: thefe fhould be cut from the plants and laid to dry a fortnight, that the wound may be healed over before they are planted. Moft people plunge the pots in which thefe are planted into a hot-bed, to promote their putting out roots; but if planted in June or July, they will root as well in the open air. Even branches broken off by accident have frequently put out roots when fallen on the ground, without any care. Thefe branches may be kept fix months out of the ground, and will take root if planted. This fhould have a light fandy earth, and in winter be placed in an airy glafs-cafe, where they may enjoy the fun and air in mild weather, but muft be protected from froft. During the winter feafon the plants muft have but little water; and in fummer, when they are placed in the open air, it fhould not be given to them too often, nor in great quantity. The third is alfo propagated by cuttings, and the plants require the fame culture; but muft have a dry warm glafs-cafe in winter, and very little water, being fubject to rot with wet. In fummer they muft be placed in the open air in a warm fheltered fituation, and in very dry weather refrefhed moderately with water. With this management the plants will flower annually, and grow to the height of eight or ten feet.

CACAO. See Theobroma.

CACCOONS. See Fevillea.

CACERES, a town of Spain, in the province of Eftremadura, is feated on the river Saler, and noted for the exceeding fine wool which the fheep bear in the neighbourhood. Between this town and Brocos, there is a wood, where the allies defeated the rear-guard of the duke of Berwick, on the 7th of April 1706. E. long. 6. 47. N. lat. 39. 15.

CACHALOT, in ichthyology. See Physeter.

CACHAN, or Cashan, a confiderable town of Perfia in Irac Agemi, where they carry on an extenfive trade in filks, filver, and gold brocades, and fine earthen ware. It is fituated in a vaft plain, 55 miles from Ifpahan. E. long. 50. 2. N. lat. 34. 10.

CACHAO, a town of Afia, capital of a province of the fame name, in the kingdom of Tonquin, about 80 miles from the gulf of Tonquin in the Eaftern Ocean, and on the weft fide of the river Hoti. It contains about 20,000 houfes, whofe walls are of mud; the roofs covered with thatch; and each has a yard, in which is a fmall arched brick building, like an oven, with the mouth to the ground. In thefe they put their goods, to fecure them from fire. The houfe of the Englifh factory is the beft in the place. The trading-people are civil to ftrangers, but the great men haughty, and the poor thievifh. They are Pagans, and have a great number of pagodas. The factories purchafe filks and lackered ware, as in China. Long. 105. 32. E. Lat. 22. 10. N.

CACHECTIC, fomething partaking of the nature of, or belonging to, cachexy.

CACHEO, a town of Negroland in Africa, feated on the river St. Domingo. It is fubject to the Portuguefe, who have three forts there, and carry on a great trade in wax and flaves. W. long. 14. 55. N. lat. 12. 0.

CACHEXY, in medicine, a term ufed by the Boerhaavians to fignify a vicious ftate of the humours and whole habit of body.

CACHRYS, in botany; a genus of the digynia order belonging to the pentandria clafs of plants; and the natural method ranking under the 45th order, *Umbellatæ*. The fruit is fubovate, angled, and cork or fpongy rinded.—There are five *fpecies*, viz. the *trifida*, with bipinnated leaves; the *ficula*, with double winged leaves; the *libanotis*, with fmooth furrowed feeds; the *linearia*, with plain channelled fruit; and the *hungarica*, with a plain, fungous, channelled feed. All thefe are perennial plants, rifing pretty high, and bearing large umbels of yellow flowers, and may be propagated by feeds which ought to be fown foon after they are ripe; for if they are kept out of the ground till the next fpring, they often mifcarry. They muft alfo be fown in a fhady border where they are to remain: for the plants, having long top roots, will not bear tranfplanting fo well as many others. The Hungarians in the neighbourhood of Erlaw, and thofe who border on Tranfylvania, Servia, &c. eat the root of the fifth fpecies, in a fcarcity of corn, for want of other bread.

CACHUNDE, a medicine highly celebrated among the Chinefe and Indians, made of feveral aromatic ingredients, perfumes, medicinal earths, and precious ftones. They make the whole into a ftiff pafte, and form out of it feveral figures according to their fancy, which are dried for ufe. Thefe are principally ufed in the Eaft Indies, but are fometimes brought over to Portugal. In China, the principal perfons ufually carry a fmall piece in their mouths, which is a continued cordial, and gives their breath a very fweet fmell. It is highly efteemed as a medicine in nervous complaints; and is reckoned a prolonger of life, and a provocative to venery, the two great intentions of moft of the medicines ufed in the Eaft.

CACOCHYLIA, or Cacochymia, according to the humoral pathology, a vicious ftate of the vital fluids, efpecially of the mafs of blood; fuppofed to arife either from a diforder of the fecretions or excretions, or from external contagion. The word is compounded of κακος *ill*, and χυμος *juice*.

CACOPHONIA, in grammar and rhetoric, the meeting of two letters, or ſyllables, which yield an uncouth and diſagreeable ſound. The word is compounded of κακος *evil*, and φωνη *voice*.

Cacophonia, in Medicine, denotes a vice or deprivation of the voice or ſpeech; of which there are two ſpecies, *aphonia* and *dyſphonia*.

CACTUS, in botany, a genus of the monogynia order belonging to the icoſandria claſs of plants; and in the natural method ranking under the 13th order, *Succulentæ*. The calyx is monophyllous; ſuperior, or above the receptacle of the fruit imbricated; the corolla polypetalous: the fruit an unilocular, polyſpermous berry. To this genus Linnæus has added the cereus and opuntia. There are 24 ſpecies, all natives of the Weſt Indies and Mexico.—The cacti are plants of a ſingular ſtructure, but eſpecially the larger kinds of them: which appear like a large, fleſhy, green melon, with deep ribs, ſet all over with ſtrong ſharp thorns, and, when the plants are cut through the middle, their inſide is a ſoft, pale green, fleſhy ſubſtance, very full of moiſture. The fruit of all the ſpecies is frequently eaten by the inhabitants of the Weſt Indies. The fruits are about three quarters of an inch in length, of a taper form, drawing to a point at the bottom toward the plant, but blunt at the top where the empalement of the flower was ſituated. The taſte is agreeably acid, which in a hot country muſt render the fruit more grateful. The cochineal animals are ſupported on a ſpecies called *cactus cochenillifer*.—The flower of the cactus grandiflora (one of the creeping cereuſes) is ſaid to be as grand and beautiful as any in the vegetable ſyſtem: it begins to open in the evening about ſeven o'clock, is in perfection about eleven, and fades about four in the morning; ſo that the ſame flower only continues in perfection about ſix hours. The calyx when expanded is about a foot in diameter, of a ſplendid yellow within, and a dark brown without; the petals are many, and of a pure white; and the great number of recurved ſtamina, ſurrounding the ſtyle in the centre of the flower, make a grand appearance, to which may be added the fine ſcent, which perfumes the air to a conſiderable diſtance. It flowers in the month of July.

CACUS, in fabulous hiſtory, an Italian ſhepherd upon mount Aventine. As Hercules was driving home the herd of king Geryon, whom he had ſlain, Cacus robbed him of ſome of his oxen, which he drew backward into his den leſt they ſhould be diſcovered. Hercules at laſt finding them out by their lowing, or the robbery being diſcovered to him, killed Cacus with his club. He was Vulcan's ſon, of prodigious bulk, and half man half ſatyr.

CADAN, a town of Bohemia, in the circle of Zats, ſeated on the northern bank of the river Egra, in E. long. 13. 34. N. lat. 50. 20.

CADARI, or Kadari, a ſect of Mahometans, who aſſert free-will; attribute the actions of men to men alone, not to any ſecret power determining the will; and deny all abſolute decrees, and predeſtination. The author of this ſect was Mabed ben Kaled Al Gihoni, who ſuffered martyrdom for it. The word comes from the Arabic, קדר *cadara*, *power*. Ben Aun calls the Cadarians the Magi, or Manichees of the Muſſulmen.

CADE, a cag, caſk, or barrel. A cade of herrings is a veſſel containing the quantity of 500 red herrings, or 1000 ſprats.

Cade-*Lamb*, a young lamb weaned and brought up by hand, in a houſe; called in the north, *pet-lamb*.

Cade-*Oil*, in the *Materia Medica*, a name given to an oil much in uſe in ſome parts of France and Germany. The phyſicians have called it *oleum cadæ*, or *oleum de cada*. This is ſuppoſed by ſome to be the piſſelæum of the ancients, but improperly; it is made of the fruit of the oxycedrus, which is called by the people of thoſe places *cada*.

Cade *Worm*, in zoology, the maggot or worm of a fly called *phryganea*. It is uſed as a bait in angling. See Phryganea.

CADEA, or, The league of the house of God, is one of thoſe that compoſe the republic of the Griſons, and the moſt powerful and extenſive of them all. It contains the biſhopric of Coire, the great valley of Engadine, and that of Bragail or Pregal. Of the 11 great, or 21 ſmall communities, there are but two that ſpeak the German language; that of the reſt is called the *Rhetic*, and is a dialect of the Italians. The Proteſtant religion is moſt prevalent in this league, which has been allied at the Swiſs cantons ever ſince the year 1298. Coire is the capital town.

CADENAC, a town of France in the department of Lot and late province of Querci, ſeated on the river Lot, in E. long. 2. 12. N. lat. 44. 36.

CADENCE, or Repose, in muſic (from the Latin *cadere* to *fall* or *deſcend*); the termination of an harmonical phraſe on a repoſe, or on a perfect chord. See farther on this ſubject under the article Music.

Cadence, in reading, is a falling of the voice below the key note at the cloſe of every period. In reading, whether proſe or verſe, a certain tone is aſſumed which is called the *key-note*; and in this tone the bulk of the words are ſounded; but this note is generally lowered towards the cloſe of every ſentence.

Cadence, in the manege, an equal meaſure or proportion obſerved by a horſe in all his motions; ſo that his times have an equal regard to one another, the one does not embrace or take in more ground than the other, and the horſe obſerves his ground regularly.

CADENE, one of the ſorts of carpets which the Europeans import from the Levant. They are the worſt ſort of all, and are ſold by the piece from one to two piaſtres per carpet.

CADENET, a town of France in the department of the mouths of the Rhone and late province of Provence. E. long. 5. 30. N. lat. 43. 40.

CADET, the younger ſon of a family, is a term naturalized in our language from the French. Before the eſtabliſhment of the French republic, at Paris, among the citizens, the cadets had an equal patrimony with the reſt. At Caux, in Normandy, the cuſtom, as with us, was to leave all to the eldeſt, except a ſmall portion to the cadets. In Spain, it is uſual for one of the cadets in great families to take the mother's name.

Cadet is alſo a military title denoting a young gentleman who chooſes to carry arms in a marching regiment as a private man; having a view to acquire ſome knowledge in the art of war, and to obtain a commiſſion in the army. A cadet differs from a volunteer, as the former takes pay, whereas the latter ſerves without pay.

CADI, or Cadhi, a judge of the civil affairs in the Turkiſh empire. It is generally taken for the judge of a town; judges of provinces being diſtinguiſhed by the appellation of *moulas*.—We find numerous complaints of the avarice, iniquity, and extortion of the Turkiſh cadis: all juſtice is here venal; the people bribe the cadis, the cadis bribe the moulas, the moulas the cadileſchers, and the cadileſchers the mufti. Each cadi has his ſerjeants, who are to ſummon perſons to appear and anſwer complaints. If the party ſummoned fails to appear at the hour appointed, ſentence is paſſed in favour of his adverſary. It is uſually vain to appeal from the ſentences of the cadi, ſince the affair is never heard anew, but judgment is paſſed on the caſe as ſtated by the cadi. But the cadis are often caſhiered and puniſhed for crying injuſtice, with the baſtinado and mulcts: the law, however, does not allow them to be put to death. Conſtantinople has had cadis ever ſince the

year 1390, when Bajazet I. obliged John Paleologus, emperor of the Greeks, to receive cadis into the city to judge all controverfies happening between the Greeks and the Turks fettled there. In fome countries of Africa, the cadis are alfo judges of religious matters. Among the Moors, cadis is the denomination of their higher order of priefts or doctors, anfwering to the rabbins among the Jews.

CADIACI, the Turkifh name of Chalcedon. See CHALCEDON.

CADILESCHER, a capital officer of juftice among the Turks, anfwering to a chief juftice among us. It is faid, that this authority was originally confined to the foldiery; but that, at prefent, it extends itfelf to the determination of all kinds of law-fuits, yet is neverthelefs fubject to appeals. There are but three cadilefchers in all the grand fignior's territories: the firft is that of Europe; the fecond, of Natolia; and the third refides at Grand Cairo. This laft is the moft confiderable: they have their feats in the divan next to the grand vizir.

CADILLAC, a town of France in the department of Gironde and late province of Guienne, feated near the river Garonne, with a handfome caftle, fituated in W. long. 0. 15. N. lat. 44. 37.

CADIZ, a city and port-town of Andalufia in Spain, fituated on the ifland of Leon, oppofite to Port St. Mary on the continent, about 60 miles fouth-weft of Seville, and 40 north-weft of Gibraltar. W. long. 6. 40. N. lat. 36. 30. It occupies the whole furface of the weftern extremity of the ifland, which is compofed of two large circular parts, joined together by a very narrow bank of fand, forming altogether the figure of a chain-fhot. At the fouth-eaft end, the ancient bridge of Suaco, thrown over a deep channel or river, affords a communication between the ifland and the continent; a ftrong line of works defends the city from all approaches along the ifthmus; and, to render them ftill more difficult, all the gardens and little villas on the beach were in 1762 cleared away, and a dreary fandy glacis left in their room, fo that now there is fcarce a tree to be found in the whole ifland.

Except the *Calle Ancha*, all the ftreets are narrow, ill-paved, and infufferably ftinking. They are all drawn in ftraight lines, and moft of them interfect each other at right angles. The fwarms of rats that in the night run about the ftreets are innumerable; whole droves of them pafs and repafs continually, and thefe their midnight revels are extremely troublefome to fuch as walk late. The houfes are lofty, with each a veftibule, which being left open till night, ferve paffengers to retire to; this cuftom, which prevails throughout Spain, renders thefe places exceedingly offenfive. In the middle of the houfe is a court like a deep well, under which is generally a ciftern, the breeding-place of gnats and mufquitos; the ground floors are warehoufes, the firft ftories compting-houfe or kitchen, and the principal apartment up two pair of ftairs. The roofs are flat, covered with an impenetrable cement, and few are without a *mirader* or turret for the purpofe of commanding a view of the fea. Round the parapet-wall at top are placed rows of fquare pillars, meant either for ornament according to fome traditional mode of decoration, or to fix awnings to, that fuch as fit there for the benefit of the fea-breeze may be fheltered from the rays of the fun; but the moft common ufe made of them, is to faften ropes for drying linen upon. High above all thefe pinnacles, which give Cadiz a moft fingular appearance, ftands the tower of fignals. Here flags are hung out on the firft fight of a fail, marking the fize of the fhip, the nation it belongs to, and, if a Spanifh Indiaman, the port of the Indies it comes from. The fhips are acquainted with the proper fignals to be made, and thefe are repeated by the watchmen of the tower; as painted lifts are in every houfe, perfons concerned in commerce foon inform themfelves of the fignals.

The city is divided into twenty-four quarters, under the infpection of as many commiffioners of police; and its population is reckoned at one hundred and forty thoufand inhabitants, of which twelve thoufand are French, and at leaft as many more Italians. The fquare of St. Antonia is large, and tolerably handfome, and there are a few fmaller openings of no great note. The public walk, or Alameda, is pleafant in the evening; it is fenced off the coach-road by a marble rail. The fea-air prevents the trees from thriving, and deftroys all hopes of future fhade.

From the Alameda, continuing your walk weftwards, you come to the Campofanto, a large efplanade, the only airing-place for coaches; it turns round moft part of the weft and fouth fides of the ifland, but the buildings are ftraggling and ugly; the only edifice of any fhow is the new orphan-houfe; oppofite to it is the fortrefs of St. Sebaftian, built on a neck of land running out into the fea. The round tower at the extremity is fuppofed to have faved the city, in the great earthquake of 1755, from being fwept away by the fury of the waves. The building proved fufficiently folid to withftand the fhock, and break the immenfe volume of water that threatened deftruction to the whole ifland. In the narrow part of the ifthmus the furge beat over with amazing impetuofity, and bore down all before it; among the reft, the grandfon of the famous tragic poet Racine, who ftrove in vain to efcape, by urging his horfe to the utmoft of his fpeed. On St. Sebaftian's feaft, a kind of wake or fair is held in the fort; an aftonifhing number of people then paffing and repaffing, on a ftring of wooden bridges laid from rock to rock, makes a very lively moving picture.

From hence to the wooden circus where they exhibit the bull-feafts, you keep turning to the left clofe above the fea, which on all this fide dafhes over large ledges of rock; the fhore feems here abfolutely inacceffible. On this fhore ftands the cathedral, a work of great expence, but carried on with fo little vigour, that it is difficult to guefs at the term of years it will require to bring it to perfection. Next, croffing before the land gate and barracks, a fuperb edifice for ftrength, convenience, and cleanlinefs, you come down to the ramparts that defend the city on the fide of the bay. If the profpect to the ocean is folemn, that towards the main land is animated in the higheft degree; the men of war ride in the eaftern bofom of the bay; lower down the merchantmen are fpread far and near; and clofe to the town an incredible number of barks, of various fhapes and fizes, cover the furface of the water, fome moored and fome in motion, carrying goods to and fro. The oppofite fhore of Spain is ftudded with white houfes, and enlivened by the towns of St. Mary, Port-real, and others; behind which, eaftward, on a ridge of hills, ftands Medina Sidonia, and further back rife the mountains of Grenada. Weftward, Rota clofes the horizon: near to this was anciently the ifland and city of Tarteffus, now covered by the fea, but at low-water fome part of the ruins are ftill to be difcerned. In a large baftion, jutting out into the bay, they have built the cuftom-houfe, the firft ftory of which is level with the walk upon the walls. When it was refolved to erect a building fo neceffary to this great emporium of trade, the marquis di Squillace gave orders that no expence fhould be fpared, and the moft intelligent architects employed, in order to erect a monument, which by its tafte and magnificence might excite the admiration of pofterity: the refult of thefe intentions proved a piece of vile architecture, compofed of materials of the very worft kind.

The buftle and activity difplayed here is prodigious during the laft months of the ftay of the flota. The packers poffefs the art of preffing goods in great perfection; but, as they pay the freight according to the cubic palms of each bale, they are apt to fqueeze down the cloths and linen fo very clofe and hard, as fometimes to render them unfit for ufe. Before the revolution in France the exportation of luxuries in drefs was enormous; Lyons furnifhed moft of them; England fends out bale goods; Brittany and the north, linens. Every commercial nation has a conful refident at Cadiz; thofe of England and France are the only ones not allowed to have any concern in trade. In 1596 Cadiz was taken, pillaged, and burnt by the Englifh; but in 1702 it was attempted in conjunction with the Dutch, without effect.

CADIZADELITES, a fect of Mahometans very like the ancient ftoics. They fhun feafts and diverfions, and affect an extraordinary gravity in all their actions; they are continually talking of God, and fome of them make a jumble of Chriftianity and Mahometanifm; they drink wine, even in the faft of the ramazan; they love and protect the Chriftians; they believe that Mahomet is the Holy Ghoft, practife circumcifion, and juftify it by the example of Jefus Chrift.

CADMEAN LETTERS, the ancient Greek or Ionic characters, fuch as they were firft brought by Cadmus from Phœnicia; whence Herodotus alfo calls them *Phœnician letters*.—According to fome writers, Cadmus was not the inventor, nor even importer of the Greek letters, but only the modeller and reformer of them; and it was hence they acquired the appellation *Cadmean* or *Phœnician letters*; whereas before that time they had been called *Pelafgian letters*.

CADMIA. See CALAMINE.

CADMUS, in fabulous hiftory, king of Thebes, the fon of Agenor king of Phœnicia, and the brother of Phœnix, Cilix, and Europa. He carried into Greece the 16 fimple letters of the Greek alphabet; and there built Thebes, in Bœotia. The poets fay, that he left his native country in fearch of his fifter Europa, whom Jupiter had carried away in the form of a bull; and that, enquiring of the Delphic oracle for a fettlement, he was anfwered, that he fhould follow the direction of a cow, and build a city where fhe lay down. Having arrived among the Phocenfes, he was met by a cow, who conducted him through Bœotia to the place where Thebes was afterwards built: but as he was about to facrifice his guide to Pallas, he fent two of his company to the fountain Dirce for water; when they being devoured by a ferpent or dragon, he flew the monfter, and afterwards, by the advice of Pallas, fowed his teeth, when there fprung up a number of armed foldiers, who prepared to revenge the death of the ferpent; but on his cafting a ftone among thefe upftart warriors, they turned their weapons againft each other with fuch animofity, that only five furvived the combat, and thofe affifted Cadmus in founding his new city. Afterwards, to recompenfe his labours, the gods gave him Harmonia, or Hermione, the daughter of Mars and Venus; and honoured his nuptials with prefents and peculiar marks of approbation and favour. But at length refigning Thebes to Pentheus, Cadmus and Hermione went to govern the Ecclellenfes: when grown old, they were transformed into ferpents; or, as others fay, fent to the Elyfian fields, in a chariot drawn by ferpents.

CADMUS of Miletum, a celebrated Greek hiftorian, was, according to Pliny, the firft of the Greeks who wrote hiftory in profe. He flourifhed about 550 years before Chrift.

CADORE, or PIEVE DE CADORE, a town of Italy, in the territory of Venice, and capital of a diftrict called *Cadorino*; famous for the birth of Titian the painter. E. long. 13. 45. N. lat. 46. 25.

CADORINO, a province of Italy, in the territory of Venice; bounded on the eaft by Friuli Proper, on the fouth and weft by the Bellunefe, and by the bifhopric of Brixen on the north. It is a very mountainous country, but pretty populous. The only town is Pieve de Cadore.

CADRITES, a fort of Mahometan friars, who once a-week fpend a great part of the night in turning round, holding each others hand, and repeating inceffantly the word *hai*, which fignifies *living*, and is one of the attributes of God; during which one of them plays on a flute. They never cut their hair, nor cover their heads; and always go bare-footed: they have liberty to quit their convent when they pleafe, and to marry.

CADSAND, an ifland on the coaft of Dutch Flanders, fituated at the mouth of the Scheldt, whereby the Dutch formerly commanded the navigation of that river.

CADUCEUS, in antiquity, Mercury's rod or fceptre, being a wand entwifted by two ferpents borne by that deity as the enfign of his quality and office, given him, according to the fable, by Apollo, for his feven-ftringed harp. Wonderful properties are afcribed to this rod by the poets; as laying men afleep, raifing the dead, &c.—It was alfo ufed by the ancients as a fymbol of peace and concord: the Romans fent the Carthaginians a javelin and a caduceus, offering them their choice either of war or peace. Among that people, thofe who denounced war were called *feciales*; and thofe who went to demand peace, *caduceatores*, becaufe they bore a caduceus in their hand.—The caduceus found on medals is a common fymbol, fignifying good conduct, peace, and profperity. The rod expreffes power, the two ferpents prudence, and the two wings diligence.

CADUCI, from *cado* to "fall," is the name of a clafs in Linnæus's *calycina*, confifting of plants whofe calyx is a fimple perianthium, fupporting a fingle flower or fructification, and falling off either before or with the petals. It ftands oppofed to the *claffes perfiftentes* in the fame method, and is exemplified in muftard and ranunculus.

CADUS, in antiquity, a wine-veffel of a certain capacity, containing 80 amphoræ or firkins; each of which, according to the beft accounts, held nine gallons.

CÆCILIA, in zoology, a genus of ferpents belonging to the amphibia clafs. The cæcilia has no fcales; it is fmooth, and moves by means of lateral rugæ or prickles. The upper lip is prominent, and furnifhed with two tentacula. It has no tail. There are but two fpecies of this ferpent, viz. 1. The *tentaculata*, has 135 rugæ. It is about a foot long, and an inch in circumference, preferving an uniform cylindrical fhape from the one end to the other. The teeth are very fmall. It has fuch a refemblance to an eel, that it may eafily be miftaken for one; but as it has neither fins nor gills, it cannot be claffed with the fifhes. It is a native of America, and its bite is not poifonous. 2. The *glutinofa*, has 340 rugæ or prickles above, and 10 below, the anus. It is of a brownifh colour, with a white line on the fide, and is a native of the Indies.

CÆCUM, or CŒCUM, the blind gut, improperly ranked with the large inteftines, fince it is infinitely the fmalleft in the human body. See ANATOMY.

CÆLIUS MONS at Rome. See CŒLIUS.

CÆLIUS (Aurelianus), an ancient phyfician, and the only one of the fect of the methodifts of whom we have any remains. He was of Sicca, a town of Numidia; but in what age he lived cannot be determined: it is probable, however, that he lived before Galen; fince, though he carefully mentions all the phyficians before him, he takes no notice of Galen. He had read over very diligently the ancient phyficians of all fects; and we are indebted to him for the knowledge of many dogmas which are not to be found but in his books *de celeribus et tardis paffio-*

gilus. He wrote, as he himfelf tells us, feveral other works; but they are all perifhed.

CAEN, a handfome and confiderable town of France, in the department of Calvados, and late province of Lower Normandy, of which it was the capital. It has a celebrated univerfity, and an academy of literature; and contains 60 ftreets, and 12 parifhes. It has a caftle with four towers, which were built by the Englifh. The town-houfe is a large building with four great towers. The royal fquare is the handfomeft in all Normandy, and has fine houfes on three fides of it. In the middle once ftood the ftatue of Louis XIV. in a Roman habit, placed on a marble pedeftal, and furrounded with an iron balluftrade. It is feated in a pleafant country on the river Orne, about eight miles from the fea. William the conqueror was buried here, in the abbey of St. Stephen, which he founded. W. long. 0. 27. N. lat. 49. 11.

CAERFILLY, a town of Glamorganfhire in South Wales, feated between the rivers Taff and Rumney, in a moorifh ground among the hills. It is thought the walls, now in ruins, were built by the Romans; there being often Roman coins dug up there. W. long. 3. 12. N. lat. 51. 25.

CAERLEON, a town of Monmouthfhire in England, and a place of great antiquity. It was a Roman town, as is evident from the many Roman antiquities found here. It is commodioufly fituated on the river Ufk, over which there is a large wooden bridge. The houfes are generally built of ftone, and there are the ruins of a caftle ftill to be feen. W. long. 3. 0. N. lat. 51. 40.

CAERMARTHEN-SHIRE, a county of Wales, bounded on the north by Severn fea or St. George's Channel, Cardiganfhire on the fouth, the fhires of Brecknock and Glamorgan on the eaft, and Pembrokefhire on the weft. Its greateft length is between 30 and 40 miles, and its breadth upwards of 20. The air is wholefome, and the foil lefs rocky and mountainous than moft other parts of Wales, and confequently is proportionally more fertile both in corn and pafture. It has alfo plenty of wood, and is well fupplied with coal and limeftone. The moft confiderable rivers are the Towy, the Cothy, and the Tave; of which the firft abounds with excellent falmon. The principal towns are Caermarthen the capital, Kidwely, Lanimdovery, &c. This county abounds with ancient forts, camps, and tumuli or barrows. Near to Caermarthen, towards the eaft, may be feen the ruins of Kaftelk Karrey, which was fituated on a fteep and inacceffible rock; and alfo feveral vaft caverns, fuppofed to have been copper mines of the Romans. Near this fpot is a fountain which ebbs and flows twice in 24 hours, like the fea.

CAERMARTHEN, a town of Wales, and capital of the county of that name. It is fituated on the river Fowey, over which it has a fine ftone-bridge. It is of great antiquity, being the Maridunum of Ptolemy. It is a populous, thriving, and polite place, many of the neighbouring gentry refiding there in the winter. It is a corporation and county of itfelf, with power to make by-laws. Here were held the courts of chancery and exchequer for South Wales, till the whole was united to England in the reign of Henry VIII. Here was born the famous conjuror Merlin; and many of his pretended prophecies are ftill preferved. The town gives the title of *marquis* to the duke of Leeds, and fends one member to parliament, and the county another.

CAERNARVON-SHIRE, a county of Wales, bounded on the north and weft by the fea, on the fouth by Merionethfhire, and on the eaft is divided from Denbighfhire by the river Conway. It is about 40 miles in length, and 20 in breadth; and fends one member to parliament for the fhire, and another for the borough of Caernarvon. The air is very piercing; owing partly to the fnow, that lies feven or eight months of the year upon fome of the mountains, which are fo high that they are called the *Britifh Alps*; and partly to the great number of lakes, which are faid not to be fewer than 50 or 60. The foil on the valleys on the fide next Ireland is pretty fertile, efpecially in barley; great numbers of black cattle, fheep, and goats, are fed on the mountains; and the fea, lakes, and rivers, abound with variety of fifh. The higheft mountains in the county are thofe called *Snowdon hills*, and *Pen-maen-mawr*, which laft hangs over the fea. There is a road cut out of the rock on the fide next the fea, guarded by a wall running along the edge of it on that fide; but the traveller is fometimes in danger of being crufhed by the fall of pieces of the rock from the precipices above. The river Conway, though its courfe from the lake out of which it iffues to its mouth is only 12 miles, yet is fo deep, in confequence of the many brooks it receives, that it is navigable by fhips of good burden for eight miles. Pearls are found in a large black mufcle taken in this river. The principal towns are Bangor, Caernarvon the capital, and Conway. In this county is an ancient road faid to have been made by Helena the mother of Conftantine the Great; and Matthew of Weftminfter afferts, that the body of Conftantius, the father of the fame Conftantine, was found at Caernarvon in the year 1283, and interred in the parifh-church there by order of Edward I.

CAERNARVON, a town of Wales, and capital of the county of that name. It was built by Edward I. near the fite of the ancient Segontium, after his conqueft of the country in 1282, the fituation being well-adapted to overawe his new fubjects. It had natural requifites for ftrength; being bounded on one fide by the arm of the fea called the *Menai*; by the eftuary of the Seiont on another, exactly where it receives the tide from the former; on a third fide, and a part of the fourth, by a creek of the Menai; and the remainder has the appearance of having the infulation completed by art. Edward undertook this great work immediately after his conqueft of the country in 1282, and completed the fortifications and caftle before 1284; for his queen, on April 25th in that year, brought forth within its walls Edward, firft prince of Wales of the Englifh line. It was built within the fpace of one year, by the labour of the peafants, and at the coft of the chieftains of the country, on whom the conqueror impofed the hateful tafk. The external ftate of the walls and caftle, Mr. Pennant informs us, are at prefent exactly as they were in the time of Edward. The walls are defended by numbers of round towers, and have two principal gates: the eaft, facing the mountains; the weft, upon the Menai. The entrance into the caftle is very augufl, beneath a great tower, on the front of which appears the ftatue of the founder, with a dagger in his hand, as if menacing his new-acquired unwilling fubjects. The gate had four portcullifes, and every requifite of ftrength. The towers are very beautiful. The eagle tower is remarkably fine, and has the addition of three flender angular turrets iffuing from the top. Edward II. was born in a little dark room in this tower, not twelve feet long nor eight in breadth: fo little did, in thofe days, a royal confort confult either pomp or convenience. The gate through which the affectionate Eleanor entered, to give the Welfh a prince of their own, who could not fpeak a word of Englifh, is at the fartheft end, at a vaft height above the outfide ground; fo could only be approached by a draw-bridge. The quay is a moft beautiful walk along the fide of the Menai, and commands a moft agreeable profpect.

Caernarvon is deftitute of manufactures, but has a brifk trade with London, Briftol, Liverpool, and Ireland, for the feveral neceffaries of life. Edward I. beftowed on this town its firft royal charter, and made it a free borough. The reprefentative of the place is elected by its burgeffes, and thofe of Conway, Pwllheli, Nefyn, and Crickaeth. The town gives title of *earl*

and *marquis* to the duke of Chandos, and has a good tide-harbour.

CAERWIS, a market-town of Flintſhire in North Wales, ſituated in W. long. 3. 25. N. lat. 53. 20.

CÆSALPINIA Brasiletto, or *Braſil-wood*; a genus of the monogynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 33d order, *Lomentaceæ*. The calyx is quinquefid, with the loweſt ſegment larger in proportion. There are five petals, with the loweſt more beautiful than the reſt. It is a leguminous plant. Of this there are three ſpecies, the moſt remarkable of which is the braſilienſis, commonly called *Braſiletto*. See Plate 63. It grows naturally in the warmeſt parts of America, from whence the wood is imported for the dyers, who uſe it much. The demand has been ſo great, that none of the large trees are left in any of the Britiſh plantations; ſo that Mr. Cateſby owns himſelf ignorant of the dimenſions to which they grow. The largeſt remaining are not above two inches in thickneſs, and eight or nine feet in height. The branches are ſlender, and full of ſmall prickles; the leaves are pinnated; the lobes growing oppoſite to one another, broad at their ends, without one notch. The flowers are white, papilionaceous, with many ſtamina and yellow apices, growing in a pyramidal ſpike, at the end of a long ſlender ſtalk: the pods incloſe ſeveral ſmall round ſeeds. The colour produced from this wood is greatly improved by a ſolution of tin in aqua regia. See Colour-making and Dyeing. The ſecond ſort is a native of the ſame countries with the firſt, but is of a larger ſize. It ſends out many weak irregular branches, armed with ſhort, ſtrong, upright thorns. The leaves branch out in the ſame manner as the firſt; but the lobes, or ſmall leaves, are oval and entire. The flowers are produced in long ſpikes like thoſe of the former, but are variegated with red. Theſe plants may be propagated from ſeeds, which ſhould be ſown in ſmall pots filled with light rich earth early in the ſpring, and plunged in a bed of tanner's bark. Being tender, they require to be always kept in the ſtove, and to be treated in the ſame manner as other exotics of the ſame kind.

CÆSALPINUS of Arezzo, profeſſor at Piſa, and afterwards phyſician to pope Clement VIII. one of the firſt-rate writers in botany at that period. See the Introduction to Botany.

CÆSAR (Julius), the illuſtrious Roman general and hiſtorian, was of the family of the Julii, who pretended they were deſcended from Venus by Æneas. The deſcendants of Aſcanius ſon of Æneas and Creuſa, and ſurnamed *Julius*, lived at Alba till that city was ruined by Tullus Hoſtilius king of Rome, who carried them to Rome, where they flouriſhed. We do not find that they produced more than two branches. The firſt bore the name of *Tullus*, the other that of *Cæſar*. The moſt ancient of the Cæſars were thoſe who were in public employments in the 11th year of the firſt Punic war. After that time we find there was always ſome of that family who enjoyed public offices in the commonwealth, till the time of Caius Julius Cæſar, the ſubject of this article. He was born at Rome the 12th of the month Quintilis, year of the city 653, and loſt his father anno 669. By his valour and eloquence he ſoon acquired the higheſt reputation in the field and in the ſenate. Beloved and reſpected by his fellow-citizens, he enjoyed ſucceſſively every magiſterial and military honour the republic could beſtow conſiſtent with its own free conſtitution. But at length having ſubdued Pompey the great rival of his growing power, his boundleſs ambition effaced the glory of his former actions: for, purſuing his favourite maxim, "that he had rather be the firſt man in a village than the ſecond in Rome," he procured himſelf to be choſen perpetual dictator; and, not content with this unconſtitutional power, his faction had reſolved to raiſe him to the imperial dignity; when the friends of the civil liberties of the republic raſhly aſſaſſinated him in the ſenate-houſe, where they ſhould only have ſeized him and brought him to a legal trial for uſurpation. By this impolitic meaſure they defeated their own purpoſe, involving the city in conſternation and terror, which produced general anarchy, and paved the way to the revolution they wanted to prevent; the monarchical government being abſolutely founded on the murder of Julius Cæſar. He fell in the 56th year of his age, 43 years before the Chriſtian æra. His commentaries contain a hiſtory of his principal voyages, battles, and victories. The London edition in 1712, in folio, is preferable to all others.

In the *Melanges Philoſophiques* of M. Ophellot, we are preſented with the following portrait of this extraordinary man: "Cæſar (ſays that writer) had one predominant paſſion, the love of glory; and he paſſed 40 years of his life in ſeeking opportunities to foſter and encourage it. His ſoul, entirely abſorbed in ambition, did not open itſelf to other impulſes. He cultivated letters; but he did not love them with enthuſiaſm, becauſe he had not leiſure to become the firſt orator of Rome. He corrupted the one half of the Roman ladies, but his heart had no concern in the fiery ardour of his ſenſes. In the arms of Cleopatra, he thought of Pompey; and this ſingular man, who diſdained to have a partner in the empire of the world, would have bluſhed to have been for one inſtant the ſlave of a woman.

"We muſt not imagine, that Cæſar was born a warrior, as Sophocles and Milton were born poets. For, if nature had made him a citizen of Sybaris, he would have been the moſt voluptuous of men. If in our days he had been born in Pennſylvania, he would have been the moſt inoffenſive of quakers, and would not have diſturbed the tranquillity of the new world.

"The moderation with which he conducted himſelf after his victories, has been highly extolled; but in this he ſhewed his penetration, not the goodneſs of his heart. Is it not obvious, that the diſplay of certain virtues is neceſſary to put in motion the political machine? It was requiſite that he ſhould have the appearance of clemency, if he inclined that Rome ſhould forgive him his victories. But what greatneſs of mind is there in a generoſity which follows on the uſurpation of ſupreme power?

"Nature, while it marked Cæſar with a ſublime character, gave him alſo that ſpirit of perſeverance which renders it uſeful. He had no ſooner begun to reflect, than he admired Sylla; hated him, and yet wiſhed to imitate him. At the age of 15, he formed the project of being dictator. It was thus that the preſident Monteſquieu conceived, in his early youth, the idea of the ſpirit of laws.

"Phyſical qualities, as well as moral cauſes, contributed to give ſtrength to his character. Nature, which had made him for command, had given him an air of dignity. He had acquired that ſoft and inſinuating eloquence, which is perfectly ſuited to ſeduce vulgar minds, and has a powerful influence on the moſt cultivated. His love of pleaſure was a merit with the fair ſex; and women, who even in a republic can draw to them the ſuffrages and attention of men, have the higheſt importance in degenerate times. The ladies of his age were charmed with the proſpect of having a dictator whom they might ſubdue by their attractions.

"In vain did the genius of Cato watch for ſome time to ſuſtain the liberty of his country. It was unequal to contend with that of Cæſar. Of what avail were the eloquence, the philoſophy, and the virtue of this republican, when oppoſed by a man who had the addreſs to debauch the wife of every citizen whoſe intereſt he meant to engage: who, poſſeſſing an enthuſiaſm for glory, wept, becauſe at the age of 30, he had not conquered the world like Alexander; and who, with the haughty temper of a deſpot, was more deſirous to be the firſt man in a village than the ſecond in Rome?

" Cæſar had the good fortune to exiſt in times of trouble and civil commotions, when the minds of men are put into a ferment; when opportunities of great actions are frequent; when talents are every thing, and thoſe who can only boaſt of their virtues are nothing. If he had lived an hundred years ſooner, he would have been no more than an obſcure villain; and, inſtead of giving laws to the world, would not have been able to produce any confuſion in it.

" I will here be bold enough to advance an idea, which may appear paradoxical to thoſe who weakly judge of men from what they achieve, and not from the principle which leads them to act. Nature formed in the ſame mould Cæſar, Mahomet, Cromwell, and Kouli Khan. They all of them united to genius that profound policy which renders it ſo powerful. They all of them had an evident ſuperiority over thoſe with whom they were ſurrounded; they were conſcious of this ſuperiority, and they made others conſcious of it. They were all of them born ſubjects, and became fortunate uſurpers. Had Cæſar been placed in Perſia, he would have made the conqueſt of India; in Arabia, he would have been the founder of a new religion; in London, he would have ſtabbed his ſovereign, or have procured his aſſaſſination under the ſanction of the laws. He reigned with glory over men whom he had reduced to be ſlaves; and, under one aſpect, he is to be conſidered as a hero; under another, as a monſter. But it would be unfortunate indeed for ſociety if the poſſeſſion of ſuperior talents gave individuals a right to trouble its repoſe. Uſurpers accordingly have flatterers, but no friends; ſtrangers reſpect them; their ſubjects complain and ſubmit; it is in their own families that humanity finds her avengers. Cæſar was aſſaſſinated by his ſon, Mahomet was poiſoned by his wife, Kouli Khan was maſſacred by his nephew, and Cromwell only died in his bed becauſe his ſon Richard was a philoſopher.

" Cæſar, the tyrant of his country; Cæſar, who deſtroyed the agents of his crimes, if they failed in addreſs; Cæſar, in fine, the huſband of every wife, and the wife of every huſband, has been accounted a great man by the mob of writers. But it is only the philoſopher who knows how to mark the barrier between celebrity and greatneſs. The talents of this ſingular man, and the good fortune which conſtantly attended him till the moment of his aſſaſſination, have concealed the enormity of his actions."

Cæsar, in Roman antiquity, a title borne by all the emperors from Julius Cæſar to the deſtruction of the empire. It was alſo uſed as a title of diſtinction for the intended or preſumptive heir of the empire, as *king of the Romans* is now uſed for that of the German empire. This title took its riſe from the ſurname of the firſt emperor, C. Julius Cæſar, which, by a decree of the ſenate, all the ſucceeding emperors were to bear. Under his ſucceſſor, the appellation of *Auguſtus* being appropriated to the emperors, in compliment to that prince, the title *Cæſar* was given to the ſecond perſon in the empire, though ſtill it continued to be given to the firſt; and hence the difference betwixt Cæſar uſed ſimply, and Cæſar with the addition of Imperator Auguſtus. The dignity of Cæſar remained to the ſecond of the empire, till Alexius Comnenus having elected Nicephorus Meliſſenus Cæſar, by contract; and it being neceſſary to confer ſome higher dignity on his own brother Iſaacius, he created him Sebaſtocrator, with the precedency over Meliſſenus; ordering, that in all acclamations, &c. Iſaacius Sebaſtocrator ſhould be named the ſecond, and Meliſſenus Cæſar the third.

Cæsar (Sir Julius), a learned civilian, was deſcended by the female line from the duke de Ceſarini in Italy; and was born near Tottenham in Middleſex, in the year 1557. He was educated at Oxford, advanced to many honourable employments, and for the laſt 20 years of his life was maſter of the rolls. He was remarkable for his extenſive bounty and charity to all perſons of worth, ſo that he ſeemed to be the almoner general of the nation. He died in 1639, in the 79th year of his age. It is very remarkable that the manuſcripts of this lawyer were offered (by the executors of ſome of his deſcendants) to a cheeſemonger for waſte-paper; but being timely inſpected by Mr. Samuel Paterſon, that gentleman diſcovered their worth, and had the ſatisfaction to find his judgment confirmed by the profeſſion, to whom they were ſold in lots for upwards of 500l. in the year 1757.

CÆSAREA, the name of ſeveral ancient cities, particularly one on the coaſt of Phenice. It was conveniently ſituated for trade; but had a very dangerous harbour, ſo that no ſhips could be ſafe in it when the wind was at ſouth-weſt. Herod the Great, king of Judea, remedied this inconvenience at an immenſe expence and labour, making it one of the moſt convenient havens on that coaſt. He alſo beautified it with many buildings, and beſtowed 12 years in the finiſhing and adorning it.

CÆSARIAN operation. See Midwifery.

CÆSARIANS, *Cæſarienſes*, in Roman antiquity, were officers or miniſters of the Roman emperors; they kept the account of the revenues of the emperors; and took poſſeſſion, in their name, of ſuch things as devolved or were confiſcated to them.

CÆSONES, a denomination given to thoſe cut out of their mother's wombs. Pliny ranks this as an auſpicious kind of birth; the elder Scipio Africanus, and the firſt of the family of Cæſars, was brought into the world in this way.

CÆSTUS, in antiquity, a large gantlet made of raw hide, which the wreſtlers made uſe of when they fought at the public games.—This was a kind of leathern ſtrap, ſtrengthened with lead or plates of iron, which encompaſſed the hand, the wriſt, and a part of the arm, as well to defend theſe parts as to enforce their blows.

Cæstus, or *Ceſtum*, was alſo a kind of girdle, made of wool, which the huſband untied for his bride the firſt day of marriage, before they went to bed. This relates to Venus's girdle, which Juno borrowed of her to entice Jupiter to love her. See Cestus.

CÆSURA, in the ancient poetry, is when, in the ſcanning of a verſe, a word is ſo divided, as that one part ſeems cut off, and goes to a different foot from the reſt; as, *Mentiſ|ri no'li, nun|quam men|dacia proſunt:* where the ſyllables *ri*, *li*, *quam*, and *men*, are cæſuras.

Cæsure, in the modern poetry, denotes a reſt or pauſe towards the middle of an Alexandrian verſe, by which the voice and pronunciation are aided, and the verſe, as it were, divided into two hemiſtichs. See Pause.

CÆTERIS paribus, a Latin term in frequent uſe among mathematical and phyſical writers. The words literally ſignify, *the reſt* (or *other things) being alike or equal.* Thus we ſay the heavier the bullet, *cæteris paribus*, the greater the range; *i. e.* by how much the bullet is heavier, if the length and diameter of the piece and ſtrength of the powder be the ſame, by ſo much will the utmoſt range or diſtance of a piece of ordnance be the greater. Thus alſo, in a phyſical way, we ſay, the velocity and quantity circulating in a given time through any ſection of an artery, will, *cæteris paribus*, be according to its diameter, and nearneſs to or diſtance from the heart.

CAFFA, in commerce, painted cotton-cloths manufactured in the Eaſt Indies, and ſold at Bengal.

Caffa, or *Kaffa*, a city and port-town of Crim Tartary, ſituated on the ſouth-eaſt part of that peninſula. E. long. 37. 0. N. lat. 44. 55. It is the moſt conſiderable town in the

country, and gives name to the ſtraits of Caffa, which runs from the Euxine or Black Sea to the Palus Meotus, or ſea of Azoph.

CAFFILA, a company of merchants or travellers who join together in order to go with more ſecurity through the dominions of the Grand Mogul, and through other countries on the continent of the Eaſt Indies. The Caffila differs from a caravan, at leaſt in Perſia: for the caffila belongs properly to ſome ſovereign or to ſome powerful company in Europe, whereas a caravan is a company of particular merchants, each trading upon his own account. The Engliſh and Dutch have each of them their caffila at Gambrow. There are alſo ſuch caffilas which croſs ſome parts of the deſerts of Africa, particularly that called the *ſea of ſand*, which lies between the kingdom of Morocco and thoſe of Tombut and Gaigo. This is a journey of 400 leagues; and takes up two months in going, and as many in coming back; the caffila travelling only by night, on account of the exceſſive heat of that country. The chief merchandize they bring back conſiſts in gold duſt, which they call *antibar*, and the Europeans *tibir*.

Caffila on the coaſt of Guzerat or Cambaya, ſignifies a ſmall fleet of merchant ſhips.

CAFFRARIA, the country of the Caffres or Hottentots in the moſt ſoutherly parts of Africa, lying in the form of a creſcent about the inland country of Monomopata, between 35° ſouth latitude and the tropic of Capricorn: and bounded on the eaſt, ſouth, and weſt, by the Indian and Atlantic oceans. See Hottentots. Moſt of the ſea-coaſts of this country are ſubject to the Dutch, who have built a fort near the moſt ſouthern promontory, called the *Cape of Good Hope*.

CAG, or Keg, a barrel or veſſel, that contains from four to five gallons.

CAGANUS, or Cacanus, an appellation anciently given by the Huns to their kings. The word appears alſo to have been formerly applied to the princes of Muſcovy, now called *czars*. From the ſame alſo, probably, the Tartar title *cham* or *can* had its origin.

CAGE, an incloſure made of wire, wicker, or the like, interwoven lattice-wiſe, for the confinement of birds or wild beaſts. The word is French, *cage*, formed from the Italian *gaggia*, of the Latin *cavea*, which ſignifies the ſame: *a caveis theatralibus in quibus includebantur feræ.*—Beaſts were uſually brought to Rome ſhut up in oaken or beechen cages, artfully formed, and covered or ſhaded with boughs, that the creatures, deceived with the appearance of a wood, might fancy themſelves in their foreſt. The fiercer ſort were pent in iron cages, leſt wooden priſons ſhould be broke through. In ſome priſons there are iron cages for the cloſer confinement of criminals. The former French laws diſtinguiſhed two ſorts of bird-cages, viz. high or ſinging cages, and low or dumb-cages; thoſe who expoſed birds to ſale were obliged to put the hens in the latter, and the cocks in the former, that perſons might not be impoſed on by buying a hen for a cock.

Cages (*caveæ*), denote alſo places in the ancient amphitheatres, wherein wild beaſts were kept, ready to be let out for ſport. The *caveæ* were a ſort of iron cages different from dens, which were under ground and dark; whereas the *caveæ* being airy and light, the beaſts ruſhed out of them with more alacrity and fierceneſs than if they had been pent under ground.

Cage, in carpentry, ſignifies an outer-work of timber, encloſing another within it. In this ſenſe we ſay, *the cage of a wind-mill*. The cage of a ſtair-caſe denotes the wooden ſides or walls which incloſe it.

CAGEAN, or Cagayan, a province of the iſland of Lytzen, or Manila, in the Eaſt Indies. It is the largeſt in the iſland, being 80 leagues in length, and 40 in breadth. The principal city is called *New Segovia*, and 15 leagues eaſtward from this city lies Cape Bajador. Doubling that cape, and coaſting along 20 leagues from north to ſouth, the province of Cagean ends, and that of Illocos begins. The peaceable Cageans who pay tribute are about 9000; but there are a great many not ſubdued.

CAGLI, an ancient epiſcopal town of Italy, in the duchy of Urbino, ſituated at the foot of the Apennine mountains. E. long. 14. 12. N. lat. 43. 30.

CAGLIARI (Paolo), called *Paulo Veroneſe*, an excellent painter, was born at Verona in the year 1532. Gabriel Cagliari his father was a ſculptor, and Antonio Badile his uncle was his maſter in painting. He was not only eſteemed the beſt of all the Lombard painters, but for his extenſive talents in the art was peculiarly ſtyled *Il pittor felice*, "the happy painter;" and there is ſcarcely a church in Venice where ſome of his performances are not to be ſeen. De Piles ſays, that "his picture of the marriage at Cana, in the church of St. George, is to be diſtinguiſhed from his other works, as being not only the triumph of Paul Veroneſe, but almoſt the triumph of painting itſelf." When the ſenate ſent Grimani, procurator of St. Mark, to be their ambaſſador at Rome, Paul attended him, but did not ſtay long, having left ſome pieces at Venice unfiniſhed. Philip II. king of Spain, ſent for him to paint the Eſcurial, and made him great offers; but Paul excuſed himſelf from leaving his own country, where his reputation was ſo well eſtabliſhed, that moſt of the princes of Europe ordered their ſeveral ambaſſadors to procure ſomething of his hand at any rate. He was indeed highly eſteemed by all the principal men in his time; and ſo much admired by the great maſters, as well his contemporaries as thoſe who ſucceeded him, that Titian himſelf uſed to ſay, he was the ornament of his profeſſion. And Guido Reni being aſked which of the maſters his predeceſſors he would chooſe to be, were it in his power, after Raphael and Correggio, named Paul Veroneſe; whom he always called his Paolino. He died of a fever at Venice in 1588, and had a tomb and a ſtatue of braſs erected to his memory in the church of St. Sebaſtian. He left great wealth to his two ſons Gabriel and Charles, who lived happily together, and joined in finiſhing ſeveral of their father's imperfect pieces.

Cagliari, an ancient, large, and rich town, capital of the iſland of Sardinia in the Mediterranean. It is ſeated on the declivity of a hill, is a univerſity, an archbiſhopric, and the reſidence of the viceroy. It has an excellent harbour, and a good trade; but is a place of no great ſtrength. It was taken, with the whole iſland, by the Engliſh in 1708, who transferred it to the emperor Charles VI.; but it was retaken by the Spaniards in 1717, and about two years afterwards ceded to the duke of Savoy in lieu of Sicily, and hence he has the title of *king of Sardinia*. E. long. 9. 14. N. lat. 39. 12.

CAGUI, in zoology, a ſynonyme of two ſpecies of monkeys, viz. the jacchus and œdipus. See Simia.

CAHORS, a conſiderable town of France, in the department of Lot and late province of Querci in Guienne, with a biſhop's ſee and an univerſity. It is ſeated on a peninſula made by the river Lot, and built partly on a craggy rock. The principal ſtreet is very narrow; and terminates in the market-place, in which is the town-houſe. The cathedral is a Gothic ſtructure, and has a large ſquare ſteeple. The fortifications are regular, and the town is ſurrounded with thick walls. E. long. 1. 6. N. lat. 44. 26.

CAHYS, a dry meaſure for corn, uſed in ſome parts of Spain, particularly at Seville and at Cadiz. It is near a buſhel of our meaſure.

CAJANABURG, the capital of the province of Cajania or

Eaſt Bothnia in Sweden, ſituated on the north-eaſt part of the lake Cajania, in E. long. 27. 0. N. lat. 63. 50.

CAIAPHAS, high-prieſt of the Jews after Simon, condemned Chriſt to death; and was put out of his place by the emperor Vitellius, for which diſgrace he made away with himſelf.

CAJAZZO, a town of the province of Lavoro in the kingdom of Naples, ſituated in E. long. 15. 0. N. lat. 41. 15.

CAICOS, the name of ſome American iſlands to the north of St. Domingo, lying from W. long. 112. 10. to 113. 16. N. lat. 21. 40.

CAJEPUT, an oil brought from the Eaſt Indies reſembling that of cardamoms.

CAJETAN (Cardinal), was born at Cajeta in the kingdom of Naples in the year 1469. His proper name was *Thomas de Vio*; but he adopted that of *Cajetan* from the place of his nativity. He defended the authority of the Pope, which ſuffered greatly at the council of Nice, in a work intitled *Of the power of the Pope*; and for this work he obtained the biſhopric of Cajeta. He was afterwards raiſed to the archiepiſcopal ſee of Palermo, and in 1517 was made a cardinal by pope Leo X. The year after, he was ſent as legate into Germany, to quiet the commotions raiſed againſt indulgences by Martin Luther; but Luther, under protection of Frederic elector of Saxony, ſet him at defiance; for though he obeyed the cardinal's ſummons in repairing to Augſberg, yet he rendered all his proceedings ineffectual. Cajetan was employed in ſeveral other negotiations and tranſactions, being as ready at buſineſs as letters. He died in 1534. He wrote Commentaries upon Ariſtotle's philoſophy, and upon Thomas Aquinas's theology; and made a literal tranſlation of the Old and New Teſtaments.

CAIFONG, a large, populous, and rich town of Aſia, in China, ſeated in the middle of a large and well cultivated plain. It ſtands in a bottom; and when beſieged by the rebels in 1642, they ordered the dykes of the river Hohangho to be cut, which drowned the city, and deſtroyed 300,000 of its inhabitants. E. long. 113. 27. N. lat. 35. 0.

CAILLE (Nicholas Louis de la), an eminent mathematician and aſtronomer, was born at a ſmall town in the dioceſe of Rheims in 1713. His father had ſerved in the army, which he quitted, and in his retirement ſtudied mathematics; and amuſed himſelf with mechanic exercifes, wherein he proved the happy author of ſeveral inventions of conſiderable uſe to the public. Nicholas, almoſt in his infancy, took a fancy to mechanics, which proved of ſignal ſervice to him in his maturer years. He was ſent young to ſchool at Mantes ſur Seine, where he diſcovered early tokens of genius. In 1729, he went to Paris; where he ſtudied the claſſics, philoſophy, and mathematics. Afterwards he went to ſtudy divinity at the college de Navarre, propoſing to embrace an eccleſiaſtical life. At the end of three years he was ordained a deacon, and officiated as ſuch in the church of the college de Mazarin ſeveral years; but he never entered into prieſt's orders, apprehending that his aſtronomical ſtudies, to which he became moſt aſſiduouſly devoted, might too much interfere with his religious duties. In 1739, he was conjoined with M. de Thury, ſon to M. Caſſini, in verifying the meridian of the royal obſervatory through the whole extent of the kingdom of France. In the month of November the ſame year, whilſt he was engaged day and night in the operations which this grand undertaking required, and at a great diſtance from Paris, he was, without ſolicitation, elected into the vacant mathematical chair which the celebrated M. Varignon had ſo worthily filled. Here he began to teach about the end of 1740; and an obſervatory was ordered to be erected for his uſe in the college, and furniſhed with a ſuitable apparatus of the beſt inſtruments. In May 1741, M. de la Caille was admitted into the royal academy of ſciences as an adjoint member for aſtronomy. Beſides the many excellent papers of his diſperſed up and down in their memoirs, he publiſhed Elements of geometry, mechanics, optics, and aſtronomy. Moreover, he carefully computed all the eclipſes of the ſun and moon that had happened ſince the Chriſtian æra, which were printed in a book publiſhed by two Benedictines, entitled *l'Art de verifier les dates*, &c. Paris, 1750, in 4to. Beſides theſe, he compiled a volume of aſtronomical ephemerides for the years 1745 to 1755; another for the years 1755 to 1765; a third for the years 1765 to 1775; an excellent work intitled *Aſtronomiæ fundamenta noviſſimis ſolis et ſtellarum obſervationibus ſtabilita*; and the moſt correct ſolar tables that ever appeared. Having gone through a ſeven years ſeries of aſtronomical obſervations in his own obſervatory, he formed a project of going to obſerve the ſouthern ſtars at the Cape of Good Hope. This was highly approved by the academy, and by the prime miniſter Comte d'Argenſon, and very readily agreed to by the ſtates of Holland. Upon this, he drew up a plan of the method he propoſed to purſue in his ſouthern obſervations; ſetting forth, that, beſides ſettling the places of the fixed ſtars, he propoſed to determine the parallax of the Moon, Mars, and Venus. But whereas this required correſpondent obſervations to be made in the northern parts of the world, he ſent to thoſe of his correſpondents who were expert in practical aſtronomy previous notice, in print, what obſervations he deſigned to make at ſuch and ſuch times for the ſaid purpoſe. At length, on the 21ſt of November 1750, he failed for the Cape, and arrived there on the 19th of April 1751. He forthwith got his inſtruments on ſhore; and with the aſſiſtance of ſome Dutch artificers, ſet about building an aſtronomical obſervatory, in which his apparatus of inſtruments was properly diſpoſed of as ſoon as it was in a fit condition to receive them.

The ſky at the Cape is generally pure and ſerene, unleſs when a ſouth-eaſt wind blows. But this is often the caſe, and when it is, it is attended with ſome ſtrange and terrible effects. The ſtars look bigger, and ſeem to caper; the moon has an undulating tremor; and the planets have a ſort of beard like comets. Two hundred and twenty-eight nights did our aſtronomer ſurvey the face of the ſouthern heavens; during which ſpace, which is almoſt incredible, he obſerved more than 10,000 ſtars; and whereas the ancients filled the heavens with monſters and old-wives tales, the Abbé de la Caille choſe rather to adorn them with the inſtruments and machines which modern philoſophy has made uſe of for the conqueſt of nature. With no leſs ſucceſs did he attend to the parallax of the Moon, Mars, Venus, and the Sun. Having thus executed the purpoſe of his voyage, and no preſent opportunity offering for his return, he thought of employing the vacant time in another arduous attempt; no leſs than that of taking the meaſure of the earth, as he had already done that of the heavens. This indeed had, through the munificence of the French king, been done before by different ſets of learned men both in Europe and America; ſome determining the quantity of a degree under the equator, and others under the arctic circle: but it had not as yet been decided whether in the ſouthern parallels of latitude the ſame dimenſions obtained as in the northern. His labours were rewarded with the ſatisfaction he wiſhed for; having determined a diſtance of 410,814 feet from a place called *Kilp-Fontyn* to the Cape, by means of a baſe of 38,802 feet, three times actually meaſured; whence he diſcovered a new ſecret of nature, namely, that the radii of the parallels in ſouth latitude are not the ſame as thoſe of the correſponding parallels in north latitude. About the 23d degree of ſouth latitude he found a degree on the meridian to contain 342,222 Paris feet. He returned to Paris the 27th of September 1754; having in his almoſt four years abſence expend-

ed no more than 9144 livres on himſelf and his companion; and at his coming into port, he refuſed a bribe of 100,000 livres, offered by one who thirſted leſs after glory than gain, to be ſharer in his immunity from cuſtom-houſe ſearches.

After receiving the congratulatory viſits of his more intimate friends and the aſtronomers, he firſt of all thought fit to draw up a reply to ſome ſtrictures which profeſſor Euler had publiſhed relative to the meridian, and then he ſettled the reſults of the compariſon of his own with the obſervations of other aſtronomers for the parallaxes. That of the ſun he fixed at 9½″; of the moon, at 56′ 56″; of Mars in his oppoſition, 36″; of Venus, 38″. He alſo ſettled the laws whereby aſtronomical refractions are varied by the different denſity or rarity of the air, by heat or cold, and dryneſs or moiſture. And, laſtly, he ſhowed an eaſy, and by common navigators practicable, method of finding the longitude at ſea by means of the moon, which he illuſtrated by examples ſelected from his own obſervations during his voyages. His fame being now eſtabliſhed upon ſo firm a baſis, the moſt celebrated academies of Europe claimed him as their own: and he was unanimouſly elected a member of the Royal Society at London; of the inſtitute of Bologna; of the imperial academy at Peterſburgh; and of the royal academies of Berlin, Stockholm, and Gottingen. In the year 1760, M. de la Caille was attacked with a ſevere fit of the gout; which, however, did not interrupt the courſe of his ſtudies; for he then planned out a new and immenſe work; no leſs than the hiſtory of aſtronomy through all ages, with a compariſon of the ancient and modern obſervations, and the conſtruction and uſe of the inſtruments employed in making them. In order to purſue the taſk he had impoſed upon himſelf in a ſuitable retirement, he obtained a grant of apartments in the royal palace of Vincennes; and whilſt his aſtronomical apparatus was erecting there, he began printing his Catalogue of the ſouthern ſtars, and the third volume of his Ephemerides. The ſtate of his health was, towards the end of the year 1763, greatly reduced. His blood grew inflamed; he had pains of the head, obſtructions of the kidneys, loſs of appetite, with a diſeaſe of the whole habit. His mind remained unaffected, and he reſolutely perſiſted in his ſtudies as uſual. In the month of March, medicines were adminiſtered to him, which rather aggravated than alleviated his ſymptoms; and he was now ſenſible, that the ſame complaint which in Africa, ten years before, yielded to a few ſimple remedies, did in his native country bid defiance to the beſt phyſicians. This induced him to ſettle his affairs: his manuſcripts he committed to the care and diſcretion of his eſteemed friend M. Maraldi. It was at laſt determined that a vein ſhould be opened; but this brought on an obſtinate lethargy, of which he died, aged 49.

CAIMACAN, or Caimacam, in the Turkiſh affairs, a dignity in the Ottoman empire, anſwering to lieutenant, or rather deputy, amongſt us. There are uſually two Caimacans; one reſiding at Conſtantinople, as governor thereof; the other attending the grand vizir in quality of his lieutenant, ſecretary of ſtate, and firſt miniſter of his council, and giving audience to ambaſſadors. Sometimes there is a third caimacan, who attends the ſultan; whom he acquaints with any public diſturbances, and receives his orders concerning them.

CAIMAN islands, certain American iſlands lying ſouth of Cuba, and north-weſt of Jamaica, between 81° and 86° of weſt longitude, and in 21° of north latitude. They are moſt remarkable on account of the fiſhery of tortoiſe, which the people of Jamaica catch here and carry home alive, keeping them in penns for food, and killing them as they want them.

CAINITES, a ſect of heretics in the 2d century, ſo called on account of their great reſpect for Cain. They pretended that the virtue which produced Abel was of an order inferior to that which had produced Cain, and that this was the reaſon why Cain had the victory over Abel and killed him; for they admitted a great number of genii, which they called *virtues*, of different ranks and orders. They made profeſſion of honouring thoſe who carry in Scripture the moſt viſible marks of reprobation; as the inhabitants of Sodom, Eſau, Korah, Dathan, and Abiram. They had, in particular, a very great veneration for the traitor Judas, under pretence that the death of Jeſus Chriſt had ſaved mankind. They had a forged goſpel of Judas, to which they paid great reſpect.

CAIRNS, or Carnes, the vulgar name of thoſe heaps of ſtones which are to be ſeen in many places of Britain, particularly Scotland and Wales.—They are compoſed of ſtones of all dimenſions thrown together in a conical form, a flat ſtone crowning the apex: ſee 3d Pl. 46, and the article Barrows. Various cauſes have been aſſigned by the learned for theſe heaps of ſtones. They have ſuppoſed them to have been, in times of inauguration, the places where the chieftain-elect ſtood to ſhow himſelf to beſt advantage to the people; or the place from whence judgment was pronounced; or to have been erected on the road-ſide in honour of Mercury; or to have been formed in memory of ſome ſolemn compact, particularly where accompanied by ſtanding pillars of ſtones; or for the celebration of certain religious ceremonies. Such might have been the reaſons, in ſome inſtances, where the evidences of ſtone-cheſts and urns are wanting: but theſe are ſo generally found, that they ſeem to determine the moſt uſual purpoſe of the piles in queſtion to have been for ſepulchral monuments. Even this deſtination might render them ſuitable to other purpoſes; particularly religious, to which by their nature they might be ſuppoſed to give additional ſolemnity.—According to Toland, fires were kindled on the tops or flat-ſtones, at certain times of the year, particularly on the eves of the 1ſt of May and the 1ſt of November, for the purpoſe of ſacrificing; at which time all the people having extinguiſhed their domeſtic hearths rekindled them from the ſacred fires of the cairns. In general, therefore, theſe accumulations appear to have been deſigned for the ſepulchral protection of heroes and great men. The ſtone-cheſts, the repoſitory of the urns and aſhes, are lodged in the earth beneath: ſometimes only one, ſometimes more, are found thus depoſited; and Mr. Pennant mentions an inſtance of 17 being diſcovered under the ſame pile.—Cairns are of different ſizes, ſome of them very large. Mr. Pennant deſcribes one in the iſland of Arran, 114 feet over, and of a vaſt height. They may juſtly be ſuppoſed to have been proportioned in ſize to the rank of the perſon, or to his popularity: the people of a whole diſtrict aſſembled to ſhow their reſpect to the deceaſed; and, by an active honouring of his memory, ſoon accumulated heaps equal to thoſe that aſtoniſh us at this time. But theſe honours were not merely thoſe of the day; as long as the memory of the deceaſed endured, not a paſſenger went by without adding a ſtone to the heap: they ſuppoſed it would be an honour to the dead, and acceptable to his manes.

Quanquam feſtinas, non eſt mora longa: licebit,
Injecto ter pulvere, curras.

To this moment there is a proverbial expreſſion among the Highlanders alluſive to the old practice: a ſuppliant will tell his patron, *Curri mi cloch er do charne*, "I will add a ſtone to your cairn;" meaning, When you are no more, I will do all poſſible honour to your memory.—Cairns are to be found in all parts of our iſlands, in Cornwall, Wales, and all parts of North Britain; they were in uſe among the northern nations; Dahlberg, in his 323d plate, has given the figure of one. In Wales they are called *carneddau*; but the proverb taken from them there, is not of the complimental kind: *Karn ar dy ben*, or, "A cairn on your head," is a token of imprecation.

CAIRO, or Grand Cairo, a large city of Africa, capital of Egypt, built in 795. It conſiſts of three towns, about a mile apart; Old Cairo, New Cairo, and the port termed Billac. The ancient town had the name of Meſra. Old Cairo is reduced to a ſmall place, though there is a harbour for boats that come from Upper Egypt. Some of the beys have country houſes here, to which they retire when the country is overflowed by the Nile. New Cairo is about a mile from the river, and is ſeven miles in circumference. It has three or four grand gates, of excellent workmanſhip; but the ſtreets are narrow, and look like lanes. The fineſt houſes are built round a court, in which they make the beſt appearance; but there are few or no windows next the ſtreet. The caſtle ſtands upon a rock. To the W. of the caſtle are the remains of ſome grand apartments, covered with domes, and adorned with moſaic pictures of trees and houſes. Theſe are now uſed for weaving and embroidering. Still higher is Joſeph's Hall, whence there is a delightful proſpect over the city, the pyramids, and all the country round. It was probably a terrace to that magnificent room which is now open on the top, and is adorned with large beautiful pillars of red granite. There are ſeveral public bagnios, which are very handſome within, and are uſed as places of refreſhment and diverſion, eſpecially for the women, who go there twice a week; but the wives of great men are deprived of this pleaſure, by having baths at home. This city is exceedingly populous; ſeveral families living in one houſe, and a number of people in each room. For this reaſon, in the buſy time of the day, the ſtreets are ſo crowded, that it is difficult to paſs along. The women have greater liberty here than in other parts of the Turkiſh empire; and there are particular ſtreets, where the courteſans ſit at the doors, richly dreſſed, to invite cuſtomers. Here are likewiſe many caravanſaries. The Caliſh is a canal, which conveys the waters of the Nile into the city: it is about 20 feet broad, and has houſes on each ſide of it. As ſoon as the water begins to riſe, they cloſe the mouth of the canal with earth, and place a mark, to ſhow the time when this and all other canals in the kingdom are to be opened, which is done with great ſolemnity. The mouth of Joſeph's Well (ſo called, not from the patriarch, but from a grand vizir, who, about 700 years ago, had the care of the work under Sultan Mahomet) is 60 feet in circumference, and in depth 276, being cut in a rock; and oxen are employed in drawing up the water. This city was a place of much greater trade, before the diſcovery of the Cape of Good Hope. Joſeph's Granary is in Old Cairo, and is ſurrounded by a ſquare wall. Here they lay up the corn that is paid as a tribute to the Grand Signior. Notwithſtanding its name, it was certainly built in the time of the Saracens. According to M. Savary, there are not leſs than 300 moſques in Cairo, the lofty minarets of which preſent a very picturesque appearance. The Europeans have their conſuls and factors here. Cairo is ſuppoſed to contain 700,000 inhabitants; and is ſeated near the Nile, 100 miles S. of its mouth. Long. 31. 23. E. Lat. 30. 3. N.

CAIROAN, or Cairwan, a city of Africa, in the kingdom of Tunis, ſeated in a ſandy barren ſoil, about five miles from the gulph of Capres. It has neither ſpring, well, nor river; for which reaſon they are obliged to preſerve rain-water in tanks and ciſterns. It was built by the Aglabites: and is the ancient Cyrene, but has now loſt its ſplendour. There is ſtill, however, a very ſuperb moſque, and the tombs of the kings of Tunis are yet to be ſeen. E. long. 9. 12. N. lat. 35. 40.

CAISSON, in the military art, a wooden cheſt, into which ſeveral bombs are put, and ſometimes filled only with gunpowder: this is buried under ſome work whereof the enemy intend to poſſeſs themſelves, and, when they are maſters of it, is fired, in order to blow them up.

Caisson is alſo uſed for a wooden frame, or cheſt uſed in laying the foundations of the piers of a bridge.

CAITHNESS-shire, the moſt northerly country of Scotland, bounded on the N. by the Pentland Frith, which divides it from the Orkney iſlands; on the S. E. by the Britiſh Ocean; and on the W. by Sutherlandſhire. Its greateſt extent is 35 miles from N. to S. and 20 from E. to W. The whole S. W. part is occupied by great mountains, the abode of roes and a variety of game. The rocky ſummits ſhelter eagles and other birds of prey; and the lakes are often reſorted to by ſwans and numerous other water-fowls. A vaſt ridge of hills forms the S. W. boundary, ending in the promontory called the Ord of Caithneſs. Along the ſide of this ſteep hill, impending, in a manner, above the ſea, a winding road is cut, which is the only entrance into this ſhire from the S. The climate is good, and the ſoil around the coaſt very improveable. Its chief exports are beef, meal and barley, butter, cheeſe, yarn, ſkins, feathers, and kelp. Engliſh is chiefly ſpoken on the coaſt, but, in the high lands, the Gaelic prevails. The women were formerly ſubject to the moſt humiliating drudgery; it being no uncommon thing, about 40 years ago, to ſee a party of them trudging to the fields, loaded with the dung-baſket, or returning home, in harveſt, under a heavy burden of ſheaves. This ſhameful treatment is now aboliſhed; the farmers employing horſes, carts, and men, as in other counties.

CAIUS, Kaye, or *Keye*, (Dr John), the founder of Caius college in Cambridge, was born at Norwich in 1510. He was admitted very young a ſtudent in Gonville-hall in the abovementioned univerſity; and at the age of 21 tranſlated from Greek into Latin ſome pieces of divinity, and into Engliſh Eraſmus's paraphraſe on Jude, &c. From theſe his juvenile labours, it ſeems probable that he firſt intended to proſecute the ſtudy of divinity. Be that as it may, he travelled to Italy, and at Padua ſtudied phyſic under the celebrated Montanus. In that univerſity he continued ſome time, where we are told he read Greek lectures with great applauſe. In 1543 he travelled through part of Italy, Germany, and France; and returning to England commenced doctor of phyſic at Cambridge. He practiſed firſt at Shrewſbury, and afterwards at Norwich; but removing to London, in 1547 he was admitted fellow of the college of phyſicians, to which he was ſeveral years preſident. In 1557, being then phyſician to queen Mary, and in great favour, he obtained a licence to advance Gonville-hall, where he had been educated, into a college; which he endowed with ſeveral conſiderable eſtates, adding an entire new ſquare at the expence of 1834l. Of this college he accepted the maſterſhip, which he kept till within a ſhort time of his death. He was phyſician to Edward VI. queen Mary, and queen Elizabeth. Towards the latter end of his life he retired to his own college at Cambridge; where, having reſigned the maſterſhip to Dr. Legge of Norwich, he ſpent the remainder of his life as a fellow-commoner. He died in July 1573, aged 63; and was buried in the chapel of his own college. Dr. Caius was a learned, active, benevolent man. In 1557 he erected a monument in St Paul's to the memory of the famous Linacre. In 1563 he obtained a grant for the college of phyſicians to take the bodies of two malefactors annually for diſſection; and he was the inventor of the *inſignia* which diſtinguiſh the preſident from the reſt of the fellows. He wrote, 1. Annals of the college from 1555 to 1572. 2. Tranſlation of ſeveral of Galen's works; printed at different times abroad. 3. *Hippocrates de Medicamentis*, firſt diſcovered and publiſhed by our author; alſo *De ratione victus*, Lov. 1556, 8vo. 4. *De medendi methodo*. Baſil, 1544; Lond. 1556; 8vo. 5. Account of the

fweating ficknefs in England. Lond. 1556, 1721. It is intituled *De ephemera Britannica*. 6. Hiftory of the univerfity of Cambridge. Lond. 1568, 8vo. 1574, 4to. in Latin. 7. *De thermis Britannicis*; doubtful whether ever printed. 8. Of fome rare plants and animals. Lond. 1570. 9. *De canibus Britannicis*, 1570. 1729. 10. *De pronunciatione Græcæ et Latinæ Linguæ*. Lond. 1574. 11. *De libris propriis*. Lond. 1570. Befides many other works which never were printed.

CAKE, a finer fort of bread, fo denominated from its flat round figure. We meet with different compofitions under the name of *cakes*; as *feed-cakes*, *plumcakes*, *pancakes*, &c. The Hebrews had feveral forts of cakes, which they offered in the temple. They were made of the meal either of wheat or barley; they were kneaded fometimes with oil and fometimes with honey. Sometimes they only rubbed them over with oil when they were baked, or fried them with oil in a frying-pan upon the fire. In the ceremony of Aaron's confecration, they facrificed a calf and two rams, and offered unleavened bread, and cakes unleavened, tempered with oil, and wafers unleavened anointed with oil; the whole made of fine wheaten flour. Exod. xxix. 1, 2.

CAKET, a town of Afia, in Perfia, in the province of Gurgiftan near Mount Caucafus. Its trade confifts chiefly in filks. E. lon. 46. 15. N. lat. 43. 32.

CALABASH, in commerce, a light kind of veffel formed of the fhell of a gourd, emptied and dried, ferving to put divers kinds of goods in, as pitch, rofin, and the like. The word is Spanifh, *Calabacca*, which fignifies the fame. The Indians alfo, both of the North and South Sea, put the pearls they have fifhed in calabafhes, and the negroes on the coaft of Africa do the fame by their gold-duft. The fmaller calabafhes are alfo frequently ufed by thefe people as a meafure, by which they fell thefe precious commodities to the Europeans. The fame veffels likewife ferve for putting in liquors; and do the office of cups, as well as bottles, for foldiers, pilgrims, &c.

CALABASH-*Tree*, in botany. See CRESCENTIA.

African CALABASH *Tree*. See ADANSONIA.

CALABRIA, a country of Italy, in the kingdom of Naples, divided into Calabria Ultra, and Calabria Citra, commonly called Ulteriore and Citeriore, or Farther and Hither Calabria. Calabria Citra is one of the 12 provinces of Naples, and bounded on the S. by Calabria Ultra, on the N. by Bafilicata, and on the W. and E. by the fea. Cofenza is the capital. Calabria Ultra is wafhed by the Mediterranean Sea on the E. S. and W. and bounded by Calabria Citra on the N. Reggio is the capital. In the beginning of 1783 a great part of Calabria, as well as of Sicily, was deftroyed by one of the moft terrible earthquakes on record. Befide the deftruction of many towns, villages, and farms, above 40,000 people perifhed by this calamity. Mountains were levelled, and vallies formed in an inftant: new rivers began to flow, and old ftreams were funk into the earth and deftroyed: plantations were removed from their fituations, and hills carried to places far diftant. At Cafal Nuovo, the princefs Gerace, and upwards of 4000 inhabitants, loft their lives; at Bagnara, 3017; at Radicina and Palmi, 6000; at Terra Nuovo, 1400. At Scilla, a wave which had fwept the country for three miles, carried off, on its return, 2473 of the inhabitants, with the prince at their head. The earthquakes (for there were feveral fhocks) vented their greateft force from the foot of thofe mountains of the Apennines, called Monte Dejo, Monte Sacro, and Monte Caulone, extending weftward to the Tufcan Sea; in all which vaft tract, there was not a fingle village or town, which was not either totally deftroyed, or very much damaged.

CALADE, in the manege, the defcent or floping declivity of a rifing manege ground, being a fmall eminence, upon which we ride down a horfe feveral times, putting him to a fhort gallop, with his fore-hams in the air, to learn him to ply or bend his haunches, and form his ftop upon the aids of the calves of the legs, the ftay of the bridle, and the cavefon feafonably given.

CALAHORRA, an epifcopal town of Spain, in Old Caftile, feated in a fertile foil, on the fide of a hill which extends to the banks of the river Ebro. W. long. 2. 7. N. lat. 42. 12.

CALAIS, a town of France, in the department of the Straits of Calais and late province of Picardy, with a citadel and a fortified harbour. It was taken by Edward III. in 1347, after a memorable fiege of more than eleven months, which has given rife to fome hiftorical as well as dramatic fictions. (See Hume, vol. ii. note H.) In 1557, in the inglorious reign of queen Mary, it was taken by the duke of Guife, and has remained ever fince in poffeffion of the French. It was bombarded by the Englifh in 1696, without receiving much injury. The fortifications are good: but its greateft ftrength is its fituation among the marfhes, which may be overflowed at the approach of an enemy. In time of peace there are packet-boats, which go twice a week between Dover and Calais. It is 21 miles E. S. E. of Dover, and 152 N. of Paris. Lon. 1. 56. E. lat. 50. 58. N.

CALAIS *and* Zetes, in fabulous hiftory, fons of Boreas and Orythia, to whom the poets attributed wings: they went on the voyage of Colcha with the Argonauts, delivered Phineus from the harpies, and were flain by Hercules.

CALAMANCO, a fort of woollen ftuff manufactured in England and Brabant. It has a fine glofs; and is checkered in the warp, whence the checks appear only on the right fide. Some calamancos are quite plain, others have broad ftripes adorned with flowers, fome with plain broad ftripes, fome with narrow ftripes, and others watered.

CALAMARTÆ, in botany, an order of plants in the *Fragmenta methodi naturalis* of Linnæus; in which he has the following genera, viz. bobartia, fcirpus, cyperus, eriophorum, carex, fchænus, flagellaria, juncus.

CALAMATA, a confiderable town of Turkey in Europe, in the Morea, and province of Belvedera. It was taken by the Venetians in 1685; but the Turks retook it afterwards, with all the Morea. It ftands on the river Spinarza, eight miles from the fea. E. long. 22. 15. N. lat. 37. 8.

CALAMINE, CALAMY, *Lapis Calaminaris*, or *Cadmia Foffilis*, a fort of ftone or mineral, containing zinc, iron, and fometimes other fubftances. It is confiderably heavy, and the more fo the better; moderately hard and brittle, or of a confiftence betwixt ftone and earth: the colour is fometimes whitifh or grey; fometimes yellowifh, or of a deep yellow; fometimes red; fometimes brown or blackifh. It is plentiful in feveral parts of Europe, as Hungary, Tranfylvania, Poland, Spain, Sweden, Bohemia, Saxony, Goflar, France, and England, particularly in Derbythire, Gloucefterfhire, Nottinghamfhire, and Somerfetfhire, as alfo in Wales. The calamine of England, however, is by the beft judges allowed to be fuperior in quality to that of moft other countries. It feldom lies very deep, being chiefly found in clayey grounds near the furface. In fome places it is mixed with lead-ores. It is the only true ore of zinc, and is ufed as an ingredient in making of brafs. The chemifts have related various experiments with this mineral, calculated to fhew that it contains iron as well as zinc.—This mineral is an article in the materia medica; but, before it comes to the fhops, it is ufually roafted or calcined, in order to feparate fome arfenical or fulphureous particles, which in its crude ftate it is fuppofed to contain, and alfo to render it more eafily reducible into a fine powder. In

this state it is employed in collyria for eyes, for promoting cicatrization in ulcers, and healing excoriations of the skin. It is the basis of an officinal Cerate called, in the revised edition of the college Pharmacopœia, *Ceratum lapidis calaminaris*.

Though the lapis calaminaris is the only native ore of zinc, there is another substance from which that semi-metal is also obtained. This is called *cadmia fornacum*, or *cadmia of the furnaces*, to distinguish it from the other. This is a matter sublimed when ores containing zinc, like those of Rammelsberg, are smelted. This cadmia consists of the flowers of the semi-metal sublimed during the fusion, and adhering to the inner-surfaces of the walls of furnaces, where they suffer a semi-fusion, and therefore acquire some solidity. So great a quantity of these are collected, that they form very thick incrustations, which must be frequently taken off. The name of *cadmia of the furnaces* has also been given to all the soots and metallic sublimates formed by smelting, although there is certainly a difference between them.

CALAMINT, in botany. See Baum and Mentha.

CALAMUS, in botany, a genus of the monogynia order, belonging to the hexandria class of plants; and in the natural method ranking under the 5th order, *Tripetaloideæ*. The calyx is hexaphyllous, there is no corolla, the fruit is a dry monospermous berry, imbricated backwards. There is but one species, the rotang. The stem is without branches, has a crown at top, and is every where beset with straight spines. This is the true Indian cane, which is not visible on the outside; but the bark being taken off discovers the smooth stick, which has no marks of spine on the bark, and is exactly like those which the Dutch sell to us; keeping this matter very secret, lest travellers going by should take as many canes out of the woods as they please. Sumatra is said to be the place where most of these sticks grow. Such are to be chosen as are of proper growth between two joints, suitable to the fashionable length of canes as they are then worn: but these are scarce.—The calamus rotang is one of several plants from which the drug improperly called Dragon's-blood is obtained.

Calamus, in the ancient poets, denotes a simple kind of pipe or fistula, the musical instrument of the shepherds and herdsmen; usually made either of an oaten stalk or a reed.

Calamus *Aromaticus*, or *Sweet-scented Flag*, in the materia medica, a species of flag called *acorus* by Linnæus. See Acorus.

Calamus *Scriptorius*, in antiquity, a reed or rush to write with. The ancients made use of styles to write on tables covered with wax; and of reed, or rush, to write on parchment, or Egyptian paper.

CALAMY (Edmund), an eminent Presbyterian divine, born at London in the year 1600, and educated at Pembroke-hall, Cambridge, where his attachment to the Arminian party excluded him from a fellowship. Dr. Felton bishop of Ely, however, made him his chaplain; and in 1639 he was chosen minister of St. Mary Aldermary, in the city of London. Upon the opening of the long parliament, he distinguished himself in defence of the Presbyterian cause; and had a principal hand in writing the famous *Smectymnus*, which, he himself says, gave the first deadly blow to episcopacy. The authors of this tract were five, the initials of whose names formed the name under which it was published; viz. Stephen Marshal, Edmund Calamy, Thomas Young, Matthew Newcomen, and William Sparstow. He was after that an active member in the assembly of divines, was a strenuous opposer of sectaries, and used his utmost endeavours to prevent those violences committed after the king was brought from the Isle of Wight. In Cromwell's time he lived privately, but was assiduous in promoting the king's return; for which he was afterwards offered a bishopric, but refused it. He was ejected for nonconformity in 1662; and died of grief at the sight of the great fire of London.

Calamy (Edmund), grandson to the preceding (by his eldest son Mr. Edmund Calamy, who was ejected out of the living of Moxton in Essex on St. Bartholomew's day 1692), was born in London, April 5, 1671. Whilst he resided here, he declined an offer of a professor's chair in the university of Edinburgh which was made him by the principal of that university, who had been commissioned to find a person properly qualified for the office. Having resolved to make divinity his principal study, he entered into an examination of the controversy between the conformists and nonconformists; which determined him to join the latter in 1692. In 1696 he drew up a table of contents to Mr. Baxter's History of his life and times, and made some remarks on the work itself. Reflecting afterwards on the usefulness of the book, he saw the expediency of continuing it; and as Mr. Baxter's history came no lower than the year 1684, he composed an abridgment of it, with an account of many other ministers who were ejected after the restoration of Charles II. and a continuation of their history till the year 1691. He afterwards published a moderate defence of nonconformity, in three tracts, in answer to some tracts of Dr. Hoadley. In 1709 Mr. Calamy made a tour to Scotland; and had the degree of doctor of divinity conferred on him by the universities of Edinburgh, Aberdeen, and Glasgow. He died June 3, 1732, greatly regretted not only by the dissenters, but also by the moderate members of the established church, both clergy and laity, with many of whom he lived in great intimacy. Besides the pieces already mentioned, he published many treatises and sermons on different subjects. He was twice married, and had 13 children.

CALANDRE, a name given by the French writers to an insect that does great mischief in granaries. It is properly of the scarab or beetle class; it has two antennæ or horns formed of a great number of round joints, and covered with a soft and short down; from the anterior part of the head there is thrust out a trunk, which is so formed at the end, that the creature easily makes way with it through the coat or skin that covers the grain, and gets at the meal or farina on which it feeds; the inside of the grain is also the place where the female deposits her eggs, that the young progeny may be born with provision about them. When the female has pierced a grain of corn for this purpose, she deposits in it one egg, or at the utmost two, but she most frequently lays them single: these eggs hatch into small worms, which are usually found with their bodies rolled up in a spiral form; and after eating till they arrive at their full growth, they are changed into chrysals, and from these in about a fortnight comes out the perfect calandre. The female lays a considerable number of eggs; and the increase of these creatures would be very great, but nature has so ordered it, that while in the egg state, and even while in that of the worm, they are subject to be eaten by mites; these little vermin are always very plentiful in granaries, and they destroy the far greater number of these larger animals.

CALAS (John), the name of a most unfortunate Protestant merchant at Thoulouse, inhumanly butchered under forms of law cruelly prostituted to shelter the sanguinary dictates of ignorant popish zeal. He had lived 40 years at Thoulouse. His wife was an English woman of French extraction; and they had five sons; one of whom, Lewis, had turned Catholic through the persuasions of a Catholic maid who had lived 30 years in the family. In October 1761, the family consisted of Calas, his wife, Mark Anthony their son, Peter their second son, and this maid. Anthony was educated for the bar; but, being of a melancholy turn of mind, was continually dwelling on passages from authors on the subject of suicide,

and one night in that month hanged himſelf on a bar laid acroſs two folding doors in their ſhop. The crowd collected by the confuſion of the family on ſo ſhocking a diſcovery, took it into their heads that he had been ſtrangled by the family to prevent his changing his religion, and that this was a common practice among proteſtants. The officers of juſtice adopted the popular tale, and were ſupplied by the mob with what they accepted as evidences of the fact. The fraternity of white penitents got the body, buried it with great ceremony, and performed a ſolemn ſervice for him as a martyr; the Franciſcans did the ſame: and after theſe formalities no one doubted the guilt of the devoted heretical family. They were all condemned to the torture, to bring them to confeſſion: they appealed to the parliament; who, as weak and as wicked as the ſubordinate magiſtrates, ſentenced the father to the torture, ordinary and extraordinary, to be broken alive upon the wheel, and then to be burned to aſhes. A diabolical decree! which, to the ſhame of humanity, was actually carried into execution. Peter Calas, the other ſon, was baniſhed for life; and the reſt were acquitted. The diſtracted widow found ſome friends, and among the reſt M. Voltaire, who laid her caſe before the council of ſtate at Verſailles, and the parliament of Thoulouſe were ordered to tranſmit the proceedings. Theſe the king and council unanimouſly agreed to annul; the capitoul or chief magiſtrate of Thoulouſe was degraded and fined; old Calas was declared to have been innocent; and every imputation of guilt was removed from the family, who alſo received from the king and clergy conſiderable gratuities.

CALASH, or Calesh, a ſmall light kind of chariot or chair, with very low wheels, uſed chiefly for taking the air in parks and gardens. The calaſh is for the moſt part richly decorated, and open on all ſides for the convenience of the air and proſpect, or at moſt incloſed with light mantlets of wax-cloth to be opened and ſhut at pleaſure. In the Philoſophical Tranſactions we have a deſcription of a new ſort of calaſh going on two wheels, not hung on traces, yet eaſier than the common coaches, over which it has this further advantage, that whereas a common coach will overturn if one wheel go on a ſurface a foot and an half higher than the other, this will admit of a difference of 3½ feet without danger of overturning. The conſtruction is alſo ſuch that, after the ſpokes turned are parallel to the horizon, and one wheel is flat over the head of him that rides in it, and the other flat under him, it will turn once more, and by that means the wheels will be placed *in ſtatu quo*, without any diſorder to the horſe or rider.

CALASIO (Marius), a Franciſcan, and profeſſor of the Hebrew language at Rome, of whom there is very little to be ſaid, but that he publiſhed there, in the year 1621, a Concordance of the Bible, which conſiſted of four great volumes in folio.

CALASIRIS, in antiquity, a linen tunic fringed at the bottom, and worn by the Egyptians under a white woollen garment: but this laſt they were obliged to pull off when they entered the temples, being only allowed to appear there in linen garments.

CALATAJUD, a large and handſome town of Spain, in the kingdom of Arragon; ſituated at the confluence of the rivers Xalon and Xiloca, at the end of a very fertile valley, with a good caſtle on a rock. W. long. 2. 9. N. lat. 41. 22.

CALATHUS, in antiquity, a kind of hand-baſket made of light wood or ruſhes; uſed by the women ſometimes to gather flowers, but chiefly after the example of Minerva, to put their work in. The figure of the calathus, as repreſented on ancient monuments, is narrow at the bottom, and widening upwards like that of a top. Pliny compares it to that of a lily. The Calathus or work-baſket of Minerva is no leſs celebrated among the poets than her diſtaff.

Calathus was alſo the name of a cup for wine uſed in ſacrifices.

CALATOR, in antiquity, a cryer, or officer, appointed to publiſh ſomething aloud, or call the people together. The word is formed from καλεω *voco, I call*. Such miniſters the pontifices had, whom they uſed to ſend before them when they went to ſacrifice on *feriæ* or holidays, to advertiſe the people to leave off work. The magiſtrates alſo uſed *calatores*, to call the people to the comitia, both *curiata* and *centuriata*. The officers in the army alſo had *calatores*; as had likewiſe many private families, to invite their gueſts to entertainments.

CALATRAVA, a city of New Caſtile, in Spain, ſituated on the river Guadiana, 45 miles ſouth of Toledo. W. long. 4. 20. N. lat. 39. 0.

Knights of Calatrava, a military order in Spain, inſtituted under Sancho III. king of Caſtile, upon the following occaſion. When that prince took the ſtrong fort of Calatrava from the Moors of Andaluſia, he gave it to the Templars, who, wanting courage to defend it, returned it him again. Then Don Reymond, of the order of the Ciſtercians, accompanied by ſeveral perſons of quality, made an offer to defend the place, which the king thereupon delivered up to them, and inſtituted that order. It increaſed ſo much under the reign of Alphonſus, that the knights deſired they might have a grand maſter, which was granted. Ferdinand and Iſabella afterwards, with the conſent of pope Innocent VIII. re-united the grand-maſterſhip of Calatrava to the Spaniſh crown; ſo that the kings of Spain are now become perpetual adminiſtrators thereof.—The knights of Calatrava bear a croſs gules, flower-deliſed with green, &c. Their rule and habit was originally that of the Ciſtercians.

CALCADA, or *St. Domingo* Calcalda, a town of Spain, ſituated in W. long. 3. 5. N. lat. 42. 36.

CALCAR, a very ſtrong town of Germany, in the circle of Weſtphalia, and duchy of Cleves. It is ſeated near the Rhine, in E. long. 5. 41. N. lat. 51. 45.

Calcar, in glaſs-making, the name of a ſmall oven or reverberatory furnace, in which the firſt calcination of ſand and ſalt of potaſhes is made for the turning them into what is called *frit*. This furnace is made in the faſhion of an oven, ten feet long, ſeven broad in the wideſt part, and two feet deep. On one ſide of it is a trench ſix inches ſquare, the upper part of which is level with the calcar, and ſeparated only from it at the mouth by bricks nine inches wide. Into this trench they put ſea coal, the flame of which is carried into every part of the furnace, and is reverberated from the roof upon the frit, over the ſurface of which the ſmoke flies very black, and goes out at the mouth of the calcar; the coals burn on iron grates, and the aſhes fall through.

Calcar (John de), a celebrated painter, was the diſciple of Titian, and perfected himſelf by ſtudying Raphael. Among other pieces he drew a nativity, repreſenting the angels around the infant Chriſt; and ſo ordered the diſpoſition of his picture, that the light all proceeds from the child. He died at Naples, in 1546, in the flower of his age. It was he who deſigned the anatomical figures of Veſal, and the portraits of the painters of Veſari.

CALCAREOUS, ſomething that partakes of the nature and qualities of calx, or lime. We ſay a *calcareous* earth, *calcareous* ſtone. See Chemistry.

CALCEARIUM, in antiquity, a donative or largeſs beſtowed on Roman ſoldiers for buying ſhoes. In monaſteries, *calcearium* denoted the daily ſervice of cleaning the ſhoes of the religious.

CALCEOLARIA, in botany; a genus of the monogynia order, belonging to the diandria claſs of plants. The corolla

is ringent and inflated; the capſule has two cells, and two valves; the calyx four parted and equal.

CALCHAS, in fabulous hiſtory, a famous diviner, followed the Greek army to Troy. He foretold that the ſiege would laſt ten years: and that the fleet, which was detained in the port of Aulis by contrary winds, would not ſail till Agamemnon's daughter had been ſacrificed to Diana. After the taking of Troy, he retired to Colophon; where, it is ſaid, he died of grief, becauſe he could not divine what another of his profeſſion, called *Mopſus*, had diſcovered.

CALCINATION, in chemiſtry, the reducing of ſubſtances to a calx by fire. See CHEMISTRY.

CALCINATO, a town of Italy, in the duchy of Mantua, remarkable for a victory gained over the Imperialiſts by the French in 1706. E. long. 9. 55. N. lat. 45. 25.

CALCULARY *of a* PEAR, a congeries of little ſtrong knots diſperſed through the whole parenchyma of the fruit. The calculary is moſt obſerved in rough-taſted or choak-pears. The knots lie more continuous and compact together towards the pear where they ſurround the ACETARY. About the ſtalk they ſtand more diſtant; but towards the cork, or ſtool of the flower, they ſtill grow cloſer, and there at laſt gather into the firmneſs of a plum-ſtone. The calculary is no vital or eſſential part of the fruit; the ſeveral knots whereof it conſiſts being only ſo many concretions or precipitations out of the ſap, as we ſee in urine, wines, and other liquors.

CALCULATION, the act of computing ſeveral ſums, by adding, ſubtracting, multiplying, or dividing. See ARITHMETIC.

CALCULATION is more particularly uſed to ſignify the computations in aſtronomy and geometry, for making tables of logarithms, ephemerides, finding the time of eclipſes, &c. See ASTRONOMY, GEOMETRY, and LOGARITHMS.

CALCULUS, primarily denotes a little ſtone or pebble, anciently uſed in making computations, taking of ſuffrages, playing at tables, and the like. In after-times, pieces of ivory, and counters ſtruck of ſilver, gold, and other matters, were uſed in lieu of theſe, but ſtill retained the ancient names. Computiſts were by the lawyers called *calculones*, when they were either ſlaves, or newly freed men; thoſe of a better condition were named *calculatores* or *numerarii*: ordinarily there was one of theſe in each family of diſtinction. The Roman judges anciently gave their opinions by calculi, which were white for abſolution, and black for condemnation. Hence *calculus albus*, in ancient writers, denotes a favourable vote, either in a perſon to be abſolved and acquitted of a charge, or elected to ſome dignity or poſt; as *calculus niger* did the contrary. This uſage is ſaid to have been borrowed from the Thracians, who marked their happy or proſperous days by *white*, and their unhappy by *black*, pebbles, put each night into an urn. Beſides the diverſity of colour, there were ſome calculi alſo which had figures or characters engraven on them, as thoſe which were in uſe in taking the ſuffrages both in the ſenate and at aſſemblies of the people. Theſe calculi were made of thin wood, poliſhed and covered over with wax. Their form is ſtill ſeen in ſome medals of the Caſſian family; and the manner of caſting them into the urns, in the medals of the Licinian family. The letters marked upon theſe calculi were U. R. for *uti rogas*, and A. for *antiquo*; the firſt of which expreſſed an approbation of the law, the latter a rejection of it. Afterwards the judges who ſat in capital cauſes uſed calculi marked with the letter A. for *abſolvo*; C. for *condemno*; and N. L. for *non liquet*, ſignifying that a more full information was required.—Calculus is alſo uſed by ancient grammarians for a kind of weight equal to two grains of cicer. Some make it equivalent to the ſiliqua, which is equal to three grains of barley. Two calculi made the ceratium.

CALCULUS *Differentialis*, is a method of differencing quantities, or of finding an infinitely ſmall quantity, which being taken infinite times, ſhall be equal to a given quantity; or, it is the arithmetic of the infinitely ſmall differences of variable quantities.—The foundation of this calculus is an infinitely ſmall quantity, or an infiniteſimal, which is a portion of a quantity incomparable to that quantity, or that is leſs than any aſſignable one, and therefore accounted as nothing; the error accruing by omitting it being leſs than any aſſignable one. Hence two quantities, only differing by an infiniteſimal, are reputed equal. Thus, in Aſtronomy, the diameter of the earth is an infiniteſimal, in reſpect of the diſtance of the fixed ſtars; and the ſame holds in abſtract quantities. The term, infiniteſimal, therefore, is merely reſpective, and involves a relation to another quantity; and does not denote any real *ens*, or being. Now infiniteſimals are called *differentials*, or *differential quantities*, when they are conſidered as the differences of two quantities. Sir Iſaac Newton calls them *moments*; conſidering them as the momentary increments of quantities, e. g. of a line generated by the flux of a point, or of a ſurface by the flux of a line. The differential calculus, therefore, and the doctrine of fluxions, are the ſame thing under different names; the former given by M. Leibnitz, and the latter by Sir Iſaac Newton: each of whom lay claim to the diſcovery. There is, indeed, a difference in the manner of expreſſing the quantities reſulting from the different views wherein the two authors conſider the infiniteſimals; the one as moments, the other as differences: Leibnitz, and moſt foreigners, expreſs the differentials of quantities by the ſame letters as variable ones, only prefixing the letter d: thus the differential of x is called $d\,x$; and that of y, $d\,y$: now $d\,x$ is a poſitive quantity, if x continually increaſe; negative, if it decreaſe. The Engliſh, with Sir Iſaac Newton, inſtead of $d\,x$ write $\dot{x}$ (with a dot over it;) for $d\,y$, $\dot{y}$, &c. which foreigners object againſt, on account of that confuſion of points which they imagine ariſes when differentials are again differenced; beſides that the printers are more apt to overlook a point than a letter. Stable quantities being always expreſſed by the firſt letters of the alphabet $d\,a=o$, $d\,b=o$, $dc=o$; wherefore $d\,(x+y-a)=d\,x+d\,y$, and $d\,(x-y+a)$ $d\,x-d\,y$. So that the differencing of quantities is eaſily performed, by the addition or ſubtraction of their compounds.

To difference quantities that multiply each other; the rule is, firſt, multiply the differential of one factor into the other factor, the ſum of the two factors is the differential ſought: thus, the quantities being $x\,y$, the differential will be $x\,d\,y+y\,d\,x$, i. e. $d\,(x\,y)=x\,d\,y+y\,d\,x$. Secondly, if there be three quantities mutually multiplying each other, the factum of the two muſt then be multiplied into the differential of the third; thus ſuppoſe $v\,x\,y$, let $v\,x=t$, then $v\,x\,y=t\,y$; conſequently $d\,(v\,x\,y)=t\,d\,y+y\,d\,t$: but $d\,t=v\,d\,x+x\,d\,v$. Theſe values, therefore, being ſubſtituted in the antecedent differential. $t\,d\,y+y\,d\,t$, the reſult is, $d\,(v\,x\,y)=v\,x\,d\,y+v\,y\,d\,x+x\,y\,d\,v$. Hence it is eaſy to apprehend how to proceed, where the quantities are more than three. If one variable quantity increaſe, while the other y decreaſes, it is evident $y\,d\,x-x\,d\,y$ will be the differential of $x\,y$.

To difference quantities that mutually divide each other; the rule is, firſt, multiply the differential of the diviſor into the dividend; and on the contrary, the differential of the dividend into the diviſor: ſubtract the laſt product from the firſt, and divide the remainder by the ſquare of the diviſor; the quotient is the differential of the quantities mutually dividing each other. See FLUXIONS.

CALCULUS *Exponentialis*, is a method of differencing exponential quantities, or of finding and ſumming up the differentials or moments of exponential quantities; or at leaſt bringing them to geometrical conſtructions.—By exponential quantity,

is here underſtood a power, whoſe exponent is invariable; e. g. $x \cdot a^x . x^v$. where the exponent x does not denote the ſame in all the points of a curve, but in ſome ſtands for 2, in others for 3, in others for 5, &c.—To difference an exponential quantity; there is nothing required but to reduce the exponential quantities to logarithmic ones; which done, the differencing is managed as in logarithmic quantities.—Thus, ſuppoſe the differential of the exponential quantity x^y required, let

$$x^y = z$$

$$\text{Then will } y\,l\,x = l\,z$$

$$l\,x\,d\,y + \frac{y\,d\,x}{x} = \frac{d\,z}{z}$$

$$z\,l\,x\,d\,y + \frac{z\,y\,d\,x}{x} = d\,z$$

That is, $x^y\,l\,x\,d\,y + x^{v-1}\,d\,x = d\,z$.

CALCULUS *Integralis, or Summatorius*, is a method of integrating, or ſumming up moments, or differential quantities; i. e. from a differential quantity given, to find the quantity from whoſe differencing the given differential reſults.—The integral calculus, therefore, is the inverſe of the differential one: whence the Engliſh, who uſually call the differential method *fluxions*, give this *calculus*, which aſcends from the fluxions, to the flowing or variable quantities: or, as foreigners expreſs it, from the differences to the ſums, by the name of the *inverſe method of fluxions*.

Hence, the integration is known to be juſtly performed, if the quantity found, according to the rules of the differential calculus, being differenced, produce that propoſed to be ſummed.—Suppoſe $\int$ the ſign of the ſum, or integral quantity, then $\int y\,d\,x$ will denote the ſum, or integral of the differential $y\,d\,x$.

To integrate, or ſum up a differential quantity: It is demonſtrated, firſt, that $\int d\,x = x$; ſecondly, $\int (dx + dy) = x + y$: thirdly, $\int (x\,dy + y\,d\,x) = xy$: fourthly, $\int (m\,x\,m-{}^1\,d\,x = x\,m$: fifthly, $\int (n\,.\,m)\,x\frac{n-m}{m}d\,x = x\,\frac{n}{m}$: ſixthly, $\int (y\,d\,x - x\,d\,y)$: $y^2 = x : y$. Of theſe, the fourth and fifth caſes are the moſt frequent, wherein the differential quantity is integrated, by adding a variable unity to the exponent, and dividing the ſum by the new exponent multiplied into the differential of the root; e. g. the fourth caſe, by $m-(1+1)\,d\,x$, i. e. by $m\,d\,x$. If the differential quantity to be integrated does not come under any of theſe formulas, it muſt either be reduced to an integral finite, or an infinite ſeries, each of whoſe terms may be ſummed.

It may be here obſerved, that, as in the analyſis of finites, any quantity may be raiſed to any degree of power; but *vice verſa*, the root cannot be extracted out of any number required; ſo in the analyſis of infinites, any variable or flowing quantity may be differenced; but *vice verſa*, any differential cannot be integrated. And as, in the analyſis of finites, we are not yet arrived at a method of extracting the roots of all equations, ſo neither has the integral calculus arrived at its perfection: and as in the former we are obliged to have recourſe to approximation, ſo in the latter we have recourſe to infinite ſeries, where we cannot attain to a perfect integration.

CALCULUS *Literalis*, or *Literal* CALCULUS, is the ſame with ſpecious arithmetic, or algebra, ſo called from its uſing the letters of the alphabet; in contradiſtinction to numeral arithmetic, which uſes figures. In the literal calculus given quantities are expreſſed by the firſt letters, *a b c d*; and quantities ſought by the laſt *z y x*, &c. Equal quantities are denoted by the ſame letters.

CALCULUS *Minervæ*, among the ancient lawyers, denoted the deciſion of a cauſe, wherein the judges were equally divided. The expreſſion is taken from the hiſtory of Oreſtes, repreſented by Æſchylus and Euripides; at whoſe trial, before the Areopagites, for the murder of his mother, the votes being equally divided for and againſt him, Minerva interpoſed, and gave the caſting vote or calculus in his behalf. M. Cramer, profeſſor at Marpurg, has a diſcourſe expreſsly *De Calculo Minervæ*; wherein he maintains, that all the effect an entire equality of voices can have, is to leave the cauſe *in ſtatu quo*.

CALCULUS *Tibertinus*, a ſort of figured ſtone, formed in great plenty about the cataracts of the Anio, and other rivers in Italy; of a white colour, and in ſhape oblong, round, or echinated. They are a ſpecies of the *ſtiriæ lapideæ*, and generated like them; and ſo like ſugar-plums in the whole, that it is a common jeſt at Rome to deceive the unexperienced by ſerving them up at table as a part of the deſert.

CALCULUS, in medicine, a ſtone formed in the bladder, kidneys, &c. The term is Latin, and ſignifies a *little pebble*. The calculus in the bladder is called *lethiaſis*; and in the kidneys, *nephritis*. See MEDICINE and SURGERY. Human calculi are commonly formed of different ſtrata of incruſtations; often ſmooth and heavy; but ſometimes ſpongy, light, and full of inequalities or protuberances. Chemically analyſed, or diſtilled in an open fire, they nearly yield the ſame principles as urine itſelf, or at leaſt an empyreumatic volatile urinous matter, together with a great deal of air. They never have, nor can have, naturally, any foreign matter for a baſis; but they may by accident. An inſtance of this is related by Dr. Percival: A bougie had unfortunately ſlipped into the bladder, and upon it a ſtone of a conſiderable ſize was formed in leſs than a year. This ſtone had the appearance of chalk, and was afterwards converted into quicklime. From experiments made both with that and other calculi, he conjectures, that hard waters which contain calcareous earth may contribute towards the formation of theſe calculi.

CALCUTTA, or FORT WILLIAM, the emporium of Bengal, and the ſeat of the governor-general of India, ſituated on the Hoogly river, or weſtern arm of the Ganges, at about 100 miles from its mouth. It extends from the weſtern point of Fort William, along the banks of the river, almoſt to the village of Coſſipoor, four miles and a half. The breadth, in many parts, is inconſiderable. Generally ſpeaking, the deſcription of one Indian city is a deſcription of all; they being all built on one plan, with very narrow, confined, and crooked ſtreets; an incredible number of reſervoirs and ponds, and a great many gardens interſperſed. A few of the ſtreets are paved with brick. The houſes are variouſly built: ſome of brick; others with mud; and a greater proportion with bamboos and mats. Theſe different kinds of fabrics ſtanding intermixed with each other, form a motley appearance: thoſe of the latter kinds are invariably of one ſtory, and covered with thatch: thoſe of brick ſeldom exceed two floors, and have flat-terraced roofs. The two former claſſes far outnumber the laſt, which are ſo thinly ſcattered, that fires, which often happen, do not, ſometimes, meet with the obſtruction of a brick houſe through a whole ſtreet. But Calcutta is, in part, an exception to this rule of building; for there, the quarter inhabited by the Engliſh is compoſed entirely of brick buildings, many of which have more the appearance of palaces than of private houſes. The line of buildings that ſurrounds two ſides of the eſplanade of the fort, is magnificent; and it adds greatly to the ſuperb appearance, that the houſes are detached from each other, and inſulated in a great ſpace. The buildings are all on a large ſcale, from the neceſſity of having a free circulation of air in a climate, the heat of which is extreme. The general approach to the houſes is by a flight of ſteps with great projecting porticos, or ſurrounded by colonnades or arcades, which give them the appearance of Grecian temples, and, indeed, every houſe

may be conſidered as a temple dedicated to hoſpitality. But the remainder of the city, and by much the greateſt part, is built as above deſcribed. Within thirty years paſt, Calcutta has been wonderfully improved both in appearance and in the ſalubrity of the air, for the ſtreets have been properly drained, and the ponds filled up; thus removing a vaſt ſurface of ſtagnant water. It is an extenſive and populous city, being ſuppoſed to contain at leaſt 500,000 inhabitants. The mixture of European and Aſiatic manners, that may be obſerved in Calcutta, is curious: coaches, phaetons, ſingle-horſe chaiſes, with the pallankeens and hackeries of the natives, the paſſing ceremonies of the Hindoos, and the different appearances of the fakirs, form a ſight more novel and extraordinary, perhaps, than any city in the world can preſent. The hackery here mentioned is a ſmall covered carriage upon two wheels, drawn by bullocks, and uſed generally for the female part of the family. The ſituation of Calcutta is not fortunate; for it has ſome extenſive muddy lakes, and a vaſt foreſt cloſe by it. Indeed, it is remarkable, that the Engliſh have been more inattentive to the natural advantages of ſituation, in their foreign ſettlements, than other European nations. Calcutta is a modern city, having riſen on the ſite of the village of Govindpour, about 95 years ago. The Ganges is navigable up to the town for the largeſt ſhips that viſit India. Here is the ſeat of the governor-general and council of Bengal, who have a controul over the preſidencies of Madras, Bombay, and Bencoolen. Here is likewiſe a ſupreme court of judicature, in which juſtice is diſpenſed, according to the laws of England, by a chief juſtice and three puiſne judges. In 1756, Calcutta was taken by the Soubah of Bengal, who forced the feeble garriſon, to the amount of 146 perſons, into a priſon called the Black Hole, a cube of 18 feet, out of which only 23 came alive. The particulars of this horrid event are the following.

It was about eight o'clock when theſe unhappy perſons were thus crammed together in a cloſe ſultry night in Bengal, in a ſituation where no air could reach them, being open only to the weſt by two windows, ſtrongly barred with iron, and from which they could receive ſcarcely any circulation of freſh air. They had been but a few minutes confined before every one fell into a perſpiration that brought on a raging thirſt, which increaſed in proportion as the body was drained of its moiſture. Various expedients were thought of to give more room and air. Every man was ſtripped, and every hat put in motion: they ſeveral times ſat down on their hams; but at each time ſeveral of the poor creatures fell, and were ſuffocated or trod to death. Before nine o'clock every man's thirſt grew intolerable, and reſpiration difficult. Efforts were made to force the door, but in vain. Inſults were even uſed to the guards, to provoke them to fire in upon the priſoners, who grew outrageous, and many delirious. "Water! water!" became the general cry; but this ſcene of miſery only proved matter of entertainment to the brutal wretches without, who ſupplied them with water, that they might have the ſatiſfaction of ſeeing them *fight* for it, as they phraſed it; and held up lights to the bars, that they might loſe no part of the inhuman diverſion. Before eleven o'clock, one third of the whole were dead. Thirſt grew intolerable; but Mr. Holwell, who lived to relate the tale, kept his mouth moiſt by ſucking the perſpiration out of his ſhirt-ſleeves, and catching the drops as they fell, like heavy rain, from his head and face. By half an hour after eleven, moſt of the living were in an outrageous delirium. They found that water heightened their uneaſineſs; and "Air! air!" was the general cry. Every inſult that could be deviſed againſt the guard, all the opprobrious names that the viceroy and his officers could be loaded with, were repeated, to provoke the guard to fire upon them. Every man had eager hopes of meeting the firſt ſhot. Some at length expired on the bodies of others; while a ſteam aroſe as well from the living as the dead, which was very offenſive. About two in the morning, theſe unhappy priſoners crowded ſo much to the windows, that many died ſtanding, unable to fall by the throng and equal preſſure around them. When the day broke, the ſtench ariſing from the dead bodies was inſufferable. At that juncture, the Soubah, who had received an account of the havoc death had made among them, ſent one of his officers to enquire if the chief ſurvived. Mr. Holwell was ſhown to him; and about ſix o'clock, an order came for their releaſe. Thus they had remained in this infernal priſon from eight at night until ſix in the morning, when the poor remains of 146 ſouls, being only 23, came out barely alive. The dead bodies were dragged out of the hole by the ſoldiers, and thrown promiſcuouſly into the ditch of an unfiniſhed ravelin, which was afterwards filled with earth.

Calcutta was retaken, the next year, by colonel Clive and admiral Watſon. The victory of Plaſſey followed; and the inhuman Soubah was depoſed, and put to death by his ſucceſſor. Immediately after this victory, colonel Clive began to erect the preſent citadel of Calcutta, which is ſuperior to any fortreſs in India. It is, however, upon too extenſive a ſcale. Calcutta is 1030 miles S. W. by S. of Madras. Long. 88. 28. E. Lat. 22. 23. N.

CALDARIUM, in the ancient baths, denoted a brazen veſſel or ciſtern, placed in the hypocauſtum, full of hot water, to be drawn thence into the *piſcina* or bath, to give it the neceſſary degree of heat. In this ſenſe the *caldarium* ſtood contradiſtinguiſhed from the *tepidarium* and *frigidarium*.

Caldarium alſo denoted the ſtove, or ſudatory, being a cloſe vaulted room, wherein by hot dry fumes, without water, people were brought to a profuſe ſweat. In which ſenſe *caldarium* was the ſame with what was otherwiſe denominated *vaporarium ſudatorium*, and *laconium*; in the Greek baths, ὑποκαυϛον *hypocauſtum*.

CALDERINUS (Domitius), a learned critic, born at Calderia near Verona. He read lectures upon polite literature at Rome with great reputation; and was the firſt who ventured to write upon the moſt difficult of the ancient poets. He died very young in the year 1477.

CALDERON, de la Barca, (Dom. Pedro), a Spaniſh officer, who after having ſignalized himſelf in the military profeſſion, quitted it for the eccleſiaſtical, and then commenced dramatic writer. His dramatic works make 9 vols. in 4to, and ſome Spaniſh authors have compared him to Shakeſpeare. He flouriſhed about the year 1640.

CALDERWOOD (David), a famous divine of the church of Scotland, and a diſtinguiſhed writer in behalf of the Preſbyterians. James I. who was deſirous of bringing the Church of Scotland nearer to a conformity with that of England, laboured earneſtly to reſtore the epiſcopal authority, and enlarge the powers of the biſhops who were then in Scotland. This deſign was very warmly oppoſed by many of the miniſters, and particularly by Mr Calderwood: who, after many ſtruggles and at laſt refuſing to comply with what the king in perſon required of him, was committed to priſon. Afterwards the privy council, according to the power exerciſed by them at that time, directed him to baniſh himſelf out of the king's dominions before Michaelmas next; and not to return without licence. Having applied to the king for a prorogation of his ſentence without ſucceſs, becauſe he would neither acknowledge his offence, nor promiſe conformity for the future, he retired to Holland, where, in 1623, he publiſhed his celebrated piece intitled *Altare Damaſcenum*. Mr. Calderwood having in the year 1624 been afflicted with a long fit of ſickneſs, and nothing having been heard of him for ſome time, a ce-

Mr. Patrick Scot, as Calderwood himself informs us, took it for granted that he was dead; and thereupon wrote a recantation in his name, as if, before his deceafe, he had changed his fentiments. This impofture being detected, Scot went over to Holland, and ftaid three weeks at Amfterdam, where he made a diligent fearch for the author of Altare Damafcenum, with a defign to have difpatched him. But Calderwood had privately retired into his own country, where he lived feveral years. Scot gave out that the king had furnifhed him with the matter for the pretended recantation, and that he only put it in order. During his retirement, Mr. Calderwood collected all the memorials relating to the ecclefiaftical affairs of Scotland, from the beginning of the reformation there down to the death of king James; which collection is ftill preferved in the univerfity library of Glafgow: that which was publifhed under the title of "The true hiftory of Scotland," is only an extract from it. In the advertifement prefixed to the laft edition of his Altare Damafcenum mention is made of his being minifter of Pencaitland near Edinburgh in 1638; but we find nothing faid there, or any where elfe, of the time of his death.

CALDRON, a large kitchen utenfil, commonly made of copper; having a moveable iron handle, whereby to hang it on the chimney-hook. The word is formed from the French *chaudron*, or rather the Latin *caldarium*.

Boiling in CALDRONS *(caldariis decoquere)*, is a capital punifhment fpoken of by the middle-age writers, decreed to divers forts of criminals, but chiefly to debafers of the coin. One of the torments inflicted on the ancient Chriftian martyrs, was boiling them in caldrons of water, oil, &c.

CALDWALL (Richard), a learned Englifh phyfician, born in Staffordfhire about the year 1513. He ftudied phyfic in Brazen-Nofe college, Oxford; and was examined, admitted into, and made cenfor of, the college of Phyficians at London, all in one day. Six weeks after, he was chofen one of the elects: and in the year 1570 was made prefident of that college. Mr. Wood tells us, that he wrote feveral pieces in his profeffion; but he does not tell us what they were, only that he tranflated a book on the art of furgery, written by one Horatio More, a Florentine phyfician. We learn from Cambden, that Caldwall founded a chirurgical lecture in the college of phyficians, and endowed it with a handfome falary. He died in the year 1585.

CALEA, in botany; a genus of the polygamia æqualis order, belonging to the fyngenefia clafs of plants; and in the natural method ranking under the 49th order, *Compofitæ*. The receptacle is paleaceous, the pappus hairy, and the calyx imbricated.

CALEB, one of the deputies fent by the Ifraelites to take a view of the land of Canaan. He made a good report of the country, and by this means revived the fpirits of the dejected people; on which account, he and Jofhua were the only perfons who, after their leaving Egypt, fettled in the land of Canaan. Caleb had for his fhare, the mountains and the city of Hebron, from which he drove three kings. Othoniel his nephew having taken the city of Debir, Caleb gave him his daughter Achfah in marriage; and died at the age of 114.

CALEDONIA, the ancient name of Scotland. From the teftimonies of Tacitus, Dio, and Solinus, we find, that the ancient Caledonia comprehended all that country lying to the north of the rivers Forth and Clyde. In proportion as the Silures or Cimbri advanced towards the north, the Caledonians being circumfcribed within narrower limits, were forced to tranfmigrate into the iflands which crowd the weftern coafts of Scotland. It is in this period, probably, we ought to place the firft great migration of the Britifh Gael into Ireland; that kingdom being much nearer to the promontory of Galloway and Cantire, than many of the Scottifh ifles are to the continent of North Britain.

To the country which the Caledonians poffeffed, they gave the name of *Gaël-doch*; which is the only appellation the Scots who fpake the Gaelic language, know for their own divifion of Britain. *Gaël-doch* is a compound, made up of *Gaël* or *Caël*, the firft colony of the ancient Gauls who tranfmigrated into Britain, and *doch*, a diftrict or divifion of a country. The Romans, by tranfpofing the letter *l* in *Cael*, and by foftening into a Latin termination the *ch* of *doch*, formed the well-known name of Caledonia.

When the tribes of North Britain were attacked by the Romans, they entered into affociations, that, by uniting their ftrength, they might be more able to repel the common enemy. The particular name of that tribe, which either its fuperior power or military reputation placed at the head of the affociation, was the general name given by the Romans to all the confederates. Hence it is that the *Mœatæ*, who with other tribes inhabited the diftricts of Scotland lying fouthward of the frith, and the *Caledonians*, who inhabited the weft and north-weft parts, have engroffed all the glory which belonged in common, though in an inferior degree, to all the other nations fettled of old in North Britain. It was for the fame reafon that the name of *Mœatæ* was entirely forgotten by foreign writers after the third century, and that of the *Caledonians* themfelves but feldom mentioned after the fourth. The different names of *Britons*, *Caledonians*, *Mœatæ*, *Barbarians*, are conftantly given to the old inhabitants of North Britain, by Tacitus, Herodian, Dio, Spartian, Vopifcus, and other ancient writers. The fucceffors of thefe Britons, Caledonians, Mœats, and Barbarians, are called Picts, Scots, and Attacots, by fome Roman writers of the fourth century. The origin of the appellation *Scoti* and *Picti*, introduced by later Roman authors, has occafioned much controverfy among the antiquarians of thefe days. The difpute feems now to be fully decided by fome learned critics of the prefent century, whofe knowledge of the Gaelic language affifted their inveftigation. See SCOTLAND, PICTS, and HIGHLANDERS.

CALEDONIA, the name of a fettlement made by the Scots on the weft fide of the gulph of Darien, in 1698; out of which they were ftarved at the requeft of the Eaft-India company; for the Englifh government prevented the other colonies from fending them any provifions; fo they were obliged to leave it in the year 1700.

New CALEDONIA, the largeft ifland in the South Pacific Ocean, except New Holland and New Zealand. It extends from lat. 19. 37. to 22. 30. S. and from long. 163. 37. to 167. 14. E. It was difcovered by capt. Cook in 1774. It is full of hills and vallies, of various extent, both in height and depth. From the hills fpring numbers of rivulets, which contribute greatly to fertilize the plains. The fummits of the hills are in general barren, though fome are clothed with wood, as are all the plains and vallies. Among the trees is a fort of pine, very fit for mafts, the wood being clofe grained, tough and light. The inhabitants are ftrong, active, and well-made; their hair is black, and much frizzled, but not woolly; their beards are crifp and thick; they befmear their faces with black pigment; and their only covering is a wrapper, made from the bark of a tree, or of leaves. They cultivate the foil with fome art and induftry, but fubfift chiefly on roots and fifh. Plantains and fugar-canes are not plentiful, bread-fruit is very fcarce, and the cocoa-nut trees are but thinly planted; but their yams and taras are in great abundance. Their houfes are circular like a beehive, and as clofe and warm. The framing of their houfes is of fmall fpars and reeds, and both the roof and fides are covered with long coarfe grafs. The floor is laid with dry grafs, and here and there mats are fpread for the principal

people to lie or fit on. They depofit their dead in the ground, and decorate the grave of their chiefs with fpears, darts, paddles, &c. all ftuck upright in the ground about it. They are of a pacific difpofition, and their women are far more chafte than thofe of the more eaftern iflands.

CALEFACTION, the production of heat in a body from the action of fire, or that impulfe impreffed by a hot body on others around it. This word is ufed in pharmacy, by way of diftinction from *coction*, which implies boiling; whereas calefaction is only heating a thing.

CALENBERG, a caftle of Germany, in the duchy of Brunfwick and principality of Calenberg. It is feated on the river Leine, and is 15 miles fouth of Hanover. It is fubject to the duke of Brunfwick Lunenberg, elector of Hanover, and king of Great Britain. E. long. 9. 43. N. lat. 52. 20.

Calenberg, a principality of Lower Saxony, and one of the three parts of the duchy of Brunfwick, is bounded on the north by the duchy of Verden, on the eaft by the principality of Zell, on the fouth by the principalities of Grubenhagen and Wolfenbuttle, and on the weft by Weftphalia. It belongs to the elector of Hanover.

CALENDAR, or Kalendar, a diftribution of time as accommodated to the ufes of life; or an Almanac, or table, containing the order of days, weeks, months, feafts, &c. occurring in the courfe of the year: being fo called from the word *Calendæ*, which among the Romans denoted the firft days of every month, and anciently was written in large characters at the head of each month. See Almanac, Calends, Month, Time, Year, &c.

In calendars the days were originally divided into octoades, or eighths; but afterwards, in imitation of the Jews, they were divided into hebdomades, or fevens, for what we now call a week: which cuftom, Scaliger obferves, was not in ufe among the Romans till after the time of Theodofius.

Divers calendars are eftablifhed in different countries according to the different forms of the year, and diftributions of time: as the Perfian, the Roman, the Jewifh, the Julian, the Gregorian, &c. calendars.—The ancient Roman calendar is given by Ricciolus, Struvius, Danet, and others; in which we perceive the order and number of the Roman holy-days and work-days.—The Jewifh calendar was fixed by Rabbi Hillel, about the year 360; from which time the days of their year may be reduced to thofe of the Julian calendar.—The three Chriftian calendars are given by Wolfius in his Elements of Chronology; as alfo the Jewifh and Mohamedan calendars. Other writers on the calendars are Vieta, Clavius, Scaliger, Blondel, &c.

The Roman Calendar was firft formed by Romulus, who diftributed time into feveral periods for the ufe of his followers and people. He divided the year into 10 months, of 304 days; beginning on the firft of March and ending with December.

Numa reformed the calendar of Romulus. He added the months of January and February, making it to commence on the firft of January, and to confift of 355 days. But as this was evidently deficient of the true year, he ordered an intercalation of 45 days to be made every four years, in this manner, viz. every two years an additional month of 22 days, between February and March; and at the end of each two years more, another month of 23 days; the month thus interpofed, being called Marcedonius, or the intercalary February.

Julius Cæfar, with the aid of Sofigenes, a celebrated aftronomer of thofe times, farther reformed the Roman calendar, from whence arofe the Julian calendar, and the Julian or old ftyle. Finding that the fun performed his annual courfe in 365 days and a quarter nearly, he divided the year into 365 days, but every fourth year 366 days, adding a day that year before the 24th of February, which being the fixth of the calends, and being thus reckoned twice, gave occafion to the name *biffextile*, or what we alfo call leap-year.

This calendar was farther reformed by order of the pope Gregory XIII. from whence arofe the term Gregorian calendar and ftyle, or what we alfo call the new ftyle, which is now obferved by almoft all European nations. The year of Julius was too long by nearly 11 minutes, which amounts to about three days in 400 years; the pope therefore, by the advice of Clavius and Ciaconius, ordained that there fhould be omitted a day in every three centuries out of four; fo that every century, which would otherwife be a biffextile year, is made to be only a common year, excepting only fuch centuries as are exactly divifible by four, which happens once in four centuries. See Bissextile. This reformation of the calendar, or the new ftyle, as we call it, commenced in the countries under the popifh influence, on the 4th of October 1582, when 10 days were omitted at once, which had been over-run fince the time of the council of Nice, in the year 325, by the furplus of 11 minutes each year. But in England it only commenced in 1752, when 11 days were omitted at once, the 3d of September being accounted the 14th that year; as the furplus minutes had then amounted to 11 days.

Julian Chriftian Calendar, is that in which the days of the week are determined by the letters A, B, C, D, E, F, G, by means of the folar cycle: and the new and full moons, particularly the pafchal full moon, with the feaft of Eafter, and the other moveable feafts depending upon it, by means of golden numbers, or lunar cycles, rightly difpofed through the Julian year. See Cycle, and Golden Number.

In this calendar, it is fuppofed that the vernal equinox is fixed to the 21ft day of March; and that the golden numbers, or cycles of 19 years, conftantly indicate the places of the new and full moons; though both are erroneous; and from hence arofe a great irregularity in the time of Eafter.

Gregorian Calendar, is that which, by means of Epacts, rightly difpofed through the feveral months, determines the new and full moons, with the time of Eafter, and the moveable feafts depending upon it, in the Gregorian year. This differs therefore from the Julian calendar, both in the form of the year, and in as much as epacts are fubftituted inftead of golden numbers. See Epact.

Though the Gregorian calendar be more accurate than the Julian, yet it is not without imperfections, as Scaliger and Calvifius have fully fhewn; nor is it perhaps poffible to devife any one that fhall be quite perfect. Yet the Reformed calendar, and that which is ordered to be obferved in England, by act of parliament made the 24th of George II. come very near to the point of accuracy: for by that act it is ordered that "Eafter-day, on which the reft depend, is always the firft Sunday after the full moon which happens upon or next after the 21ft day of March; and if the full moon happens upon a Sunday, Eafter-day is the Sunday after."

Reformed or *Corrected* Calendar, is that which, rejecting all the apparatus of golden numbers, epacts, and dominical letters, determines the equinox, and the pafchal full moon, with the moveable feafts depending upon it, by computation from aftronomical tables. This calendar was introduced among the proteftant ftates of Germany in the year 1700, when 11 days were omitted in the month of February, to make the corrected ftyle agree with the Gregorian. This alteration in the form of the year they admitted for a time; in expectation that, the true quantity of the tropical year being at length more accurately determined by obfervation, the Romanifts would agree with them on fome more convenient intercalation.

New French Calendar, is quite a new form of calendar that commenced in France on the 22d of September 1792. Although it has exifted ever fince that time, it does not cer-

tainly appear whether this new calendar will be made permanent or not; but at least as a curiosity in the science of chronology, a very brief account of it may not improperly be introduced in this place.

The year, in this calendar, commences at midnight the beginning of that day in which falls the true autumnal equinox for the observatory of Paris. The year is divided into 12 equal months, of 30 days each; after which five supplementary days are added, to complete the 365 days of the ordinary year: these five days do not belong to any month. Each month is divided into three decades of 10 days each; distinguished by 1st, 2d, and 3d decade. All these are named according to the order of the natural numbers, viz. the 1st, 2d, 3d, &c. month, or day of the decade, or of the supplementary days. The years which receive an intercalary day, when the position of the equinox requires it, which we call embolismic or bissextile, they call olimpic; and the period of four years, ending with an olimpic year, is called an olimpiade; the intercalary day being placed after the ordinary five supplementary days, and making the last day of the olimpic year. Each day, from midnight to midnight, is divided into 10 parts, each part into 10 others, and so on to the last measurable portion of time.

In this calendar too the months and days of them have new names. The first three months of the year, of which the autumn is composed, take their etymology, the first from the vintage which takes place from September to October, and is called *vendemiaire*; the second, *brumaire*, from the mists and low fogs, which shew as it were the transudation of nature from October to November: the third, *frimaire*, from the cold, sometimes dry and sometimes moist, which is felt from November to December. The three winter months take their etymology, the first, *nivose*, from the snow which whitens the earth from December to January; the second, *pluviose*, from the rains which usually fall in greater abundance from January to February; the third, *ventose*, from the wind which dries the earth from February to March. The three spring months take their etymology, the first, *germinal*, from the fermentation and development of the sap from March to April; the second, *floreal*, from the blowing of the flowers from April to May; the third, *prairial*, from the smiling fecundity of the meadow crops from May to June. Lastly, the three summer months take their etymology, the first, *messidor*, from the appearance of the waving ears of corn and the golden harvests which cover the fields from June to July; the second, *thermidor*, from the heat, at once solar and terrestrial, which inflames the air from July to August; the third, *fructidor*, from the fruits gilt and ripened by the sun from August to September. Thus, the whole 12 months are, *Autumn*, Vendemiaire, Brumaire, Frimaire.—*Winter*, Nivose, Pluviose, Ventose.—*Spring*, Germinal, Floreal, Prairial.—*Summer*, Messidor, Thermidor, Fructidor.

From these denominations it follows, that by the mere pronunciation of the name of the month, every one readily perceives three things and all their relations, viz. the kind of season, the temperature, and the state of vegetation: for instance, in the word *germinal*, his imagination will easily conceive, by the termination of the word, that the spring commences; by the construction of the word, that the elementary agents are busied; and by the signification of the word, that the buds unfold themselves.

As to the names of the days of the week, or decade of 10 days each, which they have adopted instead of seven, as these bear the stamp of judicial astrology and heathen mythology, they are simply called from the first ten numbers; thus, Primidi, Duodi, Tridi, Quartidi, Quintidi, Sextidi, Septidi, Octidi, Nonidi, Decadi.

In the almanac, or annual calendar, instead of the multitude of saints, one for each day of the year, as in the popish calendars, they annex to every day the name of some animal, or utensil, or work, or fruit, or flower, or vegetable, &c. appropriate and most proper to the times.

Astronomical CALENDAR, an instrument engraven upon copper-plates, printed on paper, and pasted on board, with a brass slider which carries a hair, and shews by inspection, the sun's meridian, altitude, right ascension, declination, rising, setting, amplitude, &c. to a greater exactness than can be shewn by the common globes.

CALENDAR of prisoners, in law, a list of all the prisoners' names in the custody of each respective sheriff. See the article EXECUTION.

CALENDARIUM FLORÆ, in botany, a calendar containing an exact register of the respective times in which the plants of any given province or climate germinate, expand, and shed their leaves and flowers, or ripen and disperse their seeds. For particulars on this curious subject, see the articles DEFOLIATIO, EFFLORESCENTIA, FRONDESCENTIA, FRUCTESCENTIA, and GERMINATIO.

CALENDER, a certain machine used in manufactories to press woollen and silken stuffs and linens, to make them smooth, even, and glossy, or to give them a waved appearance, or water them, as may be seen in mohairs and tabbies. This instrument is composed of two thick cylinders or rollers, of very hard and well-polished wood, round which the stuffs to be calendered are wound: these rollers are placed cross-wise between two very thick boards, the lower serving as a fixed base, and the upper moveable by means of a thick screw with a rope fastened to a spindle which makes its axis: the uppermost board is loaded with large stones weighing 20,000lb. or more. At Paris they have an extraordinary machine of this kind, called the *royal calender*, made by order of M. Colbert. The lower table or plank is made of a block of smooth marble, and the upper is lined with a plate of polished copper.—The alternate motion of the upper board sometimes one way, and sometimes another, together with the prodigious weight laid upon it, gives the stuffs their gloss and smoothness; or gives them the waves, by making the cylinders on which they are put roll with great force over the undermost board. When they would put a roller from under the calender, they only incline the undermost board of the machine. The dressing alone, with the many turns they make the stuffs and linens undergo in the calender, gives the waves or waters them, as the workmen call it. It is a mistake to think, as some have asserted, and Chambers among others, that they use rollers with a shallow indenture or engraving cut into them.

CALENDER OF MONTEITH, a district in the south-west corner of Perthshire in Scotland.

CALENDERS, a sort of Mahometan friars, so called from Santon Calenderi their founder. This Santon went bare-headed, without a shirt, and with the skin of a wild beast thrown over his shoulders. He wore a kind of apron before, the strings of which were adorned with counterfeit precious stones. His disciples are rather a sect of Epicureans than a society of religious. They honour a tavern as much as they do a mosque; and think they pay as acceptable worship to God by the free use of his creatures, as others do by the greatest austerities and acts of devotion. They are called, in Persia and Arabia, *Abdals*, or *Abdallat*, i. e. persons consecrated to the honour and service of God. Their garment is a single coat, made up of a variety of pieces, and quilted like a rug. They preach in the market places, and live upon what their auditors bestow on them. They are generally very vicious persons: for which reason they are not admitted into any houses.

CALENDS, in Roman antiquity. See KALENDS.

CALENDULA, The MARIGOLD; a genus of the poly-

gamia neceſſaria order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked, there is no pappus, the calyx is polyphyllous and equal, the ſeeds of the diſk membranaceous. Of this there are eight ſpecies, none of them natives of Europe. The common kind is ſo well known as to need no definition; and none of the others merit any, except the *fruticoſa*, which has lately been introduced from the Cape of Good Hope. It has a ſlender ſhrubby perennial ſtalk, which riſes to the height of ſeven or eight feet, but requires ſupport: this ſends out a great number of weak branches from the bottom to the top, which hang downward unleſs they are ſupported: they are garniſhed with oval leaves, having ſhort flat footſtalks; theſe are of a ſhining green colour on their upper ſide, but paler underneath: the flowers come out at the end of the branches, on ſhort naked footſtalks. This is eaſily propagated by cuttings; which may be planted at any time in ſummer in a ſhady border, or otherwiſe ſhaded with mats in the heat of the day: in five or ſix weeks theſe will have taken root, when they ſhould be ſeparately taken up, each put in a ſeparate pot, and placed in the ſhade till they have taken freſh root; then they may be placed, with other hardy exotic plants, in a ſheltered ſituation, where they may remain till the froſt begins, when they muſt be removed into the green-houſe, placing them near the windows, that they may enjoy the free air; for this plant only requires protection from froſt. The ſeeds of the common ſort may be ſown in March or April, where the plants are to remain; and will require no other culture but to keep them clear of weeds, and to thin the plants where they are too thick. The flowers of the common marigold were formerly uſed in medicine, but their properties are too feeble to entitle them to any notice.

CALENTIUS (Eliſius), a Neapolitan poet and proſe author. He was preceptor to Frederic the ſon of Ferdinand king of Naples, and the earlieſt writer on the illegality of putting criminals to death, except for murder. He died in the year 1503.

CALENTURE, a feveriſh diſorder incident to ſailors in hot countries; the principal ſymptom of which is their imagining the ſea to be green fields; and hence, attempting to walk abroad in theſe imaginary places of delight, they are frequently drowned. Vomits, bleeding, a ſpare diet, &c. are recommended in this diſorder.

CALEPIN (Ambroſius), an Auguſtin monk of Calepio, whence he took his name, in the 16th century. He is author of a dictionary of eight languages, ſince augmented by Paſſerat and others.

CALETURE, a fort on the iſland of Ceylon, at the mouth of a river of the ſame name. The Dutch became maſters of it in 1655; but were afterwards obliged to leave it. E. long. 80. 51. N. lat. 6. 38.

CALF, in zoology, the young of the ox kind. There are two ways of breeding calves that are intended to be reared. The one is to let the calf run about with its dam all the year round; which is the method in the cheap breeding countries, and is generally allowed to make the beſt cattle. The other is to take them from the dam after they have ſucked about a fortnight: they are then to be taught to drink that milk, which is to be made juſt warm for them, it being very dangerous to give it them too hot. The beſt time of weaning calves is from January to May: they ſhould have milk for 12 weeks after; and a fortnight before that is left off, water ſhould be mixed with the milk in larger and larger quantities. When the calf has been fed on milk for about a month, little whiſps of hay ſhould be placed all about him in cleft ſticks to induce him to eat. In the beginning of April they ſhould be turned out to graſs: only for a few days they ſhould be taken in for the night, and have milk and water given them: the ſame may alſo be given them in a pail ſometimes in the field, till they are ſo able to feed themſelves that they do not regard it. The graſs they are turned into muſt not be too rank, but ſhort and ſweet, that they may like it, and yet get it with ſome labour. Calves ſhould always be weaned at graſs; for if it be done with hay and water, they often grow big-bellied on it, and are apt to rot. When thoſe among the males are ſelected which are to be kept as bulls, the reſt ſhould be gelt for oxen: the ſooner the better. Between 10 and 20 days is a proper age. About London almoſt all the calves are fatted for the butcher. The reaſon of this is, that there is a good market for them; and the lands there are not ſo profitable to breed upon as in cheaper countries. The way to make calves fat and fine is, the keeping them very clean; giving them freſh litter every day; and the hanging a large chalk-ſtone in ſome corner where they can eaſily get at it to lick it, but where it is out of the way of being fouled by their dung and urine. The coops are to be placed ſo as not to have too much ſun upon them, and ſo high above the ground that the urine may run off. They alſo bleed them once when they are a month old, and a ſecond time before they kill them; which is a great addition to the beauty and whiteneſs of their fleſh: the bleeding is by ſome repeated much oftener, but this is ſufficient. Calves are very apt to be looſe in their bowels, which waſtes them. The remedy is to give them chalk ſcraped among milk, pouring it down with a horn. If this does not ſucceed, they give them bole armenic in large doſes, and uſe the cold bath every morning. If a cow will not let a ſtrange calf ſuck her, the common method is to rub both her noſe and the calf's with a little brandy, which generally reconciles them.

Golden CALF, an idol ſet up and worſhipped by the Iſraelites at the foot of Mount Sinai in their paſſage through the wilderneſs to the land of Canaan.

CALF-*Skins*, in the leather manufacture, are prepared and dreſſed by the tanners, ſkinners, and curriers, who ſell them for the uſe of the ſhoe-makers, ſadlers, book-binders, and other artificers, who employ them in their ſeveral manufactures.

CALF-*Skin dreſſed in ſumach*, denotes the ſkin of this animal curried black on the hair ſide, and dyed of an orange colour on the fleſh ſide, by means of ſumach, chiefly uſed in the making of belts. The Engliſh calf ſkin is much valued abroad; and the commerce very conſiderable in France and other countries; where many attempts have been made to imitate it, but hitherto in vain. What is like to baffle all endeavours for imitating the Engliſh calf in France is, the ſmallneſs and weakneſs of the calves about Paris; which at fifteen days old are not ſo big as ours when they come into the world.

Sea-CALF. See *Sea* BEAR.

CALI, a town of Popeyan in South America, ſeated in a valley of the ſame name on the river Cauca. The governor of the province uſually reſides there. Long. 78. 5. N. lat. 3. 15.

CALIBER, or CALIPER, properly denotes the diameter of any body; thus we ſay, two columns of the ſame caliber, the caliber of the bore of a gun, the caliber of a bullet, &c.

CALIBER *Compaſſes*, or CALIPER-*Compaſſes*, or ſimply CALIPERS, a ſort of compaſſes made with bowed or arched legs, the better to take the diameter of any round body; as the diameters of balls, or the bores of guns; or the diameter, and even length of caſks, and ſuch like. The beſt ſort of calipers uſually contain the following articles, viz. 1ſt, the meaſure of convex diameters in inches, &c.; 2d, of concave diameters; 3d, the weight of iron ſhot of given diameters; 4th, the weight of iron ſhot for given gun bores; 5th, the degrees of a ſemicircle; 6th, the proportion of troy and avoirdupois weight; 7th, the proportion of Engliſh and French feet and pounds weight; 8th, factors uſed in circular and ſpherical figures;

9th, tables of the ſpecific gravities and weights of bodies; 10th, tables of the quantity of powder neceſſary for the proof and ſervice of braſs and iron guns; 11th, rules for computing the number of ſhot or ſhells in a complete pile; 12th, rules for the fall or deſcent of heavy bodies; 13th, rules for the raiſing of water; 14th, rules for firing artillery and mortars; 15th, a line of inches; 16th, logarithmic ſcales of numbers, ſines, verſed ſines, and tangents; 17th, a ſectoral line of equal parts, or the line of lines; 18th, a ſectoral line of planes and ſuperficies; and 19th, a ſectoral line of ſolids.

The calipers are exhibited in Pl. 61. Their furniture and uſe we ſhall now deſcribe. Let the four faces of this inſtrument be diſtinguiſhed by the letters A, B, C, D. A and D conſiſt of a circular head and leg; B and C conſiſt only of a leg. On the circular head adjoining to the leg of the face A are diviſions denominated *ſhot diameters*; which ſhow the diſtance in inches and tenths of an inch of the points of the calipers when they are opened; ſo that if a ball not exceeding ten inches be introduced between them, the bevil edge E marks its diameter among theſe diviſions.

On the circular bevil part E of the face B is a ſcale of diviſions diſtinguiſhed by *lb. weight of iron ſhot*. When the diameter of any ſhot is taken between the points of the calipers, the inner edge of the leg A ſhows its weight in avoirdupois pounds, provided it be lb. ½, 1, 1½, 2, 3, 4, 5¼, 6, 8, 9, 12, 16, 18, 24, 26, 32, 36, or 42; the figures neareſt the bevil edge anſwering to the ſhort lines in the ſcale, and thoſe behind them to the longer ſtrokes. This ſcale is conſtructed on the following geometrical theorem, *viz.* that the weights of ſpheres are as the cubes of their diameters. On the lower part of the circular head of the face A is a ſcale of diviſions marked *bores of guns*; for the uſe of which, the legs of the calipers are ſlipped acroſs each other, till the ſteel points touch the concave ſurface of the gun in its greateſt breadth; then the bevil edge F of the face B will cut a diviſion in the ſcale ſhowing the diameter of the bore in inches and tenths.

Within the ſcales of *ſhot* and *bore* diameters on the circular part of A, are diviſions marked *pounders*: the inner figures ½, 1½, 3, 5¼, 8, 12, 18, 26, 36, correſpond to the longeſt lines; and the figures 1, 2, 4, 6, 9, 16, 24, 32, 42, to the ſhort ſtrokes. When the bore of a gun is taken between the points of the caliper, the bevil edge F of the face B will either cut or be near one of theſe diviſions, and ſhow the weight of iron ſhot proper for that gun.

On the upper half of the circular head of the face A are three concentric ſcales of degrees; the outer ſcale conſiſting of 180 degrees numbered from right to left, 10, 20, &c. the middle numbered the contrary way, and the outer ſcale beginning at the middle with 0, and numbered on each ſide to 90 degrees. Theſe ſcales ſerve to take the quantity of an angle, either entering or ſaliant. For an entering or internal angle, apply the legs of the calipers ſo that its outward edges coincide with the legs of the given angle, the degree cut by the bevil edge F in the outer ſcale ſhows the meaſure of the angle ſought: for a ſaliant or external angle, ſlip the legs of the calipers acroſs each other, ſo that their outward edges may coincide with the legs forming the angle, and the degree marked on the middle ſcale by the bevil edge E will ſhow the meaſure of the angle required. The inner ſcale will ſerve to determine the elevation of cannon and mortars, or of any oblique plane. Let one end of a thread be fixed into the notch on the plate B, and any weight tied to the other end: apply the ſtraight ſide of the plate A to the ſide of the body whoſe inclination is ſought; hold it in this poſition, and move the plate B, till the thread falls upon the line near the centre marked *Perp.* Then will the bevil edge F cut the degrees on the inner ſcale, ſhowing the inclination of that body to the horizon.

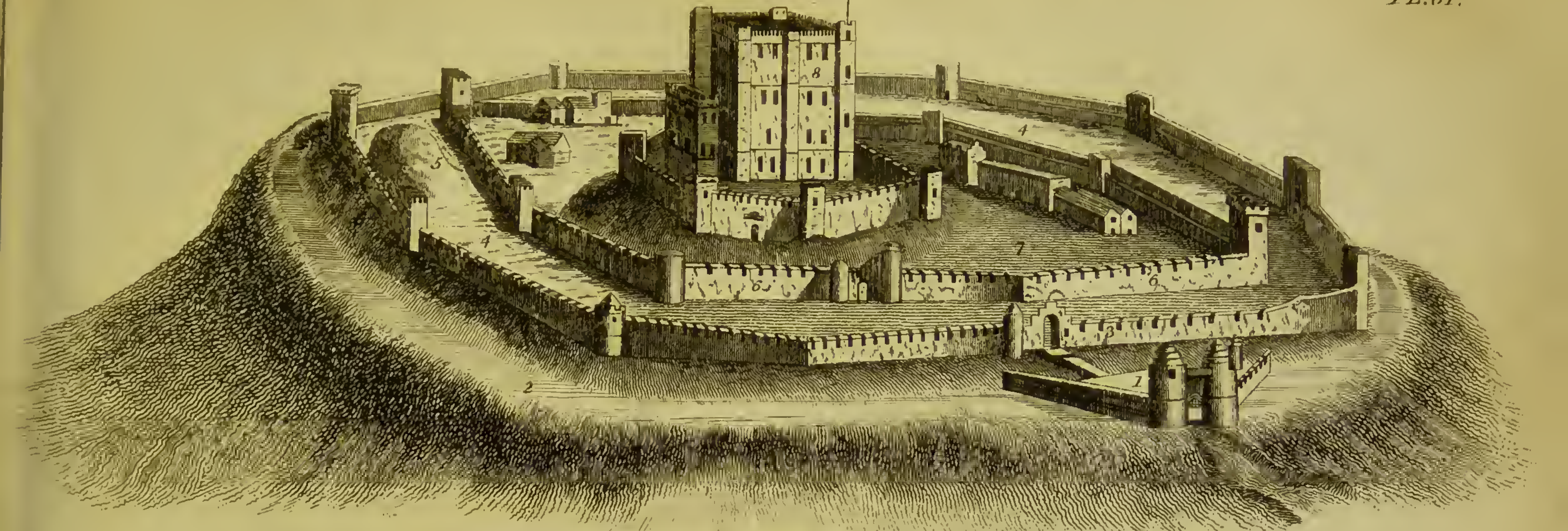
On the face C near the point of the calipers is a little table ſhowing the proportion of troy and avoirdupois weights, by which one kind of weight may be eaſily reduced into another. Near the extreme of the face D of the calipers are two tables ſhowing the proportion between the pounds weight of London and Paris, and alſo between the lengths of the foot meaſure of England and France. Near the extreme of the face A is a table containing four rules of the circle and ſphere; and geometrical figures with numbers annexed to them: the firſt is a circle including the proportion in round numbers of the diameter to its circumference; the ſecond is a circle, inſcribed in a ſquare, and a ſquare within that circle, and another circle in the inner ſquare: the numbers 28, 22, above this figure exhibit the proportion of the outward ſquare to the area of the inſcribed circle; and the numbers 14, 11, below it ſhow the proportion between the area of the inſcribed ſquare and the area of its inſcribed circle. The third is a cube inſcribed in a ſphere; and the number 89¼ ſhows that a cube of iron, inſcribed in a ſphere of 12 inches in diameter, weighs 89¼. The fourth is a ſphere in a cube, and the number 243 expreſſes the weight in pounds of a ſphere inſcribed in a cube whoſe ſide is 12 inches: the fifth repreſents a cylinder and cone of one foot diameter and height: the number in the cylinder ſhows, that an iron cylinder of that diameter and height weighs 364.5 lb. and the number 121.5 in the cone expreſſes the weight of a cone, the diameter of whoſe baſe is 12 inches, and of the ſame height: the ſixth figure ſhows that an iron cube, whoſe ſide is 12 inches, weighs 464 lb. and that a ſquare pyramid of iron, whoſe baſe is a ſquare foot and height 12 inches, weighs 154⅔ lb. The numbers which have been hitherto fixed to the four laſt figures were not ſtrictly true; and therefore they have been corrected in the figure here referred to; and by theſe the figures on any inſtrument of this kind ſhould be corrected likewiſe.

On the leg B of the calipers, is a table ſhowing the weights of a cubic inch or foot of various bodies in pounds avoirdupois. On the face D of the circular head of the calipers is a table contained between five concentric ſegments of rings: the inner one marked *Guns* ſhows the nature of the gun or the weight of ball it carries; the two next rings contain the quantity of powder uſed for proof and ſervice to braſs guns, and the two outermoſt rings ſhow the quantity for proof and ſervice in iron cannon. On the face A is a table exhibiting the method of computing the *number of ſhot or ſhells* in a triangular, ſquare, or rectangular pile. Near this is placed a table containing the principal rules relative to the *fall of bodies*, expreſſed in an algebraic manner: nearer the centre we have another table of rules for raiſing water, calculated on the ſuppoſition, that one horſe is equal in this kind of labour to five men, and that one man will raiſe a hogſhead of water to eight feet of height in one minute, and work at that rate for ſome hours. N. B. Hogſheads are reckoned at ſixty gallons.

Some of the leading principles in gunnery, relative to firing from guns and mortars, are expreſſed on the face B of the calipers. Beſides the articles already enumerated, the ſcales uſually marked on the ſector are laid down on this inſtrument: thus the line of inches is placed on the edge of the calipers, or on the ſtraight borders of the faces C, D: the logarithmic ſcales of numbers, ſines, verſed ſines, and tangents, are placed along theſe faces near the ſtraight edges: the line of lines is placed on the ſame faces in an angular poſition, and marked *Lin.* The lines of plains or ſuperficies are alſo exhibited on the faces C and D, tending towards the centre, and marked *Plan.* Finally, the lines of ſolids are laid on the ſame faces tending towards the centre, and diſtinguiſhed by *Sol.*

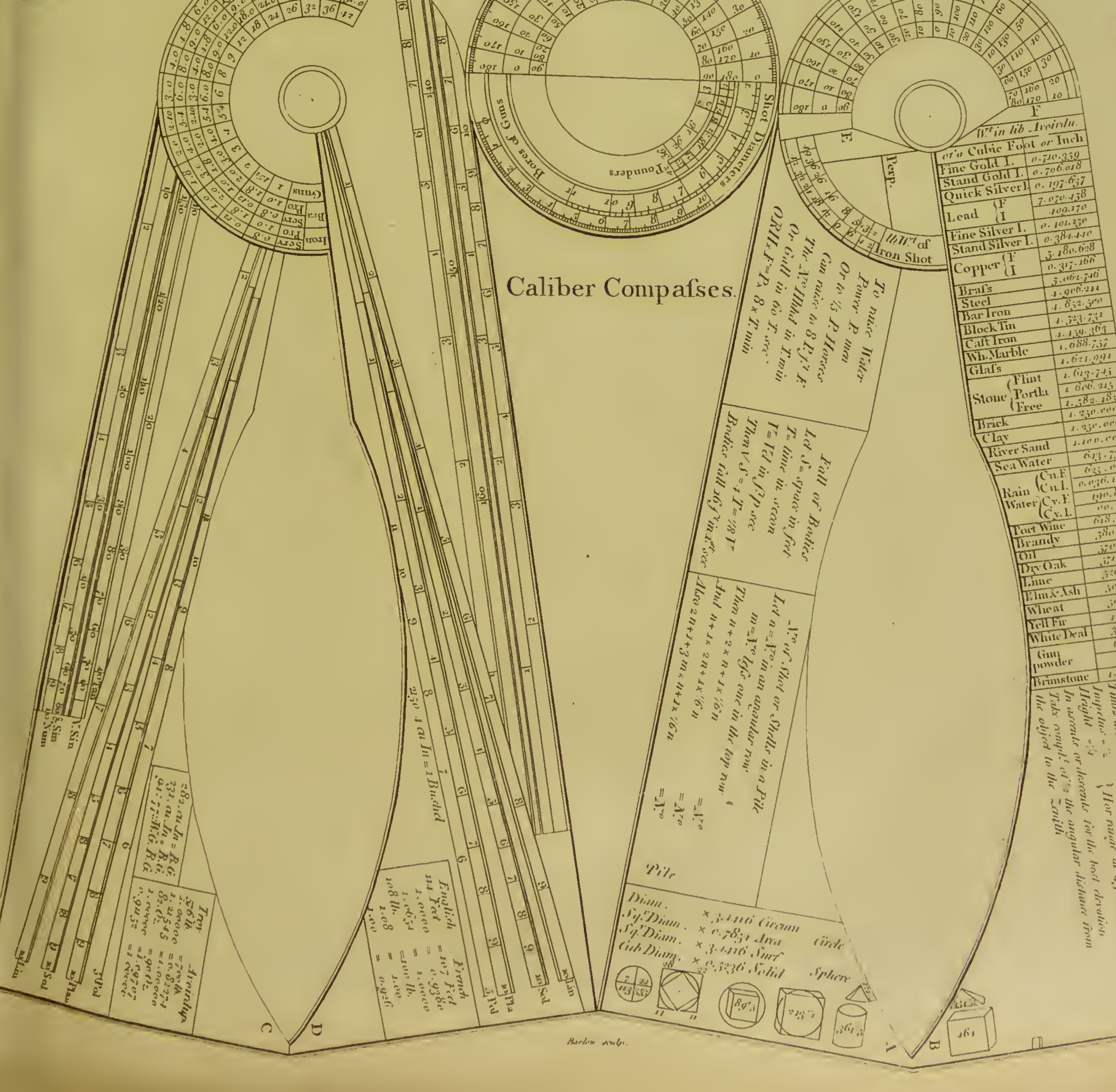
CALICOULAN, or Quillon, a town of Aſia, in the Eaſt Indies, on the coaſt of Malabar, and in the peninſula on

CASTLE



Bruchus Pisi

Cassida



Barlow sculp.

this fide the Ganges, where the Dutch have a factory. E. long. 75. 21. N. lat. 9. 5.

CALICUT, a country in the peninfula of Hindoftan, on the coaft of Malabar, 62 miles in length, and as much in breadth. It is full of woods, rivers, and marfhes; produces pepper, ginger, aloes, and rice; and the trees are always green. There is a tree, which produces a kind of dates, from which they obtain fugar and oil. This country was fubject to Tippoo Sultan, regent of Myfore; but, by the definitive treaty of peace, March 18, 1792, part of it (63 talooks) was ceded to the Englifh Eaft India Company. Calicut is the principal town.

CALICUT, a town in the peninfula of Hindoftan, on the coaft of Malabar, 320 miles S. W. of Madras. The Englifh have a factory here. This city is remarkable for being the firft Indian port vifited by European fhipping: it being difcovered by the Portuguefe, when they came to the Eaft Indies by the Cape of Good Hope, in 1498. It was then the moft flourifhing place on the coaft of Malabar, but appears to have declined in its confequence foon after; the new power of the Portuguefe having occafioned a revolution throughout the maritime parts of the peninfula. Lon. 74. 24. E. Lat. 11. 18. N.

CALIDÆ PLANTÆ (from *calor* heat); plants that are natives of warm climates. Such are thofe of the Eaft Indies, South America, Egypt, and the Canary Iflands. Thefe plants, fays Linnæus, will bear a degree of heat which is as 40 on a fcale in which the freezing point is 0, and 100 the heat of boiling water. In the 10th degree of cold they ceafe to grow, lofe their leaves, become barren, are fuffocated, and perifh.

CALIDUCT, in antiquity, a kind of pipes or canals difpofed along the walls of houfes or apartments; ufed by the ancients for conveying heat to feveral remote parts of the houfe from one common furnace.

CALIFORNIA, a peninfula of North America, on the South Sea. It was vifited in 1578 by Sir Francis Drake, who called it New Albion, and took poffeffion of it in the name of queen Elizabeth. In fummer, the heats are violent along the coaft, for it feldom rains during that feafon; but up the country the air is more temperate. In winter the rains are exceffive; and, when they are over, there is a great dew every morning. It is very healthy; for ftrangers, who have been there for five years together, never had any ficknefs. It abounds with extenfive plains, pleafant vallies, and excellent paftures, full of fine fprings. On the banks of the rivers are willows, reeds, and wild vines. California has feveral trees and fruits peculiar to the country. They have fourteen forts of grain; and they make bread of the roots of trees and plants. They have two kinds of quadrupeds peculiar to the country, one of which is about the fize of a calf of two years old, with a head like a ftag, and horns like a ram; their hair is long, and their hoofs like an ox's: the other is a kind of fheep, fome white and others black; but they differ from the European in feveral refpects. The other animals are like thofe of Mexico. The inland country, efpecially northward, is populous; but the inhabitants live in arbours, made of the boughs of trees, in fummer; and in winter they creep into caves dug in the earth. The men go naked, except a piece of fine linen about their heads; and they have ornaments made of fhells, mixed with little round berries, about their necks and arms. Their weapons are bows, arrows, and javelins, which they always carry in their hands; for they are often at war with each other. The women wear aprons made of plaited reeds, and cover their fhoulders with the fkins of beafts, with a fort of network on their heads. They have alfo necklaces and bracelets like the men. They make thefe ornaments of a kind of grafs; as alfo bags, for different ufes, and fifhing nets. With this grafs they alfo make cups, plates, difhes, and fometimes umbrellas. They have no form of government, and little religion. They are of a red copper colour, with coarfe black hair, and no beards, like the reft of the native Americans. If this country can be faid to belong to any European nation, it muft be to the Spaniards; becaufe no other Europeans have ever made any ftay here.

CALIGA, in Roman Antiquity, was the proper foldier's fhoe, made in the fandal fafhion, without upper leather to cover the fuperior part of the foot, though otherwife reaching to the middle of the leg, and faftened with thongs. The fole of the caliga was of wood, like the fabot of the French peafants, and its bottom ftuck full of nails; which clavi are fuppofed to have been very long in the fhoes of the fcouts and fentinels; whence thefe were called by the way of diftinction, *caligæ fpeculatoriæ*; as if, by mounting the wearer to a higher pitch, they gave a greater advantage to the fight: though others will have the *caligæ fpeculatoriæ* to have been made foft and woolly, to prevent their making a noife. From thefe *caligæ* it was that the emperor Caligula took his name, as having been born in the army, and afterwards bred up in the habit of a common foldier. According to Du Cange, a fort of *caligæ* was alfo worn by monks and bifhops, when they celebrated mafs pontifically.

CALIGATI, an appellation given by fome ancient writers to the common foldiers in the Roman armies, by reafon of the caliga which they wore. The caliga was the badge or fymbol of a foldier; whence to take away the caliga and belt, imported a difmiffing or cafhiering.

CALIGO, or CALIGATIO, among the old furgeons, fignified an opacity, or cloudinefs of the anterior furface of the cryftalline humour of the eye, or rather of the capfula.

CALIGULA, the Roman emperor and tyrant, A. D. 37, began his reign with every promifing appearance of becoming the real father of his people; but at the end of eight months he was feized with a fever, which, it is thought, left a phrenfy on his mind: for his difpofition totally changed, and he committed the moft atrocious acts of impiety, cruelty, and folly; fuch as proclaiming his horfe conful, feeding it at his table, introducing it to the temple in the veftments of the priefts of Jupiter, &c. and caufing facrifices to be offered to himfelf, his wife, and the horfe. After having murdered many of his fubjects with his own hand, and caufed others to be put to death without any juft caufe, he was affaffinated by a tribune of the people as he came out of the amphitheatre, A. D. 41, in the 29th year of his age, and 4th of his reign.

CALIN, a compound metal, whereof the Chinefe make tea-canifters, &c. The ingredients feem to be lead and tin.

CALIPH, or KHALIF, the fupreme ecclefiaftical dignity among the Saracens; or, as it is otherwife defined, a fovereign dignity among the Mahometans, vefted with abfolute authority in all matters relating both to religion and policy. In the Arabic it fignifies *fucceffor* or *vicar*; the caliphs bearing the fame relation to Mahomet that the popes pretend they do to Jefus Chrift or St. Peter. It is at this day one of the Grand Signior's titles, as fucceffor of Mahomet; and of the Sophi of Perfia, as fucceffor of Ali. One of the chief functions of the caliph, in quality of imam or chief prieft of Muffulmanifm, was to begin the public prayers every Friday in the chief mofque, and to deliver the *khothbah* or fermon. In after-times, they had affiftants for this latter office: but the former the caliphs always performed in perfon. The caliph was alfo obliged to lead the pilgrims to Mecca in perfon, and to march at the head of the armies of his empire. He granted inveftiture to princes; and fent fwords, ftandards, gowns, and the like, as prefents to princes of the Mahometan religion; who, though they had thrown off the yoke of the caliphate, neverthelefs held of it as vaffals. The caliphs ufually went to the mofque

mounted on mules; and the ſultans ſelgiucides, though maſters of Bagdad, held their ſtirrups, and led their mules by the bridle ſome diſtance on foot, till ſuch time as the caliphs gave them the ſign to mount on horſeback. At one of the windows of the caliph's palace, there always hung a piece of black velvet 20 cubits long, which reached to the ground, and was called the *caliph's ſleeve*; which the grandees of his court never failed to kiſs every day, with great reſpect. After the deſtruction of the caliphate by Hulaku, the Mahometan princes appointed a particular officer, in their reſpective dominions, who ſuſtains the ſacred authority of caliph. In Turkey, he goes under the denomination of *mufti*, and in Perſia under that of *ſadne*.

CALIPHATE, the office or dignity of caliph: ſee the preceding article. The ſucceſſion of caliphs continued from the death of Mahomet till the 655th year of the Hegira, when the city of Bagdad was taken by the Tartars. After this, however, there were perſons who claimed the caliphate, as pretending to be of the family of the Abaſſides, and to whom the ſultans of Egypt rendered great honours at Cairo, as the true ſucceſſors of Mahomet: but this honour was merely titular, and the rights allowed them only in matters relating to religion; and though they bore the ſovereign title of *caliphs*, they were nevertheleſs ſubjects and dependents of the ſultans. In the year of the Hegira 361, a kind of caliphate was erected by the Fatemites in Africa, and laſted till it was ſuppreſſed by Saladin. Hiſtorians alſo ſpeak of a third caliphate in Cemen or Arabia Felix, erected by ſome princes of the family of the Jobites. The emperors of Morocco aſſume the title of *grand cherifs*; and pretend to be the true caliphs, or ſucceſſors of Mahomet, though under another name.

CALIPPIC PERIOD, in chronology, a ſeries of ſeventy-ſix years, perpetually recurring; which elapſed, the middle of the new and full moons, as its inventor Calippus, an Athenian, imagined, return to the ſame day of the ſolar year. Meton, an hundred years before, had invented the period, or cycle, of nineteen years; aſſuming the quantity of the ſolar year 365 *d.* 6 *h.* 18′ 56″ 50‴ 31⁗ 34; and the lunar month, 29 *d.* 12 *h.* 45′ 47″ 26‴ 48⁗ 30; but Calippus, conſidering that the Metonic quantity of the ſolar year was not exact, multiplied Meton's period by 4, and thence aroſe a period of 76 years, called the *Calippic*. The Calippic period, therefore, contains 27759 days: and ſince the lunar cycle contains 235 lunations, and the *Calippic period* is quadruple of this, it contains 940 lunations. This period began in the third year of the 12th Olympiad, or the 4384th of the Julian period. It is demonſtrated, however, that the Calippic period itſelf is not accurate; that it does not bring the new and full moons preciſely to their places: 8 *h.* 5′ 52″ 60‴, being the exceſs of 940 lunations above 76 ſolar years; but brings them too late, by a whole day in 225 years.

CALISTA, in fabulous hiſtory, the daughter of Lycaon king of Arcadia, and one of the nymphs of Diana. Being beloved by Jupiter, that god aſſumed the form of the goddeſs of chaſtity, by which means he debauched her: but her diſgrace being revealed, as ſhe was bathing with her patroneſs, the incenſed deity turned her and the ſon with which ſhe was pregnant into bears; when Jupiter, in compaſſion to her ſufferings, took them up into the heavens, and made them the conſtellations Urſa Major and Urſa Minor.

CALIX. See CALYX.

CALIXTINS, a name given to thoſe among the Lutherans who follow the ſentiments of George Calixtus, a celebrated divine, and profeſſor at Helmſtadt, in the duchy of Brunſwick, who died in 1656: he oppoſed the opinion of St. Auguſtin, on predeſtination, grace, and free-will, and endeavoured to form an union among the various members of the Romiſh, Lutheran, and reformed churches; or, rather, to join them in the bonds of mutual forbearance and charity.

CALIXTINS alſo denote a ſect in Bohemia, derived from the Huſſites, about the middle of the 15th century, who aſſerted the uſe of the cup, as eſſential to the euchariſt. And hence their name; which is formed from the Latin *calix*, a cup.—The Calixtins are not ranked by Romaniſts in the liſt of heretics, ſince in the main they ſtill adhered to the doctrine of Rome. The reformation they aimed at terminated in the four following articles. 1. In reſtoring the cup to the laity. 2. In ſubjecting the criminal clerks to the puniſhment of the civil magiſtrate. 3. In ſtripping the clergy of their lands, lordſhips, and all temporal juriſdiction. 4. In granting liberty to all capable prieſts to preach the word of God.

CALKA, a kingdom of Tartary, in Aſia, to the eaſt of Siberia.

CALKING. See CAULKING.

CALKINS, the prominent parts at the extremities of a horſe-ſhoe, bent downwards, and forged to a ſort of point. Calkins are apt to make horſes trip, and occaſion ſtrains and other injuries. If faſhioned in form of a hare's ear, they do leſs damage; but the great ſquare calkins quite ſpoil the foot.—Calkins are either ſingle or double, that is, at one end of the ſhoe, or at both: theſe laſt are deemed leſs hurtful, as the horſes can tread more even.

CALL, among hunters, a leſſon blown upon the horn, to comfort the hounds.

CALL, an Engliſh name for the mineral called Tungſten or Wolfram by the Germans.

CALL, among ſailors, a ſort of whiſtle or pipe, of ſilver or braſs, uſed by the boatſwain and his mates to ſummon the ſailors to their duty, and direct them in the different employments of the ſhip. As the call can be ſounded to various ſtrains, each of them is appropriated to ſome particular exerciſe; ſuch as hoiſting, heaving, lowering, veering away, belaying, letting go a tackle, &c. The act of winding this inſtrument is called piping, which is as attentively obſerved by ſailors as the beat of the drum to march, retreat, rally, charge, &c. is obeyed by ſoldiers.

CALL, among fowlers, the noiſe or cry of a bird, eſpecially to its young, or to its mate in coupling-time. One method of catching partridges is by the natural call of a hen trained for the purpoſe, which drawing the cocks to her, they are entangled in a net. Different birds require different ſorts of call; but they are moſt of them compoſed of a pipe or reed, with a little leathern bag or purſe, ſomewhat in form of a bellows; which, by the motion given thereto, yields a noiſe like that of the ſpecies of bird to be taken. The call for partridges is formed like a boat bored through, and fitted with a pipe of ſwan's quill, &c. to be blown with the mouth, to make the noiſe of the cock partridge, which is very different from the call of the hen. Calls for quails, &c. are made of a leathern purſe in ſhape like a pear, ſtuffed with horſe-hair, and fitted at the end with the bone of a cat's, hare's, or coney's leg, formed like a flageolet. They are played, by ſqueezing the purſe in the palm of the hand, at the ſame time ſtriking on the flageolet part with the thumb, to counterfeit the call of the hen-quail.

CALL *of the Houſe*. See CALLING.

CALLA, WAKE-ROBIN, or *Ethiopian Arum*: a genus of the polyandria order, belonging to the gynandria claſs of plants; and in the natural method ranking under the 2d order, *Piperitæ*. The ſpatha is plain; the ſpadix covered with florets; there is no calyx; no petals; and the berries are monoſpermous. Of this there is but one ſpecies. It hath thick, fleſhy, tuberous roots, which are covered with a thin brown ſkin, and ſtrike down many ſtrong fleſhy fibres into the ground. The leaves have footſtalks more than a foot long, which are green

and fucculent. The leaves are fhaped like the point of an arrow; they are eight or nine inches in length, ending in a fharp point, which turns backward; between the leaves arifes the footftalk of the flower, which is thick, fmooth, of the fame colour as the leaves, rifes above them, and is terminated by a fingle flower, fhaped like thofe of the arum, the hood or fpatha being twifted at the bottom, but fpreads open at the top, and is of a pure white colour. When the flowers fade, they are fucceeded by roundifh flefhy berries, compreffed on two fides, each containing two or three feeds. This plant grows naturally at the Cape of Good Hope. It propagates very faft by offsets, which fhould be taken off in the latter end of Auguft, at which time the old leaves decay; for at this time the roots are in their moft inactive ftate. They are fo hardy as to live without any cover in mild winters, if planted in a warm border and dry foil; but, with a little fhelter in hard froft, they may be preferved in full growth very well.

Calla-*Sufung*, a town of Afia, in the ifland of Bouton in the Eaft Indies. It is feated about a mile from the fea, on the top of a fmall hill furrounded with cocoa-nut trees. See Bouton.

CALLAO, a fea-port of S. America, in Peru. The harbour is the beft in the South Sea. The governor is fent from Spain, and is changed every five years. It was almoft totally deftroyed by an earthquake in 1746. It is five miles from Lima, of which, indeed, it is the port. Long. 76. 53. W. Lat. 12. 2. S.

CALLEN, a town of Ireland, in the county of Kilkenny and province of Leinfter, about ten miles fouth-weft of Kilkenny. W. long. 7. 22. N. lat. 52. 25.

CALLICARPA, in botany. See Johnsonia.

CALLICO, in commerce, a fort of cloth refembling linens made of cotton. The name is taken from that of Calicut, a city on the coaft of Malabar, being the firft place at which the Portuguefe landed when they difcovered the India trade. The Spaniards ftill call it *callicu*. Callicoes are of different kinds, plain, printed, painted, ftained, dyed, chintz, muflins, and the like, all included under the general denomination of *callicoes*. Some of them are painted with various flowers of different colours: others are not ftained, but have a ftripe of gold and filver quite through the piece, and at each end is fixed a tiffue of gold, filver, and filk, intermixed with flowers. The printing of callicoes was firft fet on foot in London about the year 1676, and have long been a moft important article of commerce.

CALLICRATES, an ancient fculptor, who engraved fome of Homer's verfes on a grain of millet, made an ivory chariot that might be concealed under the wing of a fly, and an ant of ivory in which all the members were diftinct: but Ælian juftly blames him for exerting his genius and talents in things fo ufelefs, and at the fame time fo difficult. He flourifhed about the year 472 before Chrift.

CALLIGONUM, in botany; a genus of the digynia order, belonging to the polyandria clafs of plants; and in the natural method ranking under the 12th order, *Holoraceæ*. The calyx is pentaphyllous, without petals or ftyles; the fruit hifpid and monofpermous. There is but one fpecies, which is found on Mount Ararat.

CALLIGRAPHUS, anciently denoted a copyift, or ferivener, who tranfcribed fair and at length what the notaries had taken down in notes or minutes. The word is compounded of καλος, *beauty*, and γραφω *I write*. The minutes of acts, &c. were always taken in a kind of cypher, or fhort-hand; fuch as the notes of Tyro in Gruter: by which means the notaries, as the Latins called them, or the σημειογραφοι and ταχυγραφοι, as the Greeks called them, were enabled to keep pace with a fpeaker or perfon who dictated. Thefe notes, being underftood by few, were copied over fair, and at length, by perfons who had a good hand, for fale, &c. Thefe perfons were called *calligraphi*; a name frequently met with in the ancient writers.

CALLIGRAPHY, the art of fair writing. Callicrates is faid to have written an elegant diftich on a fefamum feed. Junius fpeaks of a perfon, as very extraordinary, who wrote the apoftles creed, and beginning of St. John's gofpel, in the compafs of a farthing. What would he have faid of our famous Peter Bale, who in 1575 wrote the Lord's prayer, creed, ten commandments, and two fhort prayers in Latin, with his own name, motto, day of the month, year of the Lord, and reign of the queen, in the compafs of a fingle penny, inchafed in a ring and border of gold, and covered with a cryftal, all fo accurately written as to be very legible?

CALLIMACHUS, a celebrated architect, painter, and fculptor, born at Corinth, having feen by accident a veffel about which the plant called *acanthus* had raifed its leaves, conceived the idea of forming the Corinthian capital. See Acanthus, and pl. 25. The ancients affure us, that he worked in marble with wonderful delicacy. He flourifhed about 540 B. C.

Callimachus, a celebrated Greek poet, native of Cyrene in Libya, flourifhed under Ptolemy Philadelphus and Ptolemy Euergetes kings of Egypt, about 280 years before Chrift. He paffed, according to Quintilian, for the prince of the Greek elegiac poets. His ftyle is elegant, delicate, and nervous. He wrote a great number of fmall poems, of which we have only fome hymns and epigrams remaining. Catullus has clofely imitated him, and tranflated into Latin verfe his fmall poem on the locks of Berenice. Callimachus was alfo a good grammarian and a learned critic. There is an edition of his remains, by Meff. Le Fevre, quarto; and another in two volumes octavo, with notes by Spanheim, Grævius, Bentley, &c.

CALLING *the* House, in the Britifh parliament, is the calling over the members' names, every one anfwering to his own, and going out of the houfe, in the order in which he is called: this they do in order to difcover whether there be any perfons there not returned by the clerk of the crown, or if any member be abfent without leave of the houfe.

CALLINICUS of Heliopolis, inventor of a compofition to burn in the water, called the *Greek*, and fince *Wild, Fire*. See *Grecian* Fire.

CALLINUS of Ephefus, a very ancient Greek poet, inventor of elegiac verfe; fome fpecimens of which are to be found in the collection of Stobeus. He flourifhed about 776 years before Chrift.

CALLIONYMUS, the dragonet, in ichthyology, a genus of fifhes belonging to the order of jugularies. The upper lip is doubled up; the eyes are very near each other; the membrane of the gills has fix radii; the operculum is fhut; the body is naked: and the belly-fins are at a great diftance from each other. There are three fpecies of callionymus, viz. 1. The lyra, with the firft bone of the back fin as long as the body of the animal, and a cirrhus at the anus. It is found as far north as Norway and Spitzbergen, and as far fouth as the Mediterranean fea, and is not unfrequent on the Scarborough coafts, where it is taken by the hook in 30 or 40 fathoms water. It is often found in the ftomach of the cod-fifh. 2. The dracunculus, with the firft bone of the back fin fhorter than its body, which is of a fpotted yellow colour. It frequents the fhores of Genoa and Rome. 3. The indicus, has a fmooth head, with longitudinal wrinkles; the lower jaw is a little longer than the upper one: the tongue is obtufe and emarginated: the apertures of the gills are large: it is of a livid colour, and the anus is in the middle of the body. It is a native of Afia.

CALLIOPE, in the Pagan mythology, the mufe who prefides over eloquence and heroic poetry. She was thus called

from the ſweetneſs of her voice, and was reckoned the firſt of the nine ſiſters. Her diſtinguiſhing office was to record the worthy actions of the living; and accordingly ſhe is repreſented with tablets in her hand.

CALLIPÆDIA, the art of getting or breeding fine and beautiful children. We find divers rules relating to this ſuppoſed art, in ancient and modern writers. Among the magi, a ſort of medicine called *ermeſia* was adminiſtered to pregnant women, as a means of producing a beautiful iſſue. Of this kind were the kernels of pine-nuts ground with honey, myrrh, ſaffron, palm-wine, and milk. The Jews are ſaid to have been ſo ſolicitous about the beauty of their children, that care was taken to have ſome very beautiful child placed at the door of the public baths, that the women at going out being ſtruck with his appearance, and retaining the idea, might all have children as fine as he. The Chineſe take ſtill greater care of their breeding women, to prevent uncouth objects of any kind from ſtriking their imagination. Muſicians are employed at night to entertain them with agreeable ſongs and odes, in which are ſet forth all the duties and comforts of a conjugal and domeſtic life; that the infant may receive good impreſſions even before it is born, and not only come forth agreeably formed in body, but well-diſpoſed in mind. Callipædia, nevertheleſs, ſeems to have been firſt erected into a juſt art by Claude Quillet de Chinon, a French abbot, who, under the fictitious name of *Calvidus Lætus*, has publiſhed a fine Latin poem in four books, under the title of *Callipædia, ſeu de pulchræ prolis habendæ ratione*; wherein are contained all the precepts of that new art. There is a tranſlation of it into Engliſh verſe by Mr. Rowe.

CALLIPPIC PERIOD. See CALIPPIC.

CALLISIA, in botany; a genus of the monogynia order, belonging to the triandria claſs of plants; and in the natural method ranking under the 6th order, *Enſatæ*. The calyx is triphyllous; the petals are three; the antheræ are double; and the capſule is bilocular. There is but one ſpecies, a native of America.

CALLISTEA, in Grecian antiquity, a Leſbian feſtival, wherein the women preſented themſelves in Juno's temple, and the prize was aſſigned to the faireſt. There was another of theſe contentions at the feſtival of Ceres Eleuſinia among the Parrhaſians, and another among the Eleans, where the moſt beautiful man was preſented with a complete ſuit of armour, which he conſecrated to Minerva, to whoſe temple he walked in proceſſion, being accompanied by his friends, who adorned him with ribbons, and crowned him with a garland of myrtle.

CALLISTHENES the philoſopher, diſciple and relation of Ariſtotle, by whoſe deſire he accompanied Alexander the Great in his expeditions; but proving too ſevere a cenſurer of that hero's conduct, he was put by him to the torture (on a ſuſpicion of a treaſonable conſpiracy), and died under it, 328 years before Chriſt.

CALLISTRATUS, an excellent Athenian orator, was baniſhed for having obtained too great an authority in the government. Demoſthenes was ſo ſtruck with the force of his eloquence, and the glory it procured him, that he abandoned Plato, and reſolved from thenceforward to apply himſelf to oratory.

CALLITRICHE, or STAR GRASS, in botany; a genus of the digynia order, belonging to the monandria claſs of plants; and in the natural method ranking under the 12th order, *Holoraceæ*. There is no calyx, but two petals, and the capſule is bilocular and tetraſpermous.

CALLOO, a fortreſs in the Netherlands, in the territory of Waes, on the river Scheldt, till lately ſubject to Auſtria. E. long. 4. 10. N. lat. 51. 15.

CALLOSUM CORPUS, in anatomy, a whitiſh hard ſubſtance, joining the two hemiſpheres of the brain, and appearing in view when the two hemiſpheres are drawn back. See ANATOMY.

CALLOT (James), a celebrated engraver, born at Nancy in 1593. In his youth he travelled to Rome to learn deſigning and engraving; and from thence went to Florence, where the grand duke took him into his ſervice. After the death of that prince, Callot returned to his native country; where he was very favourably received by Henry duke of Lorrain, who ſettled a conſiderable penſion upon him. His reputation being ſoon after ſpread all over Europe, the infanta of the Netherlands drew him to Bruſſels, where he engraved the ſiege of Breda. Louis XIII. made him deſign the ſiege of Rochelle, and that of the iſle of Rhe. The French king, having taken Nancy in 1631, made Callot the propoſal of repreſenting that new conqueſt, as he had already done the taking of Rochelle: but Callot begged to be excuſed; and ſome courtiers reſolving to oblige him to do it, he anſwered, that he would ſooner cut off his thumb than do any thing againſt the honour of his prince and country. This excuſe the king accepted; and ſaid, that the duke of Lorrain was happy in having ſuch faithful and affectionate ſubjects. Callot followed his buſineſs ſo cloſely, that, though he died at the age of 43, he is ſaid to have left of his own execution about 1500 pieces. The following are a few of the principal. 1. The *murder of the innocents*, a ſmall oval plate, engraved at Florence. Callot engraved the ſame ſubject at Nancy, with ſome difference in the figures on the back ground. The former is the moſt rare: a fine impreſſion of it is very difficult to be found. 2. The *marriage of Cana in Galilee*, from the Paolo Veroneſe, a middling ſized plate lengthwiſe. 3. The *paſſion of Chriſt*, on twelve very ſmall upright plates: firſt impreſſions very ſcarce. 4. *St. John in the iſland of Palma*, a ſmall plate nearly ſquare. 5. The *temptation of St. Anthony*, a middling ſized plate, lengthwiſe. He alſo engraved the ſame ſubject larger; which, though not the beſt, is notwithſtanding the ſcarceſt print. There is a conſiderable difference in the treatment of the ſubject in the two prints. 6. The *puniſhments*, wherein is ſeen the execution of ſeveral criminals. The marks of the beſt impreſſions of this plate are, a ſmall ſquare tower which appears above the houſes, towards the left, and a very ſmall image of the Virgin placed in an angle of the wall, near the middle of the print. 7. The *miſeries of war*, eighteen ſmall plates, lengthwiſe. There is another ſet on the ſame ſubject, conſiſting of ſeven plates, leſs than the former. 8. The *great fair of Florence*, ſo called becauſe it was engraved at Florence. As ſeveral parts of this plate were not equally bitten by the aquafortis, it is difficult to meet with a fine impreſſion. Callot, on his return to Nancy, re-engraved this plate without any alteration. The copy, however, is by no means equal to the original. The firſt is diſtinguiſhed from the ſecond by the words *in Firenza*, which appear below at the right hand corner of the plate. The ſecond has theſe words in the ſame place, *Fe Florentis, & excudit Nancei.* There is alſo a large copy of this print, reverſed, publiſhed by Savery; but the difference is eaſily diſtinguiſhed between it and the true print. 9. The *little fair*, otherwiſe called the *players at bowls*; where alſo ſome peaſants are repreſented dancing. This is one of the ſcarceſt of Callot's prints; and it is very difficult to meet with a fine impreſſion of it, for the diſtances and other parts of the plate failed in the biting it with the aquafortis. 10. The *tilting, or the new ſtreet at Nancy*, a middling-ſized plate, lengthwiſe. 11. The *garden of Nancy*, where young men are playing with a balloon, the ſame. 12. *View of the Pont Neuf*, a ſmall plate, lengthwiſe. 13. *View of the Louvre*, the ſame. 14. *Four landſcapes*, ſmall plates, lengthwiſe.

CALLUS, or CALLOSITY, in a general ſenſe, any cutaneous,

corneous, or offeous hardnefs, whether natural or preternatural; but moft frequently it means the callus furrounding a fractured bone. A callus, in this laft fenfe, is a fort of jelly, or liquid vifcous matter, that fweats out from the fmall arteries and bony fibres of the divided parts, and fills up the chinks or cavities between them. It firft appears of a cartilaginous fubftance; but at length becomes quite bony, and joins the fractured part fo firmly together, that the limb will often make greater refiftance to any external violence with this part than with thofe which were never broken.

Callus is alfo a hard, denfe, infenfible knob, rifing on the hands, feet, &c. by much friction and preffure againft hard bodies.

CALM, that ftate of reft which happens in the air and fea when there is no wind ftirring. A calm is more dreaded by a fea-faring man than a ftorm if he has a ftrong fhip and fea-room enough; for under the line exceffive heat fometimes produces fuch dead calms, that fhips are obliged to ftay two or three months without being able to ftir one way or other. Two oppofite winds will fometimes make a calm. This is frequently obferved in the gulf of Mexico, at no great diftance from the fhore, where fome guft or land-wind will fo poife the general eafterly wind, as to produce a perfect calm. Calms are never fo great on the ocean as on the Mediterranean, becaufe the flux and reflux of the former keep the water in a continual agitation, even where there is no wind; whereas there being no tides in the latter, the calm is fometimes fo dead, that the face of the water is as clear as a looking-glafs; but fuch calms are almoft conftant prefages of an approaching ftorm. On the coafts about Smyrna, a long calm is reputed a prognoftic of an earthquake. It is not uncommon for the veffels to be calmed, or becalmed, as the failors exprefs it, in the road of the conftant Levantine winds, in places where they ride near the land. Thus between the two capes of Cartooch toward the main, and cape Antonia in Cuba, the fea is narrow, and there is often a calm produced by fome guft of a land-wind, that poifes the Levantine wind, and renders the whole perfectly ftill for two or three days. In this cafe, the current that runs here is of ufe to the veffels, if it fets right; when it fets eafterly, a fhip will have a paffage in three or four days to the Havannah; but if otherwife, it is often a fortnight or three weeks fail, the fhip being embayed in the gulf of Mexico. When the weather is perfectly calm, no wind at all ftirring, the failors try which way the current fets, by means of a boat which they fend out, and which will ride at anchor though there is no bottom to be found, as regularly and well as if faftened by the ftrongeft anchor to the bottom. The method is this: they row the boat to a little diftance from the fhip, and then throw over their plummet, which is about forty pounds weight; they let this fink to about two hundred fathom; and then, though it never reaches the bottom, the boat will turn head againft the current, and ride very fecurely.

Calm *Latitudes*, in fea language, are fituated in the Atlantic ocean, between the tropic of Cancer and the latitude of 29° N. or they denote the fpace that lies between the trade and variable winds, becaufe it is frequently fubject to calms of long duration.

CALMAR, a ftrong fea-port of Sweden, in the province of Smaland, divided into two towns, the old and the new; but of the former there remains only the church and a few houfes. The new town is built a little way from the other, and has large handfome houfes. E. long. 16. 15. N. lat. 56. 48.

CALMET (Auguftine), one of the moft learned and laborious writers of the 18th century, was born at Mefnil le Horgue, a village in the diocefe of Toul in France, in the year 1672, and took the habit of the Benedictines in 1688. Among the many works he publifhed are, 1. A literal expofition in French, of all the books in the Old Teftament, in nine volumes folio. 2. An hiftorical, critical, chronological, geographical, and literal dictionary of the Bible, in four vols folio, enriched with a great number of figures of Jewifh antiquities. 3. A civil and ecclefiaftical hiftory of Lorrain, three vols folio. 4. A hiftory of the Old and New Teftament, and of the Jews, in two volumes folio, and feven vols duodecimo. 5. An univerfal facred and profane hiftory, in feveral volumes quarto. He died in 1757.

CALMUCKS. See Kalmucks.

CALNE, a town of Wiltfhire in England, feated on a river of the fame name. It has a handfome church, and fends two members to parliament. W. long. 1. 59. N. lat. 51. 30.

CALOGERI, in church hiftory, monks of the Greek church, divided into three degrees: the novices, called *archari*; the ordinary profeffed, called *microchemi*; and the more perfect, called *megalochemi*: they are likewife divided into cœnobites, anchorets, and reclufes. The cœnobites are employed in reciting their offices from midnight to fun-fet; they are obliged to make three genuflexions at the door of the choir, and, returning, to bow to the right and to the left, to their brethren. The anchorets retire from the converfation of the world, and live in hermitages in the neighbourhood of the monafteries; they cultivate a little fpot of ground, and never go out but on Sundays and holidays to perform their devotions at the next monaftery. As for the reclufes, they fhut themfelves up in grottos and caverns on the tops of mountains, which they never go out of, abandoning themfelves entirely to Providence: they live on the alms fent them by the neighbouring monafteries.

CALOMBAC, in the materia medica. See Excœcana.

CALOMEL, formerly called dulcified fublimate of mercury. See Pharmacy.

CALOPHYLLUM, in botany; a genus of the monogynia order, belonging to the polyandria clafs of plants, and in the natural method claffed under thofe called *doubtful* by Linnæus. The corolla is tetrapetalous; the calyx tetraphyllous and coloured; the fruit a globofe plum. There are two fpecies, both natives of India.

CALOTTE, a cap or coif of hair, fattin, or other ftuff; an ecclefiaftical ornament in moft popifh countries. See Cap.

Calotte, in architecture, a round cavity or depreffure, in form of a cap or cup, lathed and plaftered, ufed to diminifh the rife or elevation of a modern chapel, cabinet, alcove, &c. which, without fuch an expedient, would be too high for other parts of the apartment.

CALPE, a mountain of Andalufia in Spain: at the foot of which, towards the fea, ftands the town of Gibraltar. It is half a league in height towards the land, and fo fteep that there is no approaching it on that fide.

CALPURNIUS (Titus), a Latin Sicilian poet, lived under the emperor Carus and his fon. We have feven of his eclogues remaining.

CALQUING, or Calking, a term ufed in painting, &c. where the back-fide of any thing is covered over with a black or red colour, and the ftrokes or lines traced through on a waxed plate, wall, or other matter, by paffing lightly over each ftroke of the defign with a point, which leaves an impreffion of the colour on the plate or wall.

CALTHA, in botany; a genus of the monogynia order, belonging to the polyandria clafs of plants; and in the natural method ranking under the 26th order, *Multifiliquæ*. There is no calyx; there are five petals; no nectaria: the capfules are many, and polyfpermous. There is only one fpecies known, which grows naturally in moift boggy lands in many parts of England and Scotland. There is a variety, with very double flowers, which for its beauty is preferved in gardens. It is propagated by parting the roots in autumn. It fhould be

planted in a moist soil and shady situation; and as there are often such places in gardens where few other plants will thrive, to these may be allowed room, and during their season of flowering will afford an agreeable variety. The flowers gathered before they expand, and preserved in salted vinegar, are a good substitute for capers. The juice of the petals, boiled with a little alum, stains paper yellow. The remarkable yellowness of the butter in spring is supposed to be caused by this plant: but cows will only eat it when compelled by extreme hunger; and then, Boerhaave says, it occasions such an inflammation, that they generally die. Upon May-day, the country people strew the flowers upon the pavement before their doors. Goats and sheep eat this plant: horses, cows, and swine reject it.

CALTROP in military affairs, an instrument with four iron points, disposed in a triangular form, so that three of them are always on the ground, and the fourth in the air. They are scattered over the ground where the enemy's cavalry is to pass, in order to embarrass them.

CALVARIA, in anatomy, the hairy scalp or upper part of the head, which, either by disease or old age, grows bald first.

CALVART (Denis), a celebrated painter, was born at Antwerp in 1552; and had for his masters Prospero Fontana and Lorenzo Sabbatini. He opened a school at Bologna, which became celebrated; and from which proceeded Guido, Albani, and other great masters. Calvart was well skilled in architecture, perspective, and anatomy, which he considered as necessary to a painter, and taught them to his pupils. His principal works are at Bologna, Rome, and Reggio. He died at Bologna in 1619.

CALVARY, a term used in Catholic countries for a kind of chapel of devotion raised on a hillock near a city, in memory of the place where Jesus Christ was crucified near the city of Jerusalem. The word comes from the Latin *calvarium*; and that from *calvus*, bald, because the top of that hillock was bare and destitute of verdure: which is also signified by the Hebrew word *golgotha*. Such is the Calvary of St. Valerian near Paris; which is accompanied with several little chapels, in each of which is represented in sculpture one of the mysteries of the passion.

Calvary, in heraldry, a cross so called, because it resembles the cross on which our Saviour suffered. It is always set upon steps.

CALVERT (George), afterwards lord Baltimore, was born at Kipling in Yorkshire about the year 1582, and educated at Oxford, where he took the degree of bachelor of arts, and afterwards travelled. At his return, he was made secretary to Sir Robert Cecil: he was afterwards knighted, and in 1618 appointed one of the principal secretaries of state. But after he had enjoyed that post about five years, he willingly resigned it; freely owning to his majesty that he was become a Roman-catholic, so that he must either be wanting to his trust, or violate his conscience in discharging his office. This ingenuous confession so affected king James, that he continued him privy-counsellor all his reign, and the same year created him baron of Baltimore in the kingdom of Ireland. He had before obtained a patent for him and his heirs, for the province of Avelon in Newfoundland: but that being exposed to the insults of the French, he abandoned it, and afterwards obtained the grant of a country on the north part of Virginia from Charles I. who called it *Maryland*, in honour of his queen: but he died in April 1632 (aged 50), before the patent was made out. It was, however, filled up to his son Cecil Calvert lord Baltimore; and bears date June 20th 1632. It was held from the crown as part of the manor of Windsor, on one very singular condition, viz. to present two Indian arrows yearly, on Easter Tuesday, at the castle, where they were kept and shown to visitors.—His lordship wrote, 1. A Latin poem on the death of Sir Henry Upton. 2. Speeches in parliament. 3. Various letters of state. 4. The answer of Tom Tell-truth. 5. The practice of princes. And, 6. The lamentation of the kirk.

CALVI, a town of the province of Lavoro, in the kingdom of Naples, situated near the sea, about 15 miles north of the city of Naples. E. long. 14. 45. N. lat. 41. 15.

Calvi is also the name of a sea-port in the island of Corsica, situated on a bay, on the west side of the island, about 40 miles south-west of Bastia. E. long. 9. 5. N. lat. 42. 16.

CALVIN (John), the celebrated reformer of the Christian church from the Romish superstitions and doctrinal errors, and founder of the sect since called *Calvinists*, was born in 1509. He was the son of a cooper of Noyon in Picardy; and his real name was *Chauvin*, which he chose to latinize into *Calvinus*, styling himself in the title-page to his first work (a Commentary on *Seneca de clementia*), "Lucius Calvinus, Civis Romanus;" an early proof of his pride, at about 24 years of age. In 1529 he was rector of Pont l'Evêque; and in 1534 he threw up this benefice, separating himself entirely from the Romish church. The persecution against the Protestants in France (with whom he was now associated) obliged him to retire to Basle in Switzerland: here he published his famous Institutes of the Christian religion in 1535. The following year he was chosen professor of divinity, and one of the ministers of the church of Geneva. The next year, viz. 1537, he made all the people solemnly swear to a body of doctrines; but finding that religion had not yet had any great influence on the morals of the people, he, assisted by other ministers, declared, that since all their admonitions and warnings had proved unsuccessful, they could not celebrate the holy sacrament as long as these disorders reigned; he also declared, that he could not submit to some regulations made by the synod of Berne. Upon this the Syndics having summoned the people, it was ordered that Calvin and two other ministers should leave the city within two days. Calvin however retired to Strasburg, where he established a French church, of which he was the first minister, and was also chosen professor of divinity there. Two years after he was chosen to assist at the diet appointed by the emperor to meet at Worms and at Ratisbon in order to appease the troubles occasioned by the difference of religion. He went with Bucer, and entered into a conference with Melancthon. The people of Geneva now entreated him to return; to which he consented, and arrived at Geneva, September 13th 1541. He began with establishing a form of ecclesiastical discipline, and a consistorial jurisdiction, with the power of inflicting all kinds of canonical punishments. This was greatly disliked by many persons, who imagined that the papal tyranny would soon be revived. Calvin, however, asserted on all occasions the rights of his consistory with inflexible strictness; and he caused Michael Servetus to be burnt at the stake for writing against the doctrine of the Trinity. But though the rigour of his proceedings sometimes occasioned great tumults in the city, yet nothing could shake his steadiness and inflexibility. Amongst all the disturbances of the commonwealth, he took care of the foreign churches in England, France, Germany, and in Poland; and did more by his pen than his presence, sending his advice and instructions by letter, and writing a great number of books. This great reformer died on the 27th of May 1564, aged 55. His works were printed together at Amsterdam in 1671, in nine volumes folio: the principal of which are his Institutions, in Latin, the best edition of which is that of Robert Stephens in 1553, in folio; and his Commentaries on the Holy Scriptures.—Calvin is universally allowed to have had great talents, an excellent genius, and profound learning. His style is grave and polite. Independent of his spiritual pride, his morals were exemplary; for he was pious, sober, chaste, laborious, and disinterested.

But his memory can never be purified from the ſtain of burning Servetus: it ill became a reformer to adopt the moſt odious practice of the corrupt church of Rome.

CALVINISM, the doctrine and ſentiments of Calvin and his followers. Calviniſm ſubſiſts in its greateſt purity in the city of Geneva; and from thence it was firſt propagated into Germany, France, the United Provinces, and England. In France it was aboliſhed by the revocation of the edict of Nantz in 1685. It has been the prevailing religion in the United Provinces ever ſince the year 1571. The theological ſyſtem of Calvin was adopted, and made the public rule of faith in England, under the reign of Edward VI.; and the church of Scotland was modelled by John Knox, the diſciple of Calvin, agreeably to the doctrine, rites, and form of eccleſiaſtical government, eſtabliſhed at Geneva. In England it has declined ſince the time of queen Elizabeth; though it ſtill ſubſiſts, ſome ſay a little allayed, in the articles of the eſtabliſhed church; and in its rigour in Scotland. The diſtinguiſhing theological tenets of Calviniſm, as the term is now generally applied, reſpect the doctrines of PREDESTINATION, or particular ELECTION and REPROBATION, original SIN, particular REDEMPTION, effectual, or, as ſome have called it, irreſiſtible GRACE in regeneration, JUSTIFICATION by faith, PERSEVERANCE, and the TRINITY. See each of thoſe articles. Beſides the doctrinal part of Calvin's ſyſtem, which, ſo far as it differs from that of other reformers of the ſame period, principally regarded the abſolute decree of God, whereby the future and eternal condition of the human race was determined out of mere ſovereign pleaſure and free-will; it extended likewiſe to the diſcipline and government of the Chriſtian church, the nature of the Euchariſt, and the qualification of thoſe who were entitled to the participation of it. Calvin conſidered every church as a ſeparate and independent body, inveſted with the power of legiſlation for itſelf. He propoſed that it ſhould be governed by preſbyteries and ſynods, compoſed of clergy and laity, without biſhops, or any clerical ſubordination; and maintained, that the province of the civil magiſtrate extended only to its protection and outward accommodation. In order to facilitate an union with the Lutheran church, he acknowledged a real, though ſpiritual, preſence of Chriſt in the Euchariſt; that true Chriſtians were united to the man Chriſt in this ordinance; and that divine grace was conferred upon them, and ſealed to them, in the celebration of it: and he confined the privilege of communion to pious and regenerate believers. In France the Calviniſts are diſtinguiſhed by the name of *Huguenots*; and, among the common people, by that of *Parpaillots*. In Germany they are confounded with the Lutherans, under the general title *Proteſtants*; only ſometimes diſtinguiſhed by the name *Reformed*.

CALVINISTS, in church-hiſtory, thoſe who follow the opinions of CALVIN. See the two preceding articles.

Crypto-CALVINISTS, a name given to the favourers of Calviniſm in Saxony, on account of their ſecret attachment to the Genevan doctrine and diſcipline. Many of them ſuffered by the decrees of the convocation of Torgaw, held in 1576. The Calviniſts in their progreſs have divided into ſeveral branches, or leſſer ſects.

CALVISIUS (Seth), a celebrated German chronologer in the beginning of the 17th century. He wrote *Elenchus calendarii Gregoriani, et duplex calendarii melioris forma*, and other learned works, together with ſome excellent treatiſes on muſic. He died in 1617, aged 61.

CALVITIES, or CALVITIUM, in medicine, baldneſs, or a want of hair, particularly on the ſinciput, occaſioned by the moiſture of the head, which ſhould feed it, being dried up, by ſome diſeaſe, old age, or the immoderate uſe of powder, &c. See ALOPECIA.

CALUMET, a ſymbolical inſtrument of great importance among the American Indians.—It is nothing more than a pipe, whoſe bowl is generally made of a ſoft red marble: the tube of a very long reed ornamented with the wings and feathers of birds. No affair of conſequence is tranſacted without the calumet. It ever appears in meetings of commerce or exchanges; in congreſſes for determining of peace or war; and even in the very fury of a battle. The acceptance of the calumet is a mark of concurrence with the terms propoſed; as the refuſal is a certain mark of rejection. Even in the rage of a conflict this pipe is ſometimes offered; and if accepted, the weapons of deſtruction inſtantly drop from their hands, and a truce enſues. It ſeems the ſacrament of the ſavages; for no compact is ever violated which is confirmed by a whiff from this holy reed. When they treat of war, the pipe and all its ornaments are uſually red, or ſometimes red only on one ſide. The ſize and decorations of the calumet are for the moſt part proportioned to the quality of the perſons to whom they are preſented, and to the importance of the occaſion. The calumet of peace is different from that of war. They make uſe of the former to ſeal their alliances and treaties, to travel with ſafety, and to receive ſtrangers; but of the latter to proclaim war. It conſiſts of a red ſtone, like marble, formed into a cavity reſembling the head of a tobacco pipe, and fixed to a hollow reed. They adorn it with feathers of various colours; and name it the calumet of the ſun, to which luminary they preſent it, in expectation of thereby obtaining a change of weather as often as they deſire. From the winged ornaments of the calumet, and its conciliating uſes, writers compare it to the caduceus of Mercury, which was carried by the caduceatores or meſſengers of peace, with terms to the hoſtile ſtates. It is ſingular, that the moſt remote nations, and the moſt oppoſite in their other cuſtoms and manners, ſhould in ſome things have, as it were, a certain conſent of thought. The Greeks and the Americans had the ſame idea, in the invention of the caduceus of the one, and the calumet of the other.

Dance of the CALUMET, is a ſolemn rite among the Indians on various occaſions. They dare not waſh themſelves in rivers in the beginning of ſummer, nor taſte of the new fruits, without performing it; and the ſame ceremony always confirms a peace or precedes a war. It is performed in the winter-time in their cabins, and in ſummer in the open fields. For this purpoſe they chooſe a ſpot among the trees to ſhade them from the heat of the ſun, and lay in the middle a large mat, as a carpet, ſetting upon it the monitor, or god, of the chief of the company. On the right hand of this image they place the calumet, as their great deity, erecting around it a kind of trophy with their arms. Things being thus diſpoſed, and the hour of dancing come, thoſe who are to ſing take the moſt honourable ſeats under the ſhade of the trees. The company is then ranged round, every one, before he ſits down, ſaluting the monitor, which is done by blowing upon it the ſmoke of their tobacco. Each perſon next receives the calumet in rotation, and, holding it with both hands, dances to the cadence of the vocal muſic, which is accompanied with the beating of a ſort of drum. During this exerciſe, he gives a ſignal to one of their warriors, who takes a bow, arrow, and axe, from the trophies already mentioned, and fights him; the former defending himſelf with the calumet only, and both of them dancing all the while. This mock engagement being over, he who holds the calumet makes a ſpeech, in which he gives an account of the battles he has fought, and the priſoners he has taken, and then receives a cloak, or ſome other preſent, from the chief of the ball. He then reſigns the calumet to another, who having acted a ſimilar part, delivers it to a third, who afterwards gives it his neighbour, till at laſt the inſtrument returns to the perſon that began the ceremony, who pre-

sents it to the nation invited to the feast, as a mark of their friendship, and a confirmation of their alliance, when this is the occasion of the entertainment.

CALUMNY, the crime of accusing another falsely, and knowingly so, of some heinous offence. The oath of CALUMNY, *Juramentum* (or rather *Jusjurandum*) *Calumniæ*, among civilians and canonists, was an oath which both parties in a cause were obliged to take; the plaintiff that he did not bring his charge, and the defendant that he did not deny it, with a design to abuse each other, but because they believed their cause was just and good; that they would not deny the truth, nor create unnecessary delays, nor offer the judge or evidence any gifts or bribes. If the plaintiff refused this oath, the complaint or libel was dismissed; if the defendant, it was taken *pro confesso*. This custom was taken from the ancient athletæ; who, before they engaged, were to swear that they had no malice, nor would use any unfair means for overcoming each other. The *juramentum calumniæ* is much disused, as a great occasion of perjury. Anciently the advocates and proctors also took this oath; but of late it is dispensed with, and thought sufficient that they take it once for all at their first admission to practice.

CALVUS (Cornelius Licinius), a celebrated Roman orator, was the friend of Catullus; and flourished 64 B. C. Catullus, Ovid, and Horace, speak of him.

CALX properly signifies *lime*, but is also used by chemists and physicians for a fine powder remaining after the calcination or corrosion of metals and other mineral substances. All metallic calces, at least all those made by fire, are found to weigh more than the metal from which they were originally produced. See CHEMISTRY.

CALX *Nativa*, in natural history, a kind of marley earth, of a dead whitish colour, which, if thrown into water, makes a considerable bubbling and hissing noise, and has, without previous burning, the quality of making a cement like lime or plaster of Paris.

CALX *Viva*, or *Quick-lime*, that whereon no water has been cast, in contradistinction to lime which has been slaked by pouring water on it.

CALYBITES, the inhabitant of a cottage, an appellation given to certain saints on account of their long residence in some hut, by way of mortification.

The word is formed from καλυπτω *tego, I cover*; whence καλυβη, *a little cot*.—The Romish church commemorates St. John the calybites on the 15th of December.

CALYCANTHEMÆ, in botany, an order of plants in the *Fragmenta methodi naturalis* of Linnæus, in which are the following genera, viz. epilobium, œnothera, jussiæa, ludivigia, oldenlandia, isnarda, &c. See BOTANY, Part III.

CALYCANTHUS, in botany; a genus of the polygynia order, belonging to the icosandria class of plants; and in the natural method classed with those of which the order is doubtful. The calyx is monophyllous, urceolate, or blown up; squarrose, or frizzled with small coloured leaves, the corolla consisting of the leaves on the calyx; the styles are numerous, each with a glandular stigma; the seeds are many, each with a train, within a succulent calyx. There are two species; namely, 1. The *præcox*, which is not quite inured to this climate; and, 2. The *floridus*, a flowering calycanthus, or Carolina allspice tree, a native of Carolina. It seldom grows, at least with us, to more than five feet high. It divides into many branches irregularly near the ground. They are of a brown colour, and being bruised emit a most agreeable odour. The leaves that garnish this delightful aromatic are of an oval figure, pointed: they are near four inches long, and are at least two and a half broad, and are placed opposite by pairs on the branches. At the end of these stand the flowers, of a kind of chocolate-purple colour, and which are possessed of the opposite qualities of the bark on the branches. They stand single on their short footstalks, come out in May and June, and are succeeded by ripe seeds in England. The propagation of this shrub is not very difficult; though more than common care must be taken, after small plants are obtained, to preserve them till they are of a size to be ventured abroad. The last year's shoots, if laid in the ground, the bark especially being a little bruised, will strike root within the compass of twelve months, particularly if the layers are shaded, and now and then watered in the summer's drought. In the spring they should be taken off, and planted in pots; and if these are afforded a small degree of heat in a bed, they will strike so much the sooner and stronger. After they have been in this bed a month or six weeks, they should be taken out. In the heat of the summer they should be placed in the shade; and if the pots are plunged into the natural ground, it will be so much the better. At the approach of the succeeding winter's bad weather, the pots should be removed into the green-house, or some shelter, and in the spring may resume their old stations: and this should be repeated till they are of a proper size and strength to be planted out to stand. If the pots in which they were first planted were small, they may be shifted into larger a spring or two after; and, when they have got to be pretty strong plants, they may be turned out, mould and all, into the places where they are to remain. By this care of potting them, and housing them during the severe weather in winter, the young crop will be preserved: otherwise, if they were planted immediately abroad, the first hard frost the ensuing winter would destroy them all: Tanners' bark about their roots will be the most proper security; as they are at best, when full grown, but tender plants, and must have the warmest situation and the driest soil that can be procured.

CALYCIFLORÆ, in botany, the 16th order in Linnæus's *Fragmenta methodi naturalis*, consisting of plants which, as the title imports, have the stamina (the flower) inserted into the calyx. This order contains the following genera, viz. eleagnus, hippophae, osyris, and trophis. See BOTANY, Part III.

CALYCISTÆ (from *calyx* the flower-cup), systematic botanists, so termed by Linnæus, who have arranged all vegetables from the different species, structure, and other circumstances, of the calyx or flower-cup. The only systems of this kind are the *Character plantarum novus*, a posthumous work of Magnolius, professor of botany at Montpelier, published in 1720: and Linnæus's *Methodus calycina*, published in his *Classes plantarum*, at Leyden, in 1738.

CALYPSO, in fabulous history, a goddess, who was the daughter of Oceanus and Tethys, or, as others say, of Atlas. She was queen of the island of Ogygia, which from her was called the island of *Calypso*. According to Homer, Ulysses suffered shipwreck on her coast, and staid with her several years.

CALYPTRA, among botanists, a thin membranaceous involucrum, usually of a conic figure, which covers the parts of fructification. The capsules of most of the mosses have calyptræ.

CALYX, among botanists, a general term expressing the cup of a flower, or that part of a plant which surrounds and supports the other parts of the flower. The cups of flowers are very various in their structure, and on that account distinguished by several names, as *perianthium*, *involucrum*, *spatha*, *gluma*, &c. See BOTANY, Part I.

CALZADA, a town of Old Castile in Spain, seated on the river Leglera. W. long. 2. 47. N. lat. 42. 12.

CAMÆA, in natural history, a genus of the semipellucid gems approaching to the onyx structure, being composed of zones, and formed on a crystalline basis; but having their zones very broad and thick, and laid alternately one on another,

with no common matter between; ufually lefs tranfparent, and more debafed with earth, than the onyxes. 1. One fpecies of the camæa is the dull-looking onyx, with broad black and white zones; and is the camæa of the moderns, and the Arabian onyx. This fpecies is found in Egypt, Arabia, Perfia, and the Eaft Indies. 2. Another fpecies of the camæa is the dull broad zoned, green and white camæa, or the jafpi-cameo of the Italians: it is found in the Eaft Indies, and in fome parts of America. 3. The third is the hard camæa, with broad white and chefnut-coloured veins. 4. The hard camæa, with blueifh white and flefh-coloured broad veins, being the fardonyx of Pliny's time, only brought from the Eaft Indies.

CAMAIEU, CAMAYEU, or CAMEO, a word ufed to exprefs a peculiar fort of onyx; alfo by fome to exprefs a ftone, whereon are found various figures, and reprefentations of landfcapes, &c. formed by a kind of *lufus naturæ*; fo as to exhibit pictures without painting. The word comes from *camebuia*, a name the Orientals give to the onyx, when they find, in preparing it, another colour; as who fhould fay, *a fecond ftone*. It is of thefe *camaieux* Pliny is to be underftood when he fpeaks of the manifold picture of gems, and the party-coloured fpots of precious ftones: *Gemmarum pictura tam multiplex lapidumque tam difcolores maculæ*.

CAMAIEU is alfo applied by others to thofe precious ftones, as onyxes, carnelions, and agates, whereon the lapidaries employ their art to aid nature, and perfect thofe reprefentations. See CAMÆA.

CAMAIEU is alfo frequently applied to any kind of gem, whereon figures may be engraven either indentedly or in relievo. In this fenfe the lapidaries of Paris are called in their ftatutes *cutters of camayeux*.—A fociety of learned men at Florence undertook to procure all the *cameos* or *camayeux*, and intaglios in the great duke's gallery to be engraven; and began to draw the heads of divers emperors in *cameos*.

CAMAIEU is alfo ufed for a painting, wherein there is only one colour; and where the lights and fhadows are of gold, wrought on a golden or azure ground. When the ground is yellow, the French call it *cirage*; when grey, *griffaile*. This kind of work is chiefly ufed to reprefent baffo relievos: the Greeks call pieces of this fort μονοχρωματα.

CAMALDULIANS, CAMALDUNIANS, or CAMALDOLITES, an order of religious, founded by Romuald, an Italian fanatic, in 1023, in the horrible defert of Camaldoli, otherwife called Campo-Malduli, fituate in the ftate of Florence, on the Apennines. Their rule is that of St. Benedict; and their houfes, by the ftatutes, are never to be lefs than five leagues from cities. The *Camaldulians* have not borne that title from the beginning of their order; till the clofe of the eleventh century they were called *Romualdins*, from the name of their founder. Till that time, *Camaldulian* was a particular name for thofe of the defert Camaldoli; and, D. Grandi obferves, was not given to the whole order, in regard it was in this monaftery that the order commenced, but becaufe the regulation was beft maintained here.—Guido Grandi, mathematician of the great duke of Tufcany, and a monk of this order, has publifhed *Camaldulian* Differtations, on the origin and eftablifhment of it.—The *Camaldulites* were diftinguifhed into claffes, of which the one were COENOBITES, and the other EREMITES.

CAMARANA, an ifland of Arabia, in the Red Sea, whofe inhabitants are little and black. It is the beft of all the iflands in this fea, and here they fifh for coral and pearls. N. lat. 15. 0.

CAMASSEI, or CAMACE, (Andrea), painter of hiftory and landfcape, was born at Bevagna, and at firft learned the principles of defign and colouring from Dominichino; but afterwards he ftudied under Andrea Sacchi, and proved a very great painter. He was employed in St. Peter's at Rome, as alfo at St. John Lateran, and his works are extremely admired for the fweetnefs of his colouring, the elegance of his thoughts and defign, and likewife for the delicacy of his pencil. Sandrart laments that the world was deprived of fo promifing a genius, in the very bloom of life, when his reputation was daily advancing. He died in 1657. At St. John Lateran are to be feen, the Battle of Conftantine and Maxentius, and the Triumph of Conftantine; which are noble and grand compofitions; and they afford fufficient proofs of the happinefs of his invention, and the correctnefs of his execution. Alfo at Wilton, the feat of the earl of Pembroke, there is a picture of Venus with the Graces, faid to be by the hand of Camaffei.

CAMARINA *Palus*, a marfh or lake, near the city Camarina, and from which it took its name. In a time of drought, the ftench of the lake produced a peftilence; upon which the inhabitants confulted the oracle, whether they fhould not quite drain it. The oracle diffuaded them: they notwithftanding drained it, and opened a way for their enemies to come and plunder their city: hence the proverb *Ne moveas Camarinam*, that is, not to remove one evil to bring on a greater. *Lago di Camarana* is fituated in a beautiful plain, under the very walls of Camarina, and of a triangular figure.

CAMAYEU. See CAMAIEU.

CAMBAIA, or CAMPAY, a town of Afia, in India, and in the peninfula on this fide the Ganges; capital of a province of the fame name; but more commonly called *Guzarat*. It is feated at the bottom of a gulph of the fame name, on a fmall river; is a large place with high walls, and has a pretty good trade. The product and manufactures are inferior to few towns in India, for it abounds in corn, cattle, and filk; and carnelion and agate ftones are found in its rivers. The inhabitants are noted for embroidery; and fome of their quilts have been valued at 40l. It is fubject to the Great Mogul. E. long. 72. 15. N. lat. 22. 30.

CAMBAYES, in commerce, cotton cloths made at Bengal, Madras, and fome other places on the coaft of Coromandel. They are proper for the trade of Marfeilles, whither the Englifh at Madras fend great numbers of them. Many are alfo imported into Holland.

CAMBER, according to our monkifh hiftorians, one of the three fons of Brute, who, upon his father's death, had that part of Britain affigned him for his fhare, called from him *Cambria*, now *Wales*.

CAMBER-*Beam*, among builders, a piece of timber in an edifice cut archwife, or with an obtufe angle in the middle, commonly ufed in platforms, as church-leads, and on other occafions where long and ftrong beams are required.

CAMBERED-DECKS, among fhip-builders. The deck or flooring of a fhip is faid to be cambered, or to lie cambering, when it is higher in the middle of the fhip's length, and droops toward the ftem and ftern, or the two ends. Alfo when it lies irregular; a circumftance which renders the fhip very unfit for war.

CAMBERT, a French mufician in the laft century, was at firft admired for the manner in which he touched the organ, and became fuperintendant of the mufic to Anne of Auftria the queen-mother. The abbé Perrin affociated with him in the privilege he obtained of his majefty, of fetting up an opera in 1669. Cambert fet to mufic two paftorals, one intitled *Pomona*, the other *Ariadne*, which were the firft operas given in France. He alfo wrote a piece intitled *The pains and pleafures of love*. Thefe pieces fuited the public; yet, in 1672, Lully obtaining the privilege of the opera, Cambert was obliged to come to England, where he became fuperintendant of the mufic to king Charles II. and died there in 1677.

CAMBIO, an Italian word which fignifies *exchange*, commonly ufed at Provence, and in fome other countries, particularly Holland.

CAMBIST, a name given in France to thofe who trade in notes and bills of exchange. The word cambift, though a term of antiquity, is even now a technical word, of fome ufe among merchants, traders, and bankers. Some derive it from the Latin *cambium*, or rather *cambio*.

CAMBLET, or CHAMBLET, a ftuff fometimes of wool, fometimes filk, and fometimes hair, efpecially that of goats, with wool or filk. In fome, the warp is filk and wool twifted together, and the woof hair.—The true or oriental camblet is made of the pure hair of a fort of goat, frequent about Angora, and which makes the riches of that city, all the inhabitants whereof are employed in the manufacture and commerce of camblets. It is certain we find mention in middle-age writers of ftuffs made of camels hair, under the denomination of *cameletum* and *camelinum*, whence probably the origin of the term; but thefe are reprefented as ftrangely coarfe, rough, and prickly, and feem to have been chiefly ufed among the monks by way of mortification, like the hair fhirt of latter times. We have no camblets made in Europe of the goats' hair alone; even at Bruffels, they find it neceffary to add a mixture of woollen thread.—England, France, Holland, and Flanders, are the chief places of this manufacture. Bruffels exceeds them all in the beauty and quality of its camblets: thofe of England are reputed the fecond beft.

Figured CAMBLETS, are thofe of one colour, whereon are ftamped various figures, flowers, foliage, &c. by means of hot irons, which are a kind of moulds, paffed, together with the ftuff, under a prefs. Thefe are chiefly brought from Amiens and Flanders: the commerce of them was formerly much more confiderable than at prefent.

Watered CAMBLETS, thofe which, after weaving, receive a certain preparation with water; and are afterwards paffed under a hot-prefs, which gives them a figured fmoothnefs.

Waved CAMBLETS, are thofe whereon waves are impreffed, as on tabbies; by means of a calendar, under which they are paffed and repaffed feveral times.—The manufacturers, &c. of camblets are to take care they do not acquire any falfe and needlefs plaits; it being almoft impoffible to get them out again. This is notorious, even to a proverb; for we fay a perfon is like camblet, he has *taken his plait*.

CAMBODIA, a kingdom of Afia, in the Eaft Indies, bounded on the north by the kingdom of Laos, on the eaft by Cochin China and Chiapa, and on the fouth and weft by the gulph and kingdom of Siam; divided by a large river called *Mecon*. The capital town is of the fame name, feated on the weftern fhore of the faid river, about 150 miles north of its mouth. This country is annually overflowed in the rainy feafon, between June and October; and its productions and fruits are much the fame with thofe ufually found between the tropics. E. long. 104. 15. N. lat. 12. 40.

CAMBOGIA, in botany; a genus of the monogynia order, belonging to the polyandria clafs of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The corolla is tetrapetalous; the calyx tetraphyllous; and the fruit is a pome with eight cells, and folitary feeds. There is but one fpecies, the gutta, a native of India, which yields the gumrefin known by the name of *gamboge* in the fhops. See GAMBOGE.

CAMBRASINES, in commerce, fine linen made in Egypt, of which there is a confiderable trade at Cairo, Alexandria, and Rofetta, or Rafchit. They are called *cambrafines* from their refemblance to cambrics.

CAMBRAY, a handfome, large, and ftrong town of France, in the department of the North and late province of the Cambrefis. It was lately an archiepifcopal fee, but is now only a bifhopric. It has a citadel and fort, and a confiderable manufactory of linen, and efpecially of cambrics, which took their name from this city. It is feated on the Scheldt, which divides it in two, and is 22 miles S. E. of Arras, and 102 N. of Paris. Lon. 3. 20. E. Lat. 50. 11. N.

CAMBRAY (M. de Fenelon, archbifhop of). See FENELON.

CAMBRESIS, a late province of France, 25 miles in length; bounded on the N. and E. by Hainault, on the S. by Picardy, and on the W. by Artois. Cambray is the capital; and it is now included in the department of the North.

CAMBRIA, a name for the principality of Wales.

CAMBRIC, in commerce, a fpecies of linen made of flax, very fine and white; the name of which was originally derived from the city of Cambray, where they were firft manufactured. They are now made in other parts of France.—The manufacture of cambrics has long fince proved of extraordinary advantage to France. For many years it appeared that England did not in this article contribute lefs than 200,000l. per annum to the intereft of France. This proved motive fufficient to induce the parliament of Great Britain to enact many falutary laws to prevent this great lofs of our wealth. See 18 Geo. II. c. 36. and 21 Geo. II. c. 26. See alfo ftat. 32 Geo. II. c. 32, and 4 Geo. III. c. 37. which regulates the cambric manufactory, not long fince introduced into Winchelfea in Suffex; but very foon abolifhed. The cambrics now allowed in this country are manufactured in Scotland and Ireland. Any perfons convicted of wearing, felling (except for exportation), or making up for hire, any cambric or French lawns, are liable to a penalty of 5l. by the two firft ftatutes cited above.

CAMBRIDGE, a town of England, and capital of the county of that name. It takes the name of Cambridge from the bridge over the Cam, which divides the town into two parts. Either that or a place in the neighbourhood was ftyled *Camboritum* in the time of the Romans. It fuffered much during the wars with the Danes. Here was a caftle built by William the Conqueror, of which the gatehoufe yet remains, and is now the county gaol. By Doomfday-book it appears that it then had ten wards, containing 387 houfes. In William Rufus's reign it was quite deftroyed by Roger de Montgomery; but Henry I. beftowed many privileges upon it to encourage its reftoration, particularly an exemption from the power of the fheriff, on condition of its paying yearly into the exchequer 100 merks (equivalent to 1000 pounds now), and from tolls, laftage, pontage, paffage, and ftallage, in all fairs of his dominions. It was afterwards often plundered in the barons wars by the outlaws from the Ifle of Ely, till Henry III. fecured it by a deep ditch. In 1388, Richard II. held a parliament here. In the rebellion of Wat Tyler and Jack Straw againft that prince, the univerfity records were taken and burnt in the market-place.

The modern town is about one mile long from S. to N. and about half a mile broad in the middle, diminifhing at the extremities. It has 14 parifh-churches, of which two are without any towers. It contains above 1200 houfes; but the private buildings are neither elegant nor large, owing chiefly to their being held on college or corporation leafes. It is governed by a mayor, high-fteward, recorder, 13 aldermen, and 24 common-council-men, a town-clerk, &c. Its chief trade is water-carriage from hence to Downham, Lynn, Ely, &c. The Jews being encouraged to fettle in England by William I. and II. were very populous here for feveral generations, and inhabited that ftreet now called the *Jewry*. They had a fynagogue, fince converted to a parifh church, called from the fhape of its tower *Round Church*; though others are of opinion, that

it was built by the Knights Templars, it bearing a resemblance to the Temple church in London. The market-place is situated in the middle of the town, and consists of two spacious oblong squares united together; at the top of the angle stands the shire-hall, lately erected at the expence of the county. At the back of the shire-hall is the town-hall and gaol. In the market-place, fronting the shire-hall, is a remarkable handsome stone conduit, to which water is conveyed by an aqueduct, which was the benefaction of the celebrated Hobson, a carrier in the reign of James I. who was a native of this town. A fine road for the benefit of the inhabitants and students was made a few years since for 4 miles, from this town to Gogmagog-hills, pursuant to the will of Mr. Wortes. The late Dr. Addenbroke also left it 4000l. towards building and furnishing an hospital for the cure of poor diseased people gratis; of which charity the master of Catharine-hall is a trustee. This hospital has been erected at the south-east end of the town. At a little distance from Benet-college is the botanic garden of 5 acres, and a large house for the use of the governors and the residence of the curator, given to the university by the late Dr. Walker. But the principal ornament of Cambridge is its university, which is supposed to have been founded during the heptarchy. It consists of 12 colleges, and 4 halls, having the same privileges as the colleges. The whole body, which is commonly about 1500, enjoy very great privileges granted by several of our sovereigns; but it was James I. who impowered it to send two members to parliament, as the town had done from the first. The university is governed, 1. By a chancellor, who is always some nobleman, and may be changed every three years, or continued longer by the tacit consent of the university. 2. By a high-steward, chosen by the senate, and holding his place by patent from the university. 3. By a vice-chancellor, who is the head of some college or hall, and chosen yearly by the body of the university, the heads of the colleges naming two. 4. By two proctors chosen every year, according to the cycle of colleges and halls; as are two taxers, who with the proctors regulate the weights and measures, as clerks of the markets. The proctors also inspect the behaviour of the scholars, who must not be out of their colleges after nine o'clock at night. Here are also 2 moderators, 2 scrutators, a commissary, public orator, 2 librarians, a register, a school-keeper, 3 esquire beadles and a yeoman beadle, 18 professors, and the caput, consisting of the vice-chancellor, a doctor of divinity, a doctor of laws, a doctor of physic, a regent, and a non-regent master of arts. Henry VI. granted it the power to print all books of any kind within itself, a privilege which Oxford had not. The senate-house of the university is an elegant building of the Corinthian order, cost near 16,000l. building; in which on the north side is a fine statue of George I. erected in 1739, at the expence of the late Lord Townshend; opposite to this on the south side is another of George II. erected in 1765, at the expence of the late Duke of Newcastle: at the east end, on each side of the entrance, are two others; one, the late Duke of Somerset, after the Vandyke taste; the other, an Italian emblematical figure of Gloria. This is allowed to be the most superb room in England, being 101 feet long, 42 broad, and 32 high; and it has a gallery which can contain 1000 persons. This building forms the north side of a quadrangle, as the schools and public library do the west, the schools being the ground floor, and the library over them surrounding a small court. North of the philosophy school is the repository of Dr. Woodward's fossils, ores, shells, &c. The doctor, together with that collection and a part of his library, left a sum of money to this university for erecting a professorship for natural philosophy, with a provision of 150l. a-year for ever. At the south-east corner of this building is an elegant geometrical stone stair-case which leads to the old library, and consists of 18 classes; at the end of which is an elegant square room, in which are deposited the MSS. and a valuable cabinet of oriental books and curiosities, &c. This room opens to two other rooms, containing 26 large classes consisting of 30,000 volumes presented to the university by George I. being the entire collection of Dr. Moor bishop of Ely. In a grand gallery over part of the chancel is a seat for the chancellor, vice-chancellor, &c. George I. when he gave the books, also established a professor of modern history and modern languages in this university, with a salary of 400l. for himself and two persons under him qualified to instruct in that branch 20 scholars, to be nominated by the king, each of which is obliged to learn two at least of the languages. A fellowship is founded at Magdalen college, appropriated to the gentlemen of Norfolk, and called *the travelling Norfolk fellowship*. All the libraries in Cambridge, except that of the King's-college, are lending libraries; and those at Oxford are studying libraries.

The different colleges in the university are, 1. St. Peter's, the most ancient, and the first on entering the town from London. It consists of two courts, separated by a cloister and gallery: the largest 144 feet long, and 84 broad. The lesser court is divided by the chapel, which is a fine old building 54 feet long, 27 broad, and 27 high. This college was founded 1257. There are three colleges in Oxford which dispute the antiquity with this. Cambridge and Oxford were universities long before they were possessed of any colleges in their own right, the students then lodging and boarding with the townsmen, and they then hired hotels for their exercises and disputations. A hotel or hall, now denominated *Pythagoras's school*, situated on the west side of the river, is one of the ancient hotels that remains undemolished, and in which Erasmus read his first Greek lectures in England. 2. Clare-hall, on the bank of the river, over which it has an elegant stone-bridge, was founded 1326, consisting of one grand court 150 feet long and 111 broad. The front of this building, that faces the fields, has the appearance of a palace. To this college a new chapel has been added. 3. Pembroke-hall is near St. Peter's college, was founded in 1343, and consists of two courts. It has an elegant chapel built by Sir Christ. Wren. 4. Corpus Christi or Benet college, founded in 1350, has but a mean appearance, but is possessed of a remarkably large collection of valuable and curious ancient manuscripts. 5. Trinity-hall, on the north of Clare-hall, near the river, was founded in 1351; it is a small but remarkably neat building. 6. Gonvil and Caius college is near the middle of the town, north of the senate-house, and has three courts. It was founded 1348, and augmented 1557. 7. King's college, the most noble foundation in Europe, was first endowed by Henry VI. The old court resembles a decayed castle more than a college. The new building is very magnificent, near 300 feet long. The chapel is one of the finest pieces of Gothic architecture now remaining in the world. It is 304 feet long, 73 broad on the outside and 40 within, and 91 high; and yet not a single pillar to sustain its ponderous roofs, of which it has two: the first is of stone, most curiously carved; the other of wood, covered with lead; between which is a vacancy of 10 feet. There is such a profusion of carving both within and without as is no where to be equalled. Henry VII. enlarged it 188 feet in length, and Henry VIII. gave the elegant stalls and organ gallery, with its inimitable carvings, where are the coats of arms of that king and those of Anne Boleyn quartered. He gave also the elegant painted glass windows, which are in fine preservation, and were permitted by Cromwell to be preserved when almost every other in England was destroyed, as he had a particular regard for this university, where he had his education, and for the town which he had represented in parliament. A new altar has been lately erected, which corresponds with the architecture of the building, embellished with an antique painting of Christ taking down from the cross, purchased in Italy, and presented to the college by the earl of Carlisle. In this chapel are put up the

Spanish colours taken at the reduction of Manilla by Colonel Draper, a member of this college. This college has an ancient stone-bridge over the Cam. 8. Queen's-college, near the river, south of King's, was founded 1448, and consists of two courts, with a fine grove and gardens on both sides of the river, connected with each other and the college by two wooden bridges, one of which is of a curious structure. 9. Catharine-hall is east of Queen's, and its principal front on the west, the most extensive and regular in the university. It contains only one court 180 feet long and 120 broad, and was founded in 1475. 10. Jesus college is at the east end of the town, surrounded by groves and gardens. The principal front faces the south, 180 feet long, regularly built and sashed; it was originally a benedictine convent, and converted to the present use 1576. 11. Christ's college is opposite to St. Andrew's church, on the east side of the town; and was founded by Henry VII.'s mother in 1505. It has lately had a thorough repair, and is now a neat and beautiful structure. 12. St. John's college was founded by the same lady in 1509, on the site of a dissolved priory. It consists of three courts, and has a large library filled with scarce and valuable books. To this college belongs a fine stone-bridge over the river, which leads to their grand walks. 13. Magdalen college, the only one that stands on the north side of the river, near the great bridge, consists of two courts, and was founded in 1519. 14. Trinity college is east of the river, having St. John's college on the north, and Caius college and Trinity-hall on the south. It contains two large quadrangles, the first of which is 344 feet long and 280 broad. It has two noble entrances; and on the north side of it is the chapel 204 feet long, 34 broad, and 44 high. It has every grand ornament, and the much admired statue of Sir Isaac Newton, who was a student in this college. The hall is above 100 feet long, 40 broad, and 50 high. The inner court is esteemed the finest in the university, and surpasses any in Oxford. It is very spacious, and has an elegant cloister of stone pillars, supporting grand apartments; on the west is the library, the most elegant structure of the kind in the kingdom, 190 feet long, 40 broad, and 38 high within. Its entrance is by a stair-case, the steps black marble, and the walls incrusted with ancient Roman monuments. The entrance into the library is by folding doors at the north end. Its inside appearance is inexpressibly grand, having at the south end (lately erected) a beautiful painted glass window of his present majesty in his robes; and the classes are large, beautiful, and noble, well stocked with books, manuscripts, &c. Its outside has every suitable embellishment, and was erected by Sir Christopher Wren at the expence of near 20,000l. Under this building is a spacious piazza of equal dimensions; out of which open three gates to a lawn that leads to the river, over which is a new elegant cycloidal bridge of three arches, leading to extensive walks. In the middle is a remarkable vista. This college was founded on the site of two other colleges and a hall in 1546 by Henry VIII. 15. Emanuel college is at the south-east end of the town; consists of two courts, the principal of which is very neat; and was built on the site of a Dominican convent. It has been lately in a great part rebuilt and elegantly embellished. 16. Sidney-Sussex college is in Bridge-street. Its hall is elegant, but the chapel remarkable only for standing north and south, as others do east and west.

Cambridge, a village of Gloucestershire, near Berkeley, on the river Cam. Here the Danes were attacked by Edward the Elder, and some thousands of them were killed.

New Cambridge, a town of New England about three miles from Boston, remarkable for an university consisting of three colleges. W. long. 70. 4. N. lat. 42. 0.

Cambridgeshire, a county of England, bounded on the N. W. by Lincolnshire, on the N. E. by Norfolk, on the E. by Suffolk, on the S. by Essex and Herts, and on the W. by the counties of Huntingdon, Bedford, and Northampton. It is 50 miles in length from N. to S. and 25 broad from E. to W. It lies in the dioceses of Ely and Norwich; contains 17 hundreds, an episcopal see, a university, seven market-towns, and 163 parishes; and sends six members to parliament; namely, two for the county, and two each for the town and university of Cambridge. The air and soil vary extremely; some parts, especially the southern and eastern, are pleasant and healthy; but the northern, or fenny country, is low and watery, from the confluence of many rivers. All the waters of the middle part of England, which do not run into the Thames or the Trent, fall into these fens; and in the latter part of the year, when they are overflowed by water, they appear covered with fogs; so that while the higher grounds of the adjacent country glitter with the beams of the sun, the isle of Ely appears wrapt in a mist. To clear these fens, drains have been made at a very great expence, by which a great deal of ground has been rendered fertile, and the air much improved. In these fens are abundance of decoys for the wild fowl which migrate hither, during the winter, from the colder climates of the north; and it is incredible what quantities are caught of ducks, mallards, teal, &c.

Cambridge *Manuscript*, a copy of the Gospels and Acts of the Apostles in Greek and Latin. Beza found it in the monastery of Irenæus at Lyons in the year 1562, and gave it to the university of Cambridge in 1582. It is a 4to, and written on vellum: 66 leaves of it are much torn and mutilated, ten of which are supplied by a later transcriber. Beza conjectures, that this manuscript might have existed so early as the time of Irenæus: Wetstein apprehends, that it was either returned or first brought from Egypt into France; that it is the same copy which Druthmar, an ancient expositor who lived about the year 840, had seen, and which, he observes, was ascribed to St. Hilary; and that R. Stephens had given a particular account of it in his edition of the New Testament in 1550. It is usually called *Stephens's second manuscript*. Mill agrees with F. Simon in opinion, that it was written in the western part of the world by a Latin scribe, and that it is to a great degree interpolated and corrupted. He observes, that it agrees so much with the Latin Vulgate, as to afford reason for concluding, that it was corrected or formed upon a corrupt and faulty copy of that translation. From this and the Clermont copy of St. Paul's Epistles, Beza published his larger Annotations in 1582.

CAMBYSES. See Persia.

CAMDEN (William), the great antiquarian, was born in London in the year 1551. His father was a native of Lichfield in Staffordshire, who settling in London became a member of the company of painter-stainers, and lived in the Old Bailey. His mother was of the ancient family of Curwen, of Wirkington in Cumberland. He was educated first at Christ's hospital, and afterwards at St. Paul's school: from thence he was sent, in 1566, to Oxford, and entered servitor of Magdalen college; but being disappointed of a demy's place, he removed to Broad-gate hall, and somewhat more than two years after, to Christ-church, where he was supported by his kind friend and patron Dr. Thornton. About this time he was a candidate for a fellowship of All-Souls' college, but lost it by the intrigues of the Popish party. In 1570 he supplicated the regents of the university to be admitted bachelor of arts; but in this also he miscarried. The following year Mr. Camden came to London, where he prosecuted his favourite study of antiquity, under the patronage of Dr. Goodman, dean of Westminster, by whose interest he was made second master of Westminster-school in 1575. From the time of his leaving the university to this period, he took several journeys to different parts of England, with a view to make observations and collect materials for his *Britannia*, in which he was now deeply engaged. In 1581 he became intimately acquainted with the learned president Brisson, who was then in England;

and in 1586 he published the first edition of his Britannia; a work which, though much enlarged and improved in future editions, was even then esteemed an honour to its author, and the glory of his country. In 1593 he succeeded to the head mastership of Westminster school on the resignation of Dr. Grant. In this office he continued till 1597, when he was promoted to be Clarencieux king at arms. In the year 1600 Mr. Camden made a tour to the north, as far as Carlisle, accompanied by his friend Mr. (afterwards Sir Robert) Cotton. In 1606 he began his correspondence with the celebrated president De Thou, which continued to the death of that faithful historian. In the following year he published his last edition of the Britannia, which is that from which the several English translations have been made; and in 1608, he began to digest his materials for a history of the reign of queen Elizabeth. In 1609, after recovering from a dangerous illness, he retired to Chislehurst in Kent, where he continued to spend the summer months during the remainder of his life. The first part of his annals of the queen did not appear till the year 1615, and he determined that the second volume should not appear till after his death. The work was entirely finished in 1617; and from that time he was principally employed in collecting more materials for the further improvement of his Britannia. In 1622, being now upwards of 70, and finding his health decline apace, he determined to lose no time in executing his design of founding an history-lecture in the university of Oxford. His deed of gift was accordingly transmitted by his friend Mr. Heather to Mr. Gregory Wheare, who was, by himself, appointed the first professor. He died at Chislehurst in 1623, in the 73d year of his age; and was buried with great solemnity in Westminster-abbey in the south aisle, where a monument of white marble was erected to his memory. Camden was a man of singular modesty and integrity: profoundly learned in the history and antiquities of this kingdom, and a judicious and conscientious historian. He was reverenced and esteemed by the literati of all nations, and will be ever remembered as an honour to the age and country wherein he lived. Besides the works already mentioned, he was author of an excellent Greek grammar, and of several tracts in Hearne's collection. But his great and most useful work, the *Britannia*, is that upon which his fame is chiefly built. The edition above mentioned, to which he put his last hand, was correctly printed in folio, much augmented, amended where it was necessary, and adorned with maps. It was first translated into English, and published in folio at London, in 1611, by the laborious Dr. Philemon Holland, a physician of Coventry, who is thought to have consulted our author himself; and therefore great respect has been paid to the additions and explanations that occur in it on a supposition that they may belong to Camden. But in a later edition of the same translation, published in 1636, the doctor has taken liberties which cannot either be defended or excused. A new translation, made with the utmost fidelity from the last edition of our author's work, was published in 1695, by Edmond Gibson of Queen's College in Oxford, afterwards bishop of London; in which, besides the addition of notes, and of all that deserved to be taken notice of in Dr. Holland's first edition, which, though thrown out of the text, is preserved at the bottom of the page, there are many other augmentations and improvements, all properly distinguished from the genuine work of the author, as they ought to be; and the same judicious method obtained in the next edition of the same performance, which was justly considered as the very best book of its kind that had ever been published. But the public has recently been put in possession of a new translation, by Mr. Gough, who has enlarged it to nearly double the size of the last of Bishop Gibson's editions.

CAMEL, in zoology. See CAMELUS.

Camel, a kind of machine used in Holland for raising or lifting ships, in order to bring them over the Pampus, which is at the mouth of the river Y, where the shallowness of the water hinders large ships from passing. It is also used in other places, particularly at the dock of Petersburg, the vessels built there being in their passage to Cronstadt lifted over the bar by means of camels. These machines were originally invented by the celebrated De Wit, for the purpose above mentioned; and were introduced into Russia by Peter the Great, who obtained the model of them when he worked in Holland as a common shipwright. A camel is composed of two separate parts, whose outsides are perpendicular, and whose insides are concave, shaped so as to embrace the hull of a ship on both sides. Each part has a small cabin with 16 pumps and 10 plugs, managed by 20 men. They are braced to a ship underneath by means of cables, and entirely enclose its sides and bottom; being then towed to the bar, the plugs are opened, and the water admitted until the camel sinks with the ship and runs a-ground. Then, the water being pumped out, the camel rises, lifts up the vessel, and the whole is towed over the bar. This machine can raise the ship eleven feet, or, in other words, make it draw eleven feet less water.

CAMELFORD, a borough town of Cornwall in England, consisting of about 100 houses, badly built; but the streets are broad and well paved. W. long. 5. 4. N. lat. 50. 40. It sends two members to parliament; and gives title of baron to Thomas Pitt, elder brother of the great earl of Chatham.

CAMELLIA, in botany; a genus of the polyandria order, belonging to the monadelphia class of plants; and in the natural method ranking under the 37th order, *Columniferæ*. The calyx is imbricated and polyphyllous, with the interior leaves larger than the exterior ones. Of this genus there is but one species, a native both of China and Japan. Thunberg, in his *Flora Japonica*, describes it as growing every where in the groves and gardens of Japan, where it becomes a prodigiously large and tall tree, highly esteemed by the natives for the elegance of its large and very variable blossoms, and its evergreen leaves; it is there found with single and double flowers, which also are white, red, and purple, and produced from April to October. Representations of this flower are frequently met with in Chinese paintings. With us, the *Camellia* is generally treated as a stove plant, and propagated by layers; it is sometimes placed in the greenhouse; but it appears to us to be one of the properest plants imaginable for the conservatory. At some future time it may, perhaps, not be uncommon to treat it as a *Laurustinus* or *Magnolia*: but the high price at which it has hitherto been sold, may have prevented its being hazarded in this way. The blossoms are of a firm texture, but apt to fall off long before they have lost their brilliance; it therefore is a practice with some to stick such deciduous blossoms on some fresh bud, where they continue to look well for a considerable time. Petiver considered this plant as a species of tea-tree; and future observations will probably confirm his conjectures.

CAMELODUM. See CAMALODUNUM.

CAMELOPARDALIS, in zoology, the trivial name of a species of CERVUS.

CAMELUS, or CAMEL, in zoology, a genus of quadrupeds belonging to the order of pecora. The characters of the camel are these: It has no horns; it has six fore-teeth in the under jaw; the laniarii are wide set, three in the upper, and two in the lower jaw: and there is a fissure in the upper lip, resembling a cleft in the lip of a hare. See Pl. 67.

The species are: 1. The *dromedarius*, or Arabian camel, with one bunch or protuberance on the back. It has four callous protuberances on the fore-legs, and two on the hind-ones. This species is common in Africa, and the warmer parts of

Asia; not that it is spread over either of the continents. It is a common beast of burden in Egypt, and along the countries which border on the Mediterranean Sea; in the kingdom of Morocco, Sara or the Desert, and in Ethiopia: but no where south of those kingdoms. In Asia, it is equally common in Turkey and Arabia; but is scarcely seen farther north than Persia, being too tender to bear a more severe climate. In India these animals are not to be found.

2. The *Bactrianus*, or Bactrian camel, has two bunches on the back, but is in all other respects like the preceding; of which it seems to be a mere variety, rather than a different species; and is equally adapted for riding or carrying loads. It is still found wild in the deserts of the temperate parts of Asia, particularly in those between China and India. These are larger and more generous than the domesticated race. The Bactrian camel, which is very common in Asia, is extremely hardy, and in great use among the Tartars and Mongols, as a beast of burden, from the Caspian Sea to the empire of China. It bears even so severe a climate as that of Siberia, being found about the lake Baikal, where the Burats and Mongols keep great numbers. They are far less than those which inhabit Western Tartary. Here they live during winter on willows and other trees, and are by this diet brought very lean. They lose their hair in April, and go naked all May, amidst the frosts of that severe climate. To thrive, they must have dry ground and salt marshes. There are several varieties among the camels. The Turkman is the largest and strongest. The Arabian is hardy. What is called the Dromedary, Maihary, and Raguahl, is very swift. The common sort travel about 30 miles a day. The last, which has a smaller bunch, and more delicate shape, and also is much inferior in size, never carries burdens; but is used to ride on. In Arabia, they are trained for running-matches: and in many places for carrying couriers, who can go above 100 miles a day on them; and that for nine days together, over burning deserts, uninhabitable by any living creature. The African camels are the most hardy, having more distant and more dreadful deserts to pass over than any of the others, from Numidia to the kingdom of Ethiopia. In Western Tartary there is a white variety, very scarce, and sacred to the idols and priests. The Chinese have a swift variety, which they call by the expressive name of Fong Kyo Fo, or camels with feet of the wind. Fat of camels, or, as those people call it, oil of bunches, being drawn from them, is esteemed good in many disorders, but without the smallest foundation. This species of camel is rare in Arabia, being an exotic, and only kept by men of rank.

In camels the riches of Arabia have consisted from the time of Job to the present day. The patriarch reckoned 6000 camels among his pastoral treasures, and the modern Arabs estimate their wealth by the numbers of these useful animals. Without them great part of Africa would be wretched; by them the whole commerce is carried through arid and burning tracts, impassable but by beasts which Providence formed expressly for those scorching deserts. Their soles are adapted to the sands they are to pass over, their toughness and spungy softness preventing them from cracking. Their great powers of sustaining abstinence from drinking, enable them to pass over unwatered tracts for many days, without requiring the least liquid; and their patience under hunger is such, that they will travel many days fed only with a few dates, or some small balls of bean or barley-meal, or on the miserable thorny plants of the deserts.

The Arabians regard the camel as a present from heaven, a sacred animal, without whose assistance they could neither subsist, carry on trade, nor travel. Camel's milk is their common food. They also eat its flesh, that of the young camel being reckoned highly savoury. Of the hair of this animal, which is fine and soft, and which is completely renewed every year, the Arabians make stuffs for clothes, and other furniture. With their camels, they not only want nothing, but have nothing to fear. In one day, they can perform a journey of fifty leagues into the desert, which cuts off every approach from their enemies. All the armies in the world would perish in pursuit of a troop of Arabs. Hence they never submit, unless from choice, to any power. With a view to his predatory expeditions, the Arab instructs, rears, and exercises his camels. A few days after their birth, he folds their limbs under their belly, forces them to remain on the ground, and, in this situation, loads them with a pretty heavy weight, which is never removed but for the purpose of replacing a greater. Instead of allowing them to feed at pleasure, and to drink when they are dry, he begins with regulating their meals, and makes them gradually travel long journeys, diminishing, at the same time, the quantity of their aliment. When they acquire some strength, they are trained to the course. He excites their emulation by the example of horses, and, in time, renders them more robust. In fine, after he is certain of the strength, fleetness, and sobriety of his camels, he loads them both with his own and their food, sets off with them, arrives unperceived at the confines of the desert, robs the first passengers he meets, pillages the solitary houses, loads his camels with the booty, and, if pursued, he can easily accelerate his retreat. It is on these occasions that he unfolds his own talents and those of the camels. He mounts one of the fleetest, conducts the troop, and makes them travel night and day, without almost either stopping, eating, or drinking; and, in this manner, he easily performs a journey of three hundred leagues in eight days. During this period of motion and fatigue, his camels are perpetually loaded, and he allows them each day one hour only of repose, and a ball of paste. They often run in this manner nine or ten days, without finding water; and when, by chance, there is a pool in their way, they scent the water half a league off. Thirst makes them double their pace, and they drink as much at once as serves them for the time that is past, and as much to come; for their journeys often last several weeks, and their abstinence continues during that time.

There is no kind of carriage so cheap and expeditious as that by camels. The merchants and other passengers unite in a caravan, to prevent the insults and robberies of the Arabs. These caravans are often very numerous, and are always composed of more camels than men. Each camel is loaded in proportion to his strength; but, when overloaded, he refuses to march, and continues lying till his burden is lightened. The large camels generally carry a thousand, or even twelve hundred pounds weight, and the smallest from six to seven hundred. In these commercial travels, their march is not hastened: as the route is often seven or eight hundred leagues, their motions and journeys are regulated. They only walk, and perform from about ten to twelve leagues each day. Every night they are unloaded and allowed to pasture at freedom. When in a rich country, or fertile meadow, they eat, in less than an hour, as much as serves them to ruminate the whole night, and to nourish them during twenty-four hours. But they seldom meet with such pastures; neither is this delicate food necessary for them. They even seem to prefer wormwood, thistles, nettles, broom, cassia, and other prickly vegetables, to the softest herbage. As long as they find plants to browse, they easily dispense with drink. This facility of abstaining long from drink proceeds not, however, from habit alone, but is rather an effect of their structure. Independent of the four stomachs, which are common to ruminating animals, the camels have a fifth bag, which serves them as a reservoir for water. This fifth stomach is peculiar to the camel. It is so

large as to contain a vaſt quantity of water, where it remains without corrupting, or mixing with the other aliments. When the animal is preſſed with thirſt, and has occaſion for water to macerate his dry food in ruminating, he makes part of this water mount into his paunch, or even as high as the œſophagus, by a ſimple contraction of certain muſcles. It is by this ſingular conſtruction that the camel is enabled to paſs ſeveral days without drinking, and to take at a time a prodigious quantity of water, which remains in the reſervoir pure and limpid, becauſe neither the liquors of the body, nor the juices of digeſtion, can mix with it. Travellers, when much oppreſſed with drought, are ſometimes obliged to kill their camels in order to have a ſupply of drink from theſe reſervoirs. Theſe inoffenſive creatures muſt ſuffer much; for they utter the moſt lamentable cries, eſpecially when overloaded. But, though perpetually oppreſſed, their fortitude is equal to their docility. At the firſt ſignal, they bend their knees and lie down to be loaded, which ſaves their conductor the trouble of raiſing the goods to a great height. As ſoon as they are loaded, they riſe ſpontaneouſly, and without any aſſiſtance. One of them is mounted by their conductor, who goes before, and regulates the march of all the followers. They require neither whip nor ſpur. But when they begin to be tired, their courage is ſupported, or rather their fatigue is charmed, by ſinging, or by the ſound of ſome inſtrument. Their conductors relieve each other in ſinging; and, when they want to prolong the journey, they give the animals but one hour's reſt; after which, reſuming their ſong, they proceed on their march for ſeveral hours more, and the ſinging is continued till they arrive at another reſting place, when the camels again lie down; and their loads, by looſing the ropes, are allowed to glide off on each ſide of the animals. Thus they ſleep on their bellies in the middle of their baggage, which next morning is again fixed on their backs with equal facility.

But fatigue, hunger, thirſt, and meagreneſs, are not the only inconveniencies to which theſe animals are ſubjected: they are accommodated to all theſe evils by caſtration. One male only is left for eight or ten females; and the labouring camels are generally geldings. They are unqueſtionably weaker than unmutilated males; but they are more tractable, and at all ſeaſons ready for ſervice; while the former are not only unmanageable, but almoſt furious, during the rutting ſeaſon, which laſts forty days, and returns annually in the ſpring. It is then ſaid, that they foam continually, and that one or two red veſicles, as large as a hog's bladder, iſſue from their mouths. In this ſeaſon they eat little, attack and bite animals, and even their own maſters, to whom at all other times they are very ſubmiſſive. Their mode of copulating differs from that of all other quadrupeds; for the female, inſtead of ſtanding, lies down on her knees, and receives the male in the ſame poſition that ſhe repoſes, or is loaded. This poſture, to which the animals are early accuſtomed, becomes natural, ſince they aſſume it ſpontaneouſly in coition. The time of geſtation is near twelve months, and, like all large quadrupeds, the females bring forth only one at a birth. Her milk is copious and thick; and, when mixed with a large quantity of water, affords an excellent nouriſhment to man. The females are not obliged to labour, but are allowed to paſture and produce at full liberty. The advantage derived from their produce and their milk is perhaps ſuperior to what could be drawn from their working. In ſome places, however, moſt of the females are ſpayed, in order to fit them for labour; and it is alleged that this operation, inſtead of diminiſhing, augments their ſtrength, vigour, and plumpneſs. In general, the fatter camels are, the more capable they are of enduring great fatigue. Their bunches ſeem to proceed from a redundance of nouriſhment; for, during long journeys, in which their conductor is obliged to huſband their food, and where they often ſuffer much hunger and thirſt, theſe bunches gradually diminiſh, and become ſo flat, that the place where they were is only perceptible by the length of the hair, which is always longer on theſe parts than on the reſt of the back. The meagreneſs of the body augments in proportion as the bunches decreaſe. The Moors, who tranſport all articles of merchandiſe from Barbary and Numidia, as far as Æthiopia, ſet out with their camels well laden, which are very fat and vigorous; and bring back the ſame animals ſo meagre that they commonly ſell at a low price.

The ancients have held that camels are in a condition for propagating at three years of age; but this aſſertion is ſuſpicious; for, in three years, they have not acquired one half of their growth. The young camel ſucks his mother twelve months; but, when meant to be trained, in order to render him ſtrong and robuſt in the chace, he is allowed to ſuck and paſture at freedom during the firſt years, and is not loaded, or made to perform any labour, till he is four years old. He generally lives forty and ſometimes fifty years, but there is no foundation for the idle tale of his living a century.

If we conſider, under one point of view, all the qualities of this animal, and all the advantages derived from him, it muſt be acknowledged he is a moſt uſeful creature. Gold and ſilk conſtitute not the true riches of the Eaſt. The camel is the genuine treaſure of Aſia. He is more valuable than the elephant; for he may be ſaid to perform an equal quantity of labour at a twentieth part of the expence. Beſides, the whole ſpecies are under ſubjection to man, who propagates and multiplies them at pleaſure. But he has no ſuch dominion over the elephants, whom he cannot multiply, and the individuals of whom he conquers with great labour and difficulty. The camel is not only more valuable than the elephant, but perhaps equal in utility to the horſe, the aſs, and the ox, when their powers are united. He carries as much as two mules; though he eats as little, and feeds upon herbs equally coarſe as the aſs. The female furniſhes milk longer than the cow. The fleſh of a young camel is as good and wholeſome as veal. The Africans and Arabs fill their pots and tubs with it, which is fried with greaſe, and preſerved in this manner during the whole year for their ordinary repaſts. The hair is finer and more in requeſt than the beſt wool. Even their excrements are uſeful; ſal ammoniac being made of their urine; and their dung, dried in the ſun, ſerving for litter where no ſtraw can be had.

3. The *Glama*, Llama, or South-American camel-ſheep, has an almoſt even back, ſmall head, fine black eyes, and very long neck, bending much, and very protuberant near its junction with the body; in a tame ſtate, with ſmooth ſhort hair; in a wild ſtate, with long coarſe hair, white, grey and ruſſet, diſpoſed in ſpots; with a black line from the head along the top of the back to the tail, and belly white. The ſpotted may poſſibly be the tame, the laſt the wild, Llamas. The tail is ſhort; the height from four to four feet and a half; the length from the neck to the tail, ſix feet. The carcaſe diveſted of ſkin and offals, according to the editor of Mr. Byron's voyage, weighed 200 lb. In general, the ſhape exactly reſembles a camel, only it wants the dorſal bunch. It is the camel of Peru and Chili; and, before the arrival of the Spaniards, was the only beaſt of burden known to the Indians. It is very mild, gentle, and tractable. Before the introduction of mules, they were uſed by the Indians to plough the land: at preſent they ſerve to carry burdens of about 100 lb. They go with great gravity; and, like their Spaniſh maſters, nothing can prevail upon them to change their pace. They lie down to the burden; and when wearied, no blows can provoke them to go on. Feuillee ſays, they are ſo capricious,

that if ſtruck, they inſtantly ſquat down, and nothing but careſſes can make them riſe. When angry, they have no other method of revenging their injuries than by ſpitting; which they can do to the diſtance of ten paces, and if it falls on the ſkin, it raiſes an itching and a rediſh ſpot. Their fleſh is eaten, and is ſaid to be as good as mutton. The wool has a ſtrong diſagreeable ſcent. They are very ſure-footed; therefore uſed to carry the Peruvian ores over the ruggedeſt hills and narroweſt paths of the Andes. They inhabit that vaſt chain of mountains their whole length to the ſtraits of Magellan; but except where theſe hills approach the ſea, as in Patagonia, never appear on the coaſts. Like the camel, they have powers of abſtaining long from drink, ſometimes for four or five days: like that animal too, their food is coarſe and trifling. In a wild ſtate, they keep in great herds in the higheſt and ſteepeſt parts of the hills; and while they are feeding, one keeps ſentry on the pinnacle of ſome rock. If it perceives the approach of any one, it neighs; the herd takes the alarm, and goes off with incredible ſpeed. They outrun all dogs, ſo there is no way of killing them but with the gun. They are ſhot for the ſake of their fleſh and hair; for the Indians weave the laſt into cloth. From the form of the parts of generation in both ſexes, this animal copulates with ſuch difficulty, as to be often a whole day in performing the taſk.

4. The *pacos*, or ſheep of Chili, has no bunch on the back. It is covered with a fine valuable wool, which is of a roſe-red colour on the back of the animal, and white on the belly. They are of the ſame nature with the preceding; inhabit the ſame places, but are more capable of ſupporting the rigour of froſt and ſnow: they live in vaſt herds; are very timid, and exceſſively ſwift. The Indians take the pecos in a ſtrange manner: they tie cords with bits of cloth or wool hanging to them, about three or four feet from the ground, acroſs the narrow paſſes of the mountains, then drive thoſe animals towards them, which are ſo terrified by the flutter of the rags, as not to dare to paſs, but, huddling together, give the hunters an opportunity to kill with their ſlings as many as they pleaſe. The tame ones will carry from 50 to 75 lb.; but are kept principally for the ſake of the wool and the fleſh, which is very well flavoured.

CAMEO. See CAMAIEU.

CAMERA ÆOLIA, a contrivance for blowing the fire, in the fuſion of ores, without bellows; by means of water falling through a funnel into a cloſe veſſel, which ſends from it as much air or vapour as continually blows the fire. If there be any great ſpace for it to expand in by the way, it there lets fall its humidity, which may poſſibly hinder the effect. This contrivance was named *camera Æolia* by Kircher.

CAMERA *Lucida*, a contrivance of Dr. Hook for making the image of any thing appear on a wall in a light room, either by day or night. Oppoſite to the place or wall where the appearance is to be, make a hole of at leaſt a foot in diameter; or, if there be a high window with a caſement of that dimenſion in it, this will do much better without ſuch hole or caſement opened. At a convenient diſtance, to prevent its being perceived by the company in the room, place the object or picture intended to be repreſented, but in an inverted ſituation. If the picture be tranſparent, reflect the ſun's rays by means of a looking-glaſs, ſo as that they may paſs through it towards the place of repreſentation; and to prevent any rays from paſſing aſide it, let the picture be encompaſſed with ſome board or cloth. If the object be a ſtatue, or a living creature, it muſt be much enlightened by caſting the ſun's rays on it, either by reflection, refraction, or both. Between this object and the place of repreſentation put a broad convex glaſs, ground to ſuch a convexity as that it may repreſent the object diſtinctly in ſuch place. The nearer this is ſituated to the object, the more will the image be magnified on the wall, and the further the leſs; ſuch diverſity depending on the difference of the ſpheres of the glaſſes. If the object cannot be conveniently inverted, there muſt be two large glaſſes of proper ſpheres, ſituated at ſuitable diſtances, eaſily found by trial, to make the repreſentations erect. This whole apparatus of object, glaſſes, &c. with the perſons employed in the management of them, are to be placed without the window or hole, ſo that they may not be perceived by the ſpectators in the room, and the operation itſelf will be eaſily performed. See Philoſ. Tranſ. N° xxxviii. p. 741, et ſeq.

CAMERA *Obſcura*, or *Dark Chamber*, in *Optics*, a machine, or apparatus, repreſenting an artificial eye; whereon the images of external objects, received through a double convex glaſs, are exhibited diſtinctly, and in their native colours, on a white ground placed within the machine, in the focus of the glaſs. The firſt invention of this inſtrument is aſcribed to Baptiſta Porta, who publiſhed on the ſubject at Antwerp in 1560. The *camera obſcura* affords very diverting ſpectacles; both by exhibiting images perfectly like their objects, and each clothed in their native colours, and by expreſſing, at the ſame time, all their motions; which latter no other art can imitate. By means of this inſtrument, a perſon unacquainted with deſigning will be able to delineate objects with the greateſt accuracy and juſtneſs, and another well verſed in painting will find many things herein to perfect his art. For the conſtruction of this machine, ſee DIOPTRICS.

CAMERARIA, in botany; a genus of the monogynia order belonging to the pentandria claſs of plants; and in the natural method ranking under the 30th order, *Contortæ*. There are two horizontal follicles at the baſe of the ſeed-caſe. The ſeeds are inſerted into a proper membrane. Of this there are two ſpecies; the latifolia, and the anguſtifolia. The firſt is a native of the iſland of Cuba, and riſes with a ſhrubby ſtalk to the height of 10 and 12 feet, dividing into ſeveral branches, garniſhed with roundiſh pointed leaves placed oppoſite. The flowers are produced at the end of the branches in looſe cluſters, which have long tubes enlarging gradually upward, and at the top are cut into five ſegments, broad at their baſe, but ending in ſharp points; the flower is of a yellowiſh white colour. The ſecond ſort has an irregular ſhrubby ſtalk, which riſes about eight feet high, ſending out many branches which are garniſhed with very narrow thin leaves placed oppoſite at each joint. The flowers are produced ſcatteringly at the end of the branches, which are ſhaped like thoſe of the former ſort, but ſmaller. It is a native of Jamaica. Both theſe plants abound with an acrid milky juice like the ſpurge. They are propagated by ſeeds, which muſt be procured from the places of their growth. They may alſo be propagated by cuttings planted in a hot-bed during the ſummer months: they muſt have a bark ſtove, for they are very tender plants; but in warm weather they muſt have air allowed them.

CAMERARIUS (Joachim), one of the moſt learned writers of his time, was born in 1500, at Bamberg, a city of Franconia; and obtained great reputation by his writings. He tranſlated into Latin Herodotus, Demoſthenes, Xenophon, Euclid, Homer, Theocritus, Sophocles, Lucian, Theodoret, Nicephorus, &c. He publiſhed a catalogue of the biſhops of the principal ſees; Greek epiſtles: Accounts of his journeys, in Latin verſe; a Commentary on Plautus: the Lives of Helius Eobanus Heſſus, and Philip Melancthon, &c. He died in the year 1574.

CAMERARIUS (Joachim), ſon of the former, and a learned phyſician, was born at Nuremberg in 1534. After having finiſhed his ſtudies in Germany, he went into Italy, where he obtained the eſteem of the learned. At his return he was

courted by feveral princes to live with them; but he was too much devoted to books, and the ftudy of chemiftry and botany, to comply. He wrote an hortus medicus, and feveral other works. He died in the year 1598.

CAMERATED, among builders, the fame with vaulted or arched.

CAMERET-BAY, in the former province of Britanny in France, forms the harbour of Breft.

CAMERINO, a town of the ecclefiaftical ftate in Italy, fituated in E. long. 13. 7. N. lat. 45. 5.

CAMERLINGO, according to Ducange, fignified formerly the pope's or emperor's treafure; at prefent, camerlingo is no where ufed but at Rome, where it denotes the cardinal who governs the ecclefiaftical ftate and adminifters juftice. It is the moft eminent office at the court of Rome, becaufe he is at the head of the treafury. During a vacation of the papal chair, the cardinal camerlingo publifhes edicts, coins money, and exerts every other prerogative of a fovereign prince; he has under him a treafurer-general, auditor-general, and 12 prelates called *clerks of the chamber*.

CAMERON (John), one of the moft famous divines among the Proteftants of France in the 17th century, was born at Glafgow in Scotland, where he taught the Greek tongue; and having read lectures upon that language for about a year, travelled, and became profeffor at feveral univerfities, and minifter at Bourdeaux. He publifhed, 1. Theological lectures; 2. *Icon Johannis Cameronis*; and fome mifcellaneous pieces. He died in 1625, aged 60.

CAMERONIANS, a fect in Scotland, who feparated from the Prefbyterians in 1666, and continued to hold their religious affemblies in the fields. The Cameronians took their denomination from Richard Cameron, a famous field-preacher, who refufing to accept the indulgence to tender confciences, granted by king Charles II. thinking fuch an acceptance an acknowledgment of the king's fupremacy, and that he had before a right to filence them, made a defection from his brethren, and even headed a rebellion, in which he was killed. His followers were never entirely reduced till the Revolution, when they voluntarily fubmitted to king William.—The Cameronians adhered rigidly to the form of government eftablifhed in 1648.

CAMERONIANS, or *Cameronites*, is alfo the denomination of a party of Calvinifts in France, who afferted that the will of man is only determined by the practical judgment of the mind; that the caufe of men's doing good or evil proceeds from the knowledge which God infufes into them; and that God does not move the will phyfically, but only morally, in virtue of its dependence on the judgment of the mind. They had this name from John Cameron, a famous profeffor, firft at Glafgow, where he was born in 1580, and afterwards at Bourdeaux, Sedan, and Saumur; at which laft place he broached his new doctrine of grace and free-will, which was framed by Amyraut, Cappel, Bochart, Daille, and others of the more learned among the reformed minifters, who judged Calvin's doctrines on thefe points too harfh. The Cameronians are a fort of mitigated Calvinifts, and approach to the opinion of the Arminians. They are alfo called *Univerfalifts*, as holding the univerfality of Chrift's death; and fometimes *Amyraldifts*.

CAMES, a name given to the fmall flender rods of caft-lead of which the glaziers make their turned lead. The lead being caft into flender rods of twelve or fourteen inches long each, is called the *came*; fometimes alfo they call each of thefe rods a *came*, which being afterwards drawn through their vice, makes their turned lead.

CAMILLUS (Marcus Furius), was the firft who rendered the family of *Furius* illuftrious. He triumphed four times, was five times dictator, and was honoured with the title of the *fecond founder of Rome*. In a word, he acquired all the glory a man can gain in his own country. Lucius Apuleius, one of the tribunes, profecuted him to make him give an account of the fpoils taken at Veii. Camillus anticipated judgment, and banifhed himfelf voluntarily. During his banifhment, inftead of rejoicing at the devaftation of Rome by the Gauls, he exerted all his wifdom and bravery to drive away the enemy; and yet kept with the utmoft ftrictnefs the facred law of Rome, in refufing to accept the command which feveral private perfons offered him. The Romans who were befieged in the capitol, created him dictator in the year 363; in which office he acted with fo much bravery and conduct, that he entirely drove the army of the Gauls out of the territories of the commonwealth. He died in the 81ft year of his age, 365 years before the Chriftian æra.

CAMILLI and CAMILLÆ, in antiquity, boys and girls of ingenuous birth, who miniftered in the facrifices of the gods; and efpecially thofe who attended the *flamen dialis*, or prieft of Jupiter. The word feems borrowed from the language of the ancient Hetrurians, where it fignified minifter, and was changed from *cafmillus*. The Tufcans alfo gave the appellation *Camillus* to Mercury, in quality of minifter of the gods.

CAMINHA, a maritime town of Portugal, in the province of Entre-Duero-e-Minho, with the title of a duchy. It is fituated at the mouth of the river Minho, in W. long. 9. 15. N. lat. 41. 44.

CAMIS, or KAMIS, in the *Japanefe Theology*, denote deified fouls of ancient heroes, who are fuppofed ftill to intereft themfelves in the welfare of the people over whom they anciently commanded.—The camis anfwer to the heroes in the ancient Greek and Roman theology, and are venerated like the faints in the modern Romifh church.—Befides the heroes or camis beatified by the confent of antiquity, the *mikaddos*, or pontiffs, have deified many others, and continue ftill to grant the apotheofis to new worthies; fo that they fwarm with *camis*: the principal one is *Tenfio Dai Sin*, the common father of Japan, to whom are paid devotions and pilgrimages extraordinary.

CAMISADE, in the art of war, an attack by furprife in the night, or at the break of day, when the enemy is fuppofed to be a-bed. The word is faid to have taken its rife from an attack of this kind; wherein, as a badge or fignal to know one another by, they bore a fhift, in French called *chemife*, or *camife*, over their arms.

CAMISARDS, a name given by the French to the Calvinifts of the Cevennes, who formed a league, and took up arms in their own defence, in the year 1688.

CAMLETINE, a flight ftuff, made of hair and coarfe filk, in the manner of camblet. It is now out of fafhion.

CAMMA, and GOBBI, two provinces of the kingdom of Loango in Africa. The inhabitants are continually at war with each other. The weapons they formerly ufed in their wars were the fhort pike, bows and arrows, fword and dagger; but fince the Europeans have become acquainted with that coaft, they have fupplied them with fire arms. The chief town of Gobbi lies about a day's journey from the fea. Their rivers abound with a variety of fifh; but are infefted with fea-horfes, which do great mifchief both by land and water. The principal commerce with the natives is in logwood, elephants teeth, and tails, the hair of which is highly valued, and ufed for feveral curious purpofes.

CAMMIN, a maritime town of Germany, in Brandenburg Pomerania, fituated in E. long. 15°. N. lat. 54°.

CAMOENS (Louis de), a famous Portuguefe poet, the honour of whofe birth is claimed by different cities. But according to N. Antonio, and Manuel Correa, his intimate friend, this event happened at Lifbon in 1517. His family was of confiderable note, and originally Spanifh. In 1370, Vafco Perez de Camoens, difgufted at the court of Caftile, fled to that

of Lisbon, where king Ferdinand immediately admitted him into his council, and gave him the lordships of Sardoal, Punnete, Marano, Amendo, and other considerable lands; a certain proof of the eminence of his rank and abilities. In the war for the succession, which broke out on the death of Ferdinand, Camoens sided with the king of Castile, and was killed in the battle of Aljabarota. But though John I. the victor, seized a great part of his estate, his widow, the daughter of Gonsalo Tereyro, grand master of the order of Christ, and general of the Portuguese army, was not reduced beneath her rank. She had three sons, who took the name of *Camoens*. The family of the eldest intermarried with the first nobility of Portugal; and even, according to Castera, with the blood-royal. But the family of the second brother, whose fortune was slender, had the superior honour to produce the author of the Lusiad.

Early in his life the misfortunes of the poet began. In his infancy, Simon Vaz de Camoens, his father, commander of a vessel, was shipwrecked at Goa, where, with his life, the greatest part of his fortune was lost. His mother, however, Anne de Macedo of Santarene, provided for the education of her son Louis at the university of Coimbra. What he acquired there, his works discover; an intimacy with the classics, equal to that of a Scaliger, but directed by the taste of a Milton or a Pope.

John III. having prepared an armament against Africa, Camoens, tired of an inactive life, went to Ceuta in this expedition, and greatly displayed his valour in several rencounters. In a naval engagement with the Moors in the straits of Gibraltar, in the conflict of boarding, he was among the foremost, and lost his right eye. Yet neither hurry of actual service nor the dissipation of the camp could stifle his genius. He continued his *Lusiadas*, and several of his most beautiful sonnets were written in Africa, while, as he expressed it,

"One hand the pen, and one the sword, employ'd."

After a life crowded with disastrous events, in the course of which his valour, his indiscretion, and his extraordinary poetical talents were displayed by turns, Camoens, in 1569, returned to Lisbon—unhappy even in his arrival, for the pestilence then raged in that city, and prevented his publication for three years. At last, in 1572, he printed his Lusiad, which, in the opening of the first book, in a most elegant turn of compliment, he addressed to his prince, king Sebastian, then in his 18th year. The king, says the French translator, was so pleased with his merit, that he gave the author a pension of 4000 reals, on condition that he should reside at court. But this salary, says the same writer, was withdrawn by cardinal Henry, who succeeded to the crown of Portugal, lost by Sebastian at the battle of Alcazar.

Though the great patron of one species of literature, a species the reverse of that of Camoens, certain it is, that the author of the Lusiad was utterly neglected by Henry, under whose inglorious reign he died in all the misery of poverty. By some, it is said, he died in an alms-house. It appears, however, that he had not even the certainty of subsistence which these houses provide. He had a black servant, who had grown old with him, and who had long experienced his master's humanity. This grateful Indian, a native of Java, who, according to some writers, saved his master's life in the unhappy shipwreck where he lost his effects, begged in the streets of Lisbon for the only man in Portugal on whom God had bestowed those talents which have a tendency to erect the spirit of a downward age. To the eye of a careful observer, the fate of Camoens throws great light on that of his country, and will appear strictly connected with it. The same ignorance, the same degenerated spirit which suffered Camoens to depend on his share of the alms begged in the streets by his old hoary servant, the same spirit which caused this, sunk the kingdom of Portugal into the most abject vassalage ever experienced by a conquered nation. While the grandees of Portugal were blind to the ruin which impended over them, Camoens beheld it with a poignancy of grief which hastened his exit. In one of his letters he has these remarkable words: *Em fim accaberey à vida, e verram todos que fuy efeiçoada a minho patria, &c.* "I am ending the course of my life, the world will witness how I have loved my country. I have returned, not only to die in her bosom, but to die with her." In this unhappy situation, in 1579, in his 62d year, the year after the fatal defeat of Don Sebastian, died Louis de Camoens, the greatest literary genius ever produced by Portugal; in martial courage, and spirit of honour, nothing inferior to her greatest heroes. And in a manner suitable to the poverty in which he died, was he buried.

CAMOMILE, in botany. See ANTHEMIS.

CAMP, the ground on which an army pitch their tents. It is marked out by the quarter-master general, who appoints every regiment their ground.

The chief advantages to be minded in choosing a camp for an army, are, to have it near the water, in a country of forage, where the soldiers may find wood for dressing their victuals; that it have a free communication with garrisons; and with a country from whence it may be supplied with provisions: and, if possible, that it be situated on a rising ground, in a dry gravelly soil. Besides, the advantages of the ground ought to be considered, as marshes, woods, rivers, and inclosures; and if the camp be near the enemy, with no river or marsh to cover it, the army ought to be intrenched. An army always encamps fronting the enemy; and generally in two lines, running parallel about 500 yards distance; the horse and dragoons on the wings, and the foot in the centre: sometimes a body of two, three, or four brigades is encamped behind the two lines, and is called the *body of reserve*. The artillery and bread-waggons are generally encamped in the rear of the two lines. A battalion of foot is allowed 80 or 100 paces for its camp; and 30 or 40 for an interval betwixt one battalion and another. A squadron of horse is allowed 30 for its camp, and 50 for an interval, and more if the ground will allow it.

The disposition of the *Hebrew* encampment, agreeably to divine command, was of a quadrangular form, surrounded with an inclosure of the height of 10 hands breadth. It made a square of 12 miles in compass about the tabernacle; and within this was another called the *Levites camp*. The *Greeks* had also their camps, fortified with gates and ditches. The *Lacedæmonians* made their camp generally, though not always, of a round figure, looking upon that as the most perfect and defensible of any form. The figure of the *Roman* camp was a square divided into two principal parts: in the upper parts were the general's pavilion, or prætorium, and the tent of the chief officers; in the lower, those of inferior degree were placed. On one side of the prætorium stood the quæstorium, or apartment of the treasurer of the army; and near this the forum, both for a market-place and the assembling of councils. On the other side of the prætorium were lodged the legati; and below it the tribunes had their quarters, opposite to their respective legions. By the side of the tribunes were the præfecti of the foreign troops, over against their respective wings; and behind these were the lodgments of the evocati, then those of the extraordinarii and ablecti equites, which concluded the higher part of the camp. Between the two partitions was a spot of ground called *principia*, for the altars and images of the gods, and probably also for the chief ensigns. The middle of the lower partition was assigned to the Roman horse; next to them were quartered the triarii; then the principes, and close by them the hastati; afterwards the foreign horse, and lastly the foreign foot. They fortified their camp with a ditch and parapet, which they termed *fossa* and *vallum*; in the latter some distinguish two parts, *viz.* the *agger* or earth, and the

ſtakes or wooden ſtakes drove in to ſecure it. The camps were ſometimes ſurrounded by walls made of hewn ſtone; and the tents themſelves formed of the ſame matter.

The *Turks*, in the front of their camp, quarter the janizaries and other foot, whoſe tents encompaſs their aga; and in the rear are the quarters of the ſpahis and other horſemen. The body of the camp is poſſeſſed by the ſtately tents or pavilions of the vizier or general, reis effendi or chancellor, kahija or ſteward, the teſterdar baſhaw or lord treaſurer, and kapiſlar kahiaſee or maſter of the ceremonies. In the middle of theſe tents is a ſpacious field, wherein are erected a building for the divan, and a haſna or treaſury. When the ground is marked out for a camp, all wait for the pitching of the tent *lailac*, the place where the courts of juſtice are held; it being the diſpoſition of this that is to regulate all the reſt. The *Arabs* ſtill live in camps, as the ancient Scenites did. The camp of the Aſſyne Emir, or king of the country about Tadmor, is deſcribed by a traveller who viewed it, as ſpread over a very large plain, and poſſeſſing ſo vaſt a ſpace, that though he had the advantage of a riſing ground, he could not ſee the utmoſt extent of it. His own tent was near the middle; ſcarce diſtinguiſhable from the reſt, except that it was larger, being made, like the others, of a ſort of hair-cloth.

CAMP is alſo uſed by the Siameſe, and ſome other nations in the Eaſt Indies, as the name of the quarters which they aſſign to foreigners who come to trade with them. In theſe camps, every nation forms, as it were, a particular town, where they carry on all their trade, not only keeping all their warehouſes and ſhops there, but alſo living in theſe camps with their whole families. The Europeans, however, are ſo far indulged, that at Siam, and almoſt every where elſe, they may live either in the cities or ſuburbs as they ſhall judge moſt convenient.

CAMP *fight*, or KAMP *fight*, in law writers, denotes the trial of a cauſe by duel, or a legal combat of two champions in the field, for deciſion of ſome controverſy. In the trial by camp fight, the accuſer was, with the peril of his own body, to prove the accuſed guilty; and by offering him his glove, to challenge him to this trial, which the other muſt either accept of, or acknowledge himſelf guilty of the crime whereof he was accuſed. If it were a crime deſerving death, the camp fight was for life and death: if the offence deſerved only impriſonment, the camp fight was accompliſhed when one combatant had ſubdued the other, ſo as either to make him yield or take him priſoner. The accuſed had liberty to chooſe another to fight in his ſtead, but the accuſer was obliged to perform it in his own perſon, and with equality of weapons. No women were permitted to be ſpectators, nor males under the age of thirteen. The prieſt and the people who looked on, were engaged ſilently in prayer, that the victory might fall to him who had right. None might cry, ſhriek, or give the leaſt ſigh; which in ſome places was executed with ſo much ſtrictneſs, that the executioner ſtood ready with an axe to cut off the right hand or foot of the party that ſhould offend in that reſpect. He that, being wounded, yielded himſelf, was at the other's mercy either to be killed or ſuffered to live. But if life were granted him, he was declared infamous by the judge, and diſabled from ever bearing arms, or riding on horſeback.

CAMPAGNA. See CAMPANIA.

CAMPAIGN, in the art of war, denotes the ſpace of time that an army keeps the field, or is encamped. The beginning of every campaign is conſiderably more unhealthy than if the men were to remain in quarters. After the firſt fortnight or three weeks encampment, the ſickneſs decreaſes daily; the moſt infirm being by that time in the hoſpitals, and the weather daily growing warmer. This healthy ſtate continues throughout the ſummer, unleſs the men get wet clothes or wet beds; in which caſe, a greater or leſs degree of the dyſentery will appear in proportion to the preceding heats. But the moſt ſickly part of the campaign begins about the middle or end of Auguſt, whilſt the days are ſtill hot, but the nights cool and damp, with fogs and dews: then, and not ſooner, the dyſentery prevails; and though its violence is over by the beginning of October, yet the remitting fever gaining ground, continues throughout the reſt of the campaign, and never entirely ceaſes, even in winter quarters, till the froſts begin. At the beginning of a campaign the ſickneſs is ſo uniform, that the number may be nearly predicted; but for the reſt of the ſeaſon, as the diſeaſes are then of a contagious nature, and depend ſo much upon the heats of ſummer, it is impoſſible to foreſee how many may fall ſick from the beginning to the end of autumn. It is alſo obſerved, that the laſt fortnight of a campaign, or if protracted till the beginning of ſpring, is attended with more ſickneſs than the firſt two months encampment: ſo that it is better to take the field a fortnight ſooner, in order to return into winter quarters ſo much the earlier. As to winter expeditions, though ſevere in appearance, they are attended with little ſickneſs, if the men have ſtrong ſhoes, quarters, fuel, and proviſions. Long marches in ſummer are not without danger, unleſs made in the night, or ſo early in the morning as to be over before the heat of the day, which the commanding officer generally orders.

CAMPANACEÆ, in botany, an order of plants in the *Fragmenta methodi naturalis* of Linnæus, in which are the following genera, viz. convolvulus, ipomæa, polemonium, campanula, roella, viola, &c.—See BOTANY, Part III.

CAMPANELLA (Thomas), a famous Italian philoſopher, born at Stilo in Calabria, in 1568. He diſtinguiſhed himſelf by his early proficiency in learning; for at the age of 13 he was a perfect maſter of the ancient orators and poets. His peculiar inclination was to philoſophy, to which he at laſt confined his whole time and ſtudy. In order to arrive at truth, he ſhook off the yoke of authority: by which means the novelty of ſome of his opinions expoſed him to many inconveniences; for at Naples he was thrown into priſon, in which he remained 27 years, and during this confinement wrote his famous work entitled *Atheiſmus triumphatus*. Being at length ſet at liberty, he went to Paris, where he was graciouſly received by Louis XIII. and cardinal Richelieu: the latter procured him a penſion of 2000 livres, and often conſulted him on the affairs of Italy. Campanella paſſed the remainder of his days in a monaſtery of Dominicans at Paris, and died in 1639.

CAMPANI (Matthew) of Spoletto, curate at Rome, wrote a curious treatiſe on the art of cutting glaſſes for ſpectacles, and made ſeveral improvements in optics, in which he was aſſiſted by his brother and pupil Joſeph. He died about the year 1678.

CAMPANIA, a town of Italy, in the kingdom of Naples, and in the farther principato, with a biſhop's ſee. E. long. 15. 30. N. lat. 40. 40.

CAMPANIA, or *Campagna di Roma*, anciently Latium, a province of Italy, bounded on the W. by the river Tiber and the ſea, on the S. W. by the ſea, on the S. and on the N. by Sabina. Though the ſoil is good, it produces little or nothing, on account of the heavy duties upon corn; and the air is unwholeſome. Formerly the beſt-peopled and beſt cultivated ſpot in the world, few villages, little cultivation, and ſcarcely any inhabitants are now to be ſeen: no trees, no incloſures; nothing, in ſhort, but the ſcattered ruins of temples and tombs, which preſent the idea of a country depopulated by peſtilence. In the midſt of theſe deſerted fields, Rome, the ancient miſtreſs of the world, rears her head in melancholy majeſty. The Campania extends 60 miles along the Mediterranean, and is ſubject to the pope.

CAMPANIFORM, or CAMPANULATED, an appellation given to flowers reſembling a bell.

CAMPANINI, a name given to an Italian marble dug out of the mountains of Carrara, becauſe, when it is worked, it ſounds like a bell.

CAMPANULA, or BELL FLOWER: a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 29th order, *Campanaceæ*. The corolla is campanulated, with its fundus cloſed up by the valves that ſupport the ſtamina; the ſtigma is trifid; the capſule inferior, or below the receptacle of the flower, opening and emitting the ſeeds by lateral pores.

Of this genus there are no fewer than 41 *Species* enumerated by botanical writers: but the following are the moſt worthy of attention. 1. The *pyramidalis*, hath thick tuberous roots filled with a milky juice; it ſends out ſtrong, ſmooth, upright ſtalks, which riſe to the height of four feet, garniſhed with ſmooth oblong leaves a little indented at the edges. The flowers are produced from the ſide of the ſtalks, and are regularly ſet on for more than half their length, forming a ſort of pyramid; theſe are large, open, and ſhaped like a bell. The moſt common colour of the flowers is blue, though ſome are white, but the former are moſt eſteemed. 2. The *decurrens*, or peach-leaved bell-flower, is a native of the northern parts of Europe: of this there are ſome with white, and ſome with blue flowers, and ſome with double flowers of both colours. Theſe laſt have of late been propagated in ſuch abundance as to have almoſt baniſhed from the gardens thoſe with ſingle flowers. 3. The *medium*, commonly called *Canterbury bell-flower*, is a biennial plant, which periſhes ſoon after it has ripened its ſeeds. It grows naturally in the woods of Italy and Auſtria; but is cultivated in the Britiſh gardens for the beauty of its flowers, which are blue, purple, white and ſtriped, with double flowers of all the colours. This ſpecies has oblong, rough, hairy leaves, ſerrated on their edges: from the centre of theſe riſes a ſtiff, hairy, furrowed ſtalk about two feet high, ſending out ſeveral lateral branches, garniſhed with long, narrow, hairy leaves ſawed on their edges. From the ſetting on of theſe leaves proceed the footſtalks of the flower; thoſe which are on the lower part of the ſtalk and branches diminiſhing gradually in their length upward, and thereby forming a ſort of pyramid. The flowers of this kind are very large, and make a fine appearance. The ſeeds ripen in September, and the plants decay ſoon after. 4. The *trachelium*, with nettle leaves, hath a perennial root, which ſends up ſeveral ſtiff hairy ſtalks having two ribs or angles. Theſe put out a few ſhort ſide branches, garniſhed with oblong hairy leaves deeply ſawed on their edges. Toward the upper part of the ſtalks, the flowers come out alternately upon ſhort trifid foot-ſtalks having hairy empalements. The colours of the flowers are a deep and a pale blue and white, with double flowers of the ſame; the double-flowered kind only merit a place in gardens. 5. The *latifolia*, or greateſt bell-flower, has a perennial root, compoſed of many fleſhy fibres that abound with a milky juice. From theſe ariſe ſeveral ſtrong, round, ſingle ſtalks, which never put out branches, but are garniſhed with oval ſpear-ſhaped leaves ſlightly indented on their edges. Towards the upper part of the ſtalk the flowers come out ſingly upon ſhort foot-ſtalks; their colours are blue, purple, and white. 6. The *rapunculus*, or rampion, hath roundiſh fleſhy roots, which are eatable, and much cultivated in France for ſallads; ſome years paſt it was cultivated in the Engliſh gardens for the ſame purpoſe, but is now generally neglected. It is a native of Britain; but the roots of the wild ſort never grow to half the ſize of thoſe which are cultivated. 7. The *ſpeculum*, with yellow eye-bright leaves, is an annual plant with ſlender ſtalks riſing a foot high, branching out on every ſide, and garniſhed with oblong leaves a little curled on their edges; from the wings of the leaves come out the flowers ſitting cloſe to the ſtalks, which are of a beautiful purple inclining to a violet colour. In the evening they contract and fold into a pentagonal figure; from whence it is by ſome called *viola pentagonia*, or *five-cornered violet*. 8. The *hybrida*, or common Venus's looking-glaſs. This ſeldom riſes more than ſix inches high, with a ſtalk branching from the bottom upward, and garniſhed with oval leaves ſitting cloſe to the ſtalks, from the baſe of which the branches are produced, which are terminated by flowers very like the former ſort. This was formerly cultivated in the gardens: but ſince the former kind has been introduced it has almoſt ſupplanted this; for the other is a much taller plant, and the flowers larger, though of a leſs beautiful colour. 9. The *canarienſis*, with an orach leaf and tuberous root, is a native of the Canary iſlands. It has a thick fleſhy root of an irregular form; ſometimes running downward like a parſnip, at other times dividing into ſeveral knobs near the top; and when any part of the root is broken, there iſſues out a milky juice at the wound. From the head or crown of the root ariſe one, two, three, or more ſtalks, in proportion to the ſize of the root; but that in the centre is generally larger, and riſes higher than the others. Theſe ſtalks are very tender, round, and of a pale green; their joints are far diſtant from each other; and when the roots are ſtrong, the ſtalks will riſe to ten feet high, ſending out ſeveral lateral branches. At each joint they are garniſhed with two, three, or four ſpear-ſhaped leaves, with a ſharp-pointed beard on each ſide. They are of a ſea-green; and, when they firſt come out, are covered ſlightly with an aſh-coloured pounce. From the joints of the ſtalk the flowers are produced, which are of the perfect bell-ſhape, and hang downward; they are of a flame colour, marked with ſtripes of a browniſh red: the flower is divided into five parts; at the bottom of each is ſeated a nectarium, covered with a white tranſparent ſkin, much reſembling thoſe of the crown imperial, but ſmaller. The flowers begin to open in the beginning of October, and there is often a ſucceſſion of them till March. The ſtalks decay to the root in June, and new ones ſpring up in Auguſt.

The firſt ſort is *cultivated* to adorn halls, and to place before chimnies in the ſummer when it is in flower, for which purpoſe there is no plant more proper; for when the roots are ſtrong, they will ſend out four or five ſtalks which will riſe as many feet high, and are adorned with flowers a great part of their length. When the flowers begin to open, the pots are removed into the rooms, where, being ſhaded from the ſun and rain, the flowers will continue long in beauty; and if the pots are every night removed into a more airy ſituation, but not expoſed to heavy rains, the flowers will be fairer, and continue much longer in bloom. Thoſe plants which are thus treated, are ſeldom fit for the purpoſe the following ſeaſon; therefore a ſupply of young ones muſt be annually raiſed. The plant may be propagated either by dividing the roots or by ſeeds, but the latter produce the moſt vigorous and beſt flowering plants. The ſeeds muſt be ſown in autumn in boxes or pots filled with light undunged earth, and placed in the open air till the froſt or hard rains come on: then they muſt be placed under a hot-bed frame, where they may be ſheltered from both; but in mild weather the glaſſes ſhould be drawn off every day, that they may enjoy the free air: with this management the plants will come up early in the ſpring, and then they muſt be removed out of the frame, placing them firſt in a warm ſituation; but, when the ſeaſon becomes warm, they ſhould be ſo placed as to have the morning ſun only. In September the leaves of the plants will begin to decay, at which time they ſhould be tranſplanted; therefore there muſt be one or two beds prepared, in proportion to the number of plants. Theſe beds muſt be in a warm ſituation, and the earth light, ſandy, and without any mixture of dung. The plants muſt then be taken out of the pots or caſes very carefully, ſo as not to bruiſe their roots; for they are very tender, and on being broken the

milky juice will flow out plentifully, which will greatly weaken them. These should be planted at about six inches distance each way, with the head or crown of the root half an inch below the surface. If the season proves dry, they must be gently watered three or four days after they are planted; the beds should also be covered with mats in the day time, but which should be taken off at night to let the dew fall on the plants. Towards the end of November the beds should be covered over with some old tanners' bark to keep out the frost; and where there is no convenience for covering them with frames, they should be arched over with hoops, that in severe weather they may be covered with mats. In the spring the mats must be removed, and, the following summer, the plants kept free from weeds. In autumn the earth should be stirred between them, some fresh earth spread over the beds, and the plants covered in winter as before. In these beds the plants may remain two years, during which time they are to be treated in the manner before directed. The roots will now be strong enough to flower; so, in September they should be nicely taken up, and some of the most promising carefully planted in pots; the others may be planted in warm borders, or in a fresh bed, at a greater distance than before, to allow them room to grow. Those plants which are potted should be sheltered in winter from great rains and hard frosts, otherwise they will be in danger of rotting, or at least will be so weakened as not to flower with any strength the following summer; and those which are planted in the full ground, should have some old tanners' bark laid round them to prevent the frost from getting at the roots. The second, third, fourth, and fifth sorts are so easily propagated by parting the roots, or by seeds, that no particular directions for their culture need be given. The sixth sort, which is cultivated for its esculent roots, may be propagated by seeds, which are to be sown in a shady border; and when the plants are about an inch high, the ground should be hoed as is practised for onions, to cut up the weeds, and thin the plants, to the distance of three or four inches; and when the weeds come up again, they must be hoed over to destroy them: this, if well performed in dry weather, will make the ground clean for a long time; so that being three times repeated, it will keep the plants clean till winter, which is the season for eating the roots, when they may be taken up for use as wanted. They will continue good till April, at which time they send out their stalks, when the roots become hard and unfit for use.—The seventh and eighth sorts are easily propagated by seeds, which they produce in plenty. If these, and the Venus navelwort, dwarf lychnis, candy-tuft, and other low annual flowers, are properly mixed in the border of the flower-garden, and sown at two or three different seasons, so as to have a succession of them in flower, they will make an agreeable variety. If these seeds are sown in autumn, the plants will flower early in the spring; but if sown in the spring, they will not flower till the middle of June; and if a third sowing is performed about the middle of May, the plants will flower in August; but from these good seeds must not be expected.—The ninth sort is propagated by parting the roots, which must be done with caution: for if they are broken or wounded, the milky juice will flow out plentifully; and if planted before the wounds are skinned over, it occasions their rotting; therefore when any of them are broken, they should be laid in the green-house a few days to heal. These roots must not be too often parted, if they are expected to flower well; for by this means they are weakened. The best time for transplanting and parting their roots is in July, soon after the stalks are decayed. They must not be planted in rich earth, otherwise they will be very luxuriant in branches, and have but few flowers. They succeed best in a light sandy loam, mixed with a fourth part of screened lime rubbish: when the roots are first planted, the pots should be placed in the shade, and unless the season is very dry they should not be watered; for during the time they are inactive, wet is very injurious to them. About the middle of August, the roots will begin to put out fibres; at which time, if the pots are placed under a hot-bed frame, and, as the nights grow cool, covered with the glasses, but opened every day to enjoy the free air, it will greatly forward them for flowering, and increase their strength: when the stalks appear, they must be now and then refreshed with water; but it must not be given too often, nor in too great quantity. The plants thus managed, by the middle of September will have grown so tall as not to be kept any longer under the glass frame; they must therefore be removed into a dry airy glass-case, where they may enjoy the free air in mild weather, yet be screened from the cold. During the winter season they must be frequently refreshed with water, and guarded from frost; and, in the spring, when the stalks begin to decay, the pots should be set abroad in the shade, and not watered.

CAMPBELL (John), an eminent historical, biographical, and political writer, born at Edinburgh, March 8, 1707-8. Among many other works, he was either sole author of, or principally concerned in the following: "The Military History of Prince Eugene and the Duke of Marlborough:" "Ancient Universal History;" "Lives of the English Admirals;" "Hermippus Redivivus: or, the Sage's Triumph over old Age and the Grave:" "Voyages and Travels," 2 vols. folio; "Biographia Britannica;" "The Preceptor;" "Present State of Europe;" "The Modern Universal History;" and "A Political Survey of Britain." Dr. Campbell died Dec. 28, 1775.

CAMPBELLTOWN, a parliament town of Argyle-shire in Scotland, seated on the lough of Kilkerran, on the eastern shore of Kintyre or Cantyre, of which it is the capital. It has a good harbour; and is now a very considerable place, though within these 50 years only a petty fishing town. It has in fact been created by the fishery; for it was appointed the place of rendezvous for the busses; and above 260 have been seen in the harbour at once. The inhabitants are reckoned to be upwards of 8000 in number. W. long. 5. 10. N. lat. 54.

CAMPDEN, a small town of Gloucestershire in England, containing about 200 houses. It gives title of Viscount, by courtesy, to the Earl of Gainsborough's son. W. long. 1. 50. N. lat. 52.

CAMPEACHY, a town of Mexico in South America, seated on the east coast of a bay of the same name, on the west of the province of Yucataro. It is defended by a good wall and strong forts; but is neither so rich, nor carries on such a trade, as formerly; it having been the port for the sale of logwood, the place where it is cut being about 30 miles distant. It was taken by the English in 1596; by the bucaneers in 1678; and by the Flibusters of St. Domingo in 1685, who set it on fire and blew up the citadel. W. long. 93. 7. N. lat. 19. 20.

Campeachy-*Wood*, in botany. See Hæmatoxylum.

CAMPEN, a strong town of Overyssel in the United Provinces. It hath a citadel and a harbour; but the latter is almost choaked up with sand. It was taken by the Dutch in 1578, and by the French in 1672; but they abandoned it the following year. It is seated near the mouth of the river Yssel and Zuyder Zee. E. long. 5. 35. N. lat. 52. 38.

CAMPESTRE, in antiquity, a sort of cover for the privities, worn by the Roman soldiers in their field exercises; being girt under the navel, and hanging down to the knees. The name is supposed to be formed from *campus*, the field or place where the Roman soldiers performed their exercises.

CAMPHORA, Camphor or Camphire, a solid concrete juice extracted from the wood of the laurus camphora. See

Bay, Chemistry, and Materia Medica. Pure camphor is very white, pellucid, somewhat unctuous to the touch; of a bitterish aromatic taste, yet accompanied with a sense of coolness; of a very fragrant smell, somewhat like that of rosemary, but much stronger. It has been very long esteemed one of the most efficacious diaphoretics; and has been celebrated in malignant fevers and epidemical diseases. In deliria, also, where opiates could not procure sleep, but rather aggravated the symptoms, this medicine has sometimes been observed to procure it. All these effects, however, Dr. Cullen attributes to its sedative property, and denies that camphor has any other medicinal virtues than those of an antispasmodic and sedative. He allows it to be very powerful, and capable of doing much good or much harm. From experiments made on different animals, camphor appears to be poisonous to every one of them. In some it produced sleep followed by death, without any other symptom. In others, before death, they were awakened into convulsions and rage. It seems, too, to act chiefly on the stomach; for an entire piece swallowed, produced the above-mentioned effects with very little diminution of its bulk.

CAMPHUYSEN (Dirk Theodore Raphael), an eminent painter, was born at Gorcum in 1586. He learned the art of painting from Diederic Govertze; and by a studious application to it, he very soon not only equalled, but far surpassed his master. He had an uncommon genius, and studied nature with care, judgment, and assiduity. His subjects were landscapes, mostly small, with ruinous buildings, huts of peasants, or views of villages on the banks of rivers, with boats and hoys, and generally he represented them by moon-light. His pencil is remarkably tender and soft, his colouring true nature and very transparent, and his expertness in perspective is seen in the proportional distances of his objects, which are excellently contrived, and have a surprising degree of nature and truth. As he left off painting at an age when others are scarcely qualified to commence artists, few of his works are to be met with, and they bring considerable prices; as they cannot but give pleasure to the eye of the observer. He painted his pictures with a thin body of colour, but they are handled with singular neatness and spirit. He practised in his profession only till he was 18 years of age, and being then recommended as a tutor to the sons of the lord of Nieuport, he undertook the employment, and discharged it with so much credit, that he was appointed secretary to that nobleman. He excelled in drawing with a pen: and the designs which he finished in that manner are very highly esteemed.

CAMPIAN (Edmund), an English Jesuit, was born at London, of indigent parents, in the year 1540; and educated at Christ's hospital, where he had the honour to speak an oration before queen Mary on her accession to the throne. He was admitted a scholar of St. John's college in Oxford at its foundation, and took the degree of master of arts in 1564. About the same time he was ordained by a bishop of the church of England, and became an eloquent Protestant preacher. In 1566, when queen Elizabeth was entertained by the university of Oxford, he spoke an elegant oration before her majesty, and was also respondent in the philosophy act in St. Mary's church. In 1568, he was junior proctor of the university. In the following year, he went over to Ireland, where he wrote a history of that kingdom, and turned papist; but being found rather too assiduous in persuading others to follow his example, he was committed to prison. He soon, however, found means to escape; landed in England in 1571, and thence proceeded to Douay in Flanders, where he publicly recanted his former heresy, and was created bachelor of divinity. He went soon after to Rome, where, in 1573, he was admitted of the society of Jesus, and was sent by the general of that order to Vienna, where he wrote his tragedy called *Nectar et Ambrosia*, which was acted before the emperor with great applause.

From Vienna he went to Prague in Bohemia, where he resided in the Jesuits' college about six years, and then returned to Rome. From thence, in 1580, he was sent by Pope Gregory XIII. with the celebrated Father Parsons, to convert the people of England. From Pitts we learn, that, some time before, several English priests, inspired by the Holy Ghost, had undertaken to convert their countrymen; that 80 of these foreign seminarists, besides several others who by God's grace had been converted in England, were actually engaged in the pious work with great success; that some of them had suffered imprisonment, chains, tortures, and ignominious death, with becoming constancy and resolution: but seeing at last that the labour was abundant and the labourers few, they solicited the assistance of the Jesuits; requesting, that though not early in the morning they would at least in the third, sixth, or ninth hour, send labourers into the Lord's vineyard. In consequence of this solicitation, the above two were sent to England. They arrived in an evil hour for Campian, at Dover; and were next day joyfully received by their friends at London. He had not been long in England, before Walsingham the secretary of state, being informed of his uncommon assiduity in the cause of the church of Rome, used every means in his power to have him apprehended, but for a long time without success. However, he was at last taken by one Elliot, a noted *priest-taker*, who found him in the house of Edward Yates, Esq; at Lyford in Berkshire, and conducted him in triumph to London, with a paper on his hat, on which was written *Campian the Jesuit*. He was imprisoned in the Tower; where, Wood says, "he did undergo many examinations, abuses, rackings, tortures;" *exquisitissimis cruciatibus tortus*, says Pitts. It is hoped, for the credit of our reformers, this torturing part of the story is not true. The poor wretch, however, was condemned, on the stat. 25 Ed. III. for high treason: and butchered at Tyburn, with two or three of his fraternity. However criminal in the eye of the law, or of the English gospel, might be the zeal of this Jesuit for the salvation of the poor heretics of this kingdom, biographers of each persuasion unite in giving him a great and amiable character. "All writers (says the Oxford antiquary), whether Protestants or Popish, say, that he was a man of admirable parts; an elegant orator, a subtile philosopher and disputant, and an exact preacher whether in English or the Latin tongue, of a sweet disposition, and a well-polished man." Fuller, in his church history, says, "he was of a sweet nature, constantly carrying about him the charms of a plausible behaviour, of a fluent tongue, and good parts." His History of Ireland, in two books, was written in 1570, and published by Sir James Ware, from a manuscript in the Cotton library, Dublin, 1633, folio. He wrote also *Chronologia universalis*, a very learned work; and various other tracts.

CAMPICURSIO, in the ancient military art, a march of armed men for several miles, from and back again to the camp, to instruct them in the military pace. This exercise was nearly akin to the *decursio*, from which it only differed, in that the latter was performed by horsemen, the former also by foot.

CAMPIDOCTORES, or Campiductores, in the Roman army, were officers who instructed the soldiery in the discipline and exercises of war, and the art of handling their weapons to advantage. These are also sometimes called *campigeni*, and *armidoctores*.

CAMPIDUCTOR, in middle age writers, signifies the leader or commander of an army, or party.

CAMPION, in botany, the English name of the Lychnis.

Campion, a town of the kingdom of Tanguth in Tartary. It was formerly remarkable for being a place through which

the caravans passed in the road from Bukharia to China. E. long. 104. 53. N. lat. 40. 25.

CAMPISTRON, a celebrated French dramatic author, was born in 1656. Racine directed his poetical talents to the theatre, and assisted him in his first pieces. He died in the year 1723.

CAMPITÆ, in church history, an appellation given to the donatists, on account of their assembling in the fields for want of churches. For a similar reason, they were also denominated *Montenses* and *Rupitani*.

CAMPLI, or CAMPOLI, a town of Italy, in the kingdom of Naples, and in the farther Abruzzo, situated in E. long. 13. 55. N. lat. 42. 38.

CAMPO MAJOR, a town of the province of Alentejo in Portugal. W. long. 7. 24. N. lat. 38. 50.

CAMPREDON, a town of Catalonia in Spain, seated at the foot of the Pyrenean mountains. The fortifications were demolished by the French in 1691. W. long. 1. 56. N. lat. 42. 20.

CAMPS (Francis de), abbot of Notre Dame at Sigi, was born at Amiens in 1643; and distinguished himself by his knowledge of medals, by writing an history of France, and several other works. He died at Paris in 1723.

CAMPVERE. See VEER.

CAMPUS, in antiquity, a field or vacant plain in a city, not built upon, left vacant on account of shows, combats, exercises, or other uses of the citizens.

CAMPUS *Maii*, in ancient customs, an anniversary assembly of our ancestors held on May-day, when they confederated together for the defence of the kingdom against all its enemies.

CAMPUS *Martius*, a large plain in the suburbs of ancient Rome, lying between the Quirinal and Capitoline mounts and the Tiber, thus called because consecrated to the god Mars, and set apart for military sports and exercises to which the Roman youth were trained, as the use and handling of arms, and all manner of feats of activity. Here were the races run, either with chariots or single horses; here also stood the villa publica, or palace for the reception of ambassadors, who were not permitted to enter the city. Many of the public comitia were held in the same field, part of which was for that purpose cantoned out. The place was also nobly decorated with statues, arches, columns, porticos, and the like structures.

CAMPUS *Sceleratus*, a place without the walls of ancient Rome, where the Vestals who had violated their vows of virginity were buried alive.

CAMUL, a town of Asia, on the eastern extremity of the kingdom of Cialus, on the frontiers of Tangut. E. long. 98. 5. N. lat. 57. 15.

CAMUS, a person with a low flat nose, hollowed in the middle. The Tartars are great admirers of camus beauties. Rubruquis observes, that the wife of the great Jenghiz Chan, a celebrated beauty, had only two holes by way of a nose.

CAMUS (John Peter), a French prelate born in 1582. He was author of a number of pious romances (the taste of his time), and other theological works, to the amount of 200 vols. His definition of politics is remarkable: *Ars non tam regendi, quam fallendi, homines*; "the art not so much of governing, as of deceiving mankind." He died in the year 1652.

CAN, in the sea language, as pump-can, a vessel wherewith seamen pour water into the pump to make it go.

CAN-*Buoy*. See BUOY.

CAN-*Hook*, an instrument used to sling a cask by the ends of the staves: it is formed by fixing a broad and flat hook at each end of a short rope; and the tackle by which the cask so slung may be hoisted or lowered, is hooked to the middle of the rope.

CANAAN, the fourth son of Ham. The irreverence of Ham towards his father Noah is recorded in Gen. ix. Upon that occasion the patriarch cursed him in a branch of his posterity: "Cursed," says he, "be Canaan; a servant of servants shall he be unto his brethren." This curse being pronounced, not against Ham the immediate transgressor, but against his son, who does not appear, from the words of Moses, to have been any way concerned in the crime, has occasioned several conjectures and much disagreement amongst writers on divinity. The posterity of Canaan were very numerous. His eldest son was Sidon, who at least founded and peopled the city of Sidon, and was the father of the Sidonians and Phœnicians. Canaan had besides ten sons, who were the fathers of so many people, dwelling in Palestine, and in part of Syria; namely, the Hittites, the Jebusites, the Amorites, the Girgasites, the Hivites, the Arkites, the Sinites, the Arvadites, the Zemarites, and Hamathites.

Land of CANAAN, lies between the Mediterranean Sea and the mountains of Arabia, and extends from Egypt to Phœnicia. It is bounded to the east by the mountains of Arabia; to the south by the wilderness of Paran, Idumæa, and Egypt; to the west by the Mediterranean, called in Hebrew the Great Sea; to the north by the mountains of Libanus. This country, which was first called Canaan, from Canaan the son of Ham, whose posterity possessed it, was afterwards called Palestine, from the people which the Hebrews call Philistines, and the Greeks and Romans corruptly Palestines, who inhabited the sea-coasts, and were first known to them. It likewise had the name of the *Land of Promise*, from the promise God made to Abraham of giving it to him; that of the *Land of Israel*, from the Israelites having made themselves masters of it; that of *Judah*, from the tribe of Judah, which was the most considerable of the twelve; and lastly, the happiness it had of being sanctified by the presence, actions, miracles, and death of Jesus Christ, has given it the name of the *Holy Land*, which it retains to this day.

CANADA, a large country of North America, bounded on the N. by New Britain; on the E. by the gulf of St. Lawrence; on the S. by Nova Scotia and the United States; and on the W. by unknown lands. It lies between 61° and 81° W. long. and 45° and 52° N. lat. and was discovered by John and Sebastian Cabot, father and son, in 1497. This country, in general, is pretty good; but the winter continues for six months very severe. The land that is cleared is fertile, and the wheat sown in May is reaped at the end of August. Of all their animals the beaver is the most useful and curious. The rivers and lakes are full of fish, and there are a great number of trees unknown in Europe. Canada turpentine is greatly esteemed for its balsamic qualities, and for its use in disorders of the breast and stomach. The different tribes of Indians, or original natives, in Canada, are almost innumerable; but they have been observed to decrease in population where the Europeans are most numerous, owing chiefly to their immoderate use of spirituous liquors. As liberty, however, is the ruling passion of the Indians, it is probable that, as the Europeans advance, the former will retreat to more distant regions. Canada was conquered by the English, in the war of 1756, and confirmed to them by the French at the peace of 1763. By an act of parliament in 1774, this country was formed into a province, called Quebec, from the name of the capital; a government was instituted conformably to the French laws of Canada; and the Roman Catholic religion was not merely tolerated, but established. By another act, in 1791, the country was divided into two provinces; namely, Upper Canada and

Lower Canada, of which latter province Quebec is the chief town; and a conſtitution, in imitation of that of England, was given to each of theſe provinces.

CANAL, an artificial cut in the ground, ſupplied with water from rivers, ſprings, &c. in order to make a navigable communication betwixt one place and another. The particular operations neceſſary for making artificial navigations depend upon a number of circumſtances. The ſituation of the ground; its vicinity or connection with rivers; the eaſe or difficulty with which a proper quantity of water can be obtained: theſe and many other circumſtances neceſſarily produce great variety in the ſtructure of artificial navigations, and augment or diminiſh the labour and expence of executing them. When the ground is naturally level, and unconnected with rivers, the execution is eaſy, and the navigation is not liable to be diſturbed by floods: but, when the ground riſes and falls, and cannot be reduced to a level, artificial methods of raiſing and lowering veſſels muſt be employed; which likewiſe vary according to circumſtances.

A kind of temporary ſluices are ſometimes employed for raiſing boats over falls or ſhoals in rivers by a very ſimple operation. Two poſts, or pillars of maſon-work, with grooves, are fixed, one on each bank of the river, at ſome diſtance below the ſhoal. The boat having paſſed theſe poſts, planks are let down acroſs the river, by pullies, into the grooves, by which the water is dammed up to a proper height for allowing the boat to paſs up the river over the ſhoal. The Dutch and Flemings at this day ſometimes when obſtructed by caſcades, form an inclined plane or rolling-bridge upon dry land, along which their veſſels are drawn from the river below the caſcade into the river above it. This, it is ſaid, was the only method employed by the ancients, and is ſtill uſed by the Chineſe, who are ſaid to be entirely ignorant of the nature and utility of locks. Theſe rolling bridges conſiſt of a number of cylindrical rollers which turn eaſily on pivots, and a mill is commonly built near them, ſo that the ſame machinery may ſerve the double purpoſe of working the mill and drawing up veſſels.

A *Lock* is a baſon placed lengthwiſe in a river or canal, lined with walls of maſonry on each ſide, and terminated by two gates, placed where there is a caſcade or natural fall of the country; and ſo conſtructed, that the baſon being filled with water by an upper ſluice to the level of the waters above, a veſſel may aſcend through the upper gate; or the water in the lock being reduced to the level of the water at the bottom of the caſcade, the veſſel may deſcend through the lower gate; for when the waters are brought to a level on either ſide, the gate on that ſide may be eaſily opened. But as the lower gate is ſtrained in proportion to the depth of water it ſupports, when the perpendicular height of the water exceeds 12 or 13 feet, more locks than one become neceſſary. Thus, if the fall be 17 feet, two locks are required, each having $8\frac{1}{2}$ feet fall; and if the fall be 26 feet, three locks are neceſſary, each having 8 feet 8 inches fall. The ſide-walls of a lock ought to be very ſtrong. Where the natural foundation is bad, they ſhould be founded on piles, and platforms of wood; they ſhould likewiſe ſlope outwards in order to reſiſt the preſſure of the earth from behind.

In Pl. 62. fig. 1. we have given a perſpective view of part of a canal; having a veſſel within the lock A C.—Fig. 2. is a ſection of an open lock, with the veſſel about to enter.—Fig. 3. ſhews the ſection of a lock, full of water, and the veſſel raiſed to a level with the water in the ſuperior canal.—Fig. 4. is a ground plan of a lock, with a veſſel in the inferior canal. C, the under gate. A, the upper gate. G H, a ſubterraneous paſſage for letting water run from the ſuperior canal into the lock. K F, a ſubterraneous paſſage for water to paſs from the lock to the inferior canal.

In fig. 1, X and Y are two flood-gates, each of which conſiſts of two leaves, reſting by their edges upon each other, ſo as to form an obtuſe angle, in order the better to reſiſt the preſſure of the water. The firſt (X) prevents the water of the ſuperior canal from falling into the lock; and the ſecond (Y) dams up and ſuſtains the water in the lock. Theſe flood-gates have each a long lever A*b*, A*b*; C*b*, C*b*; by which they are made to open. Theſe gates ſhould be made very tight and cloſe, in order that as little water as poſſible may be waſted.

Through the ſubterraneous paſſage G H (fig. 2, 3, and 4) which deſcends obliquely, by opening the ſluice G, the water is let down from the ſuperior canal D into the lock, where it is ſtopped and retained by the gate C when ſhut, till the water on the lock comes to be on a level with the water on the ſuperior canal D; as repreſented fig. 3. When on the other hand, the water contained by the lock is to be let out, the paſſage G H muſt be ſhut by letting down the ſluice G; the gate A muſt be alſo ſhut, and the paſſage K F opened by raiſing the ſluice K. A free paſſage being thus given to the water, it deſcends through K F into the inferior canal, until the water in the lock is on a level with the water in the inferior canal B; as repreſented, fig. 2.

Now let it be required to raiſe the veſſel in fig. 2. from the inferior canal B to the ſuperior one D; if the lock happens to be full of water, the ſluice G muſt be ſhut, and alſo the gate A, and the ſluice K, opened ſo that the water in the lock may run out till it is on a level with the water in the inferior canal B. When the water in the lock comes to be on a level with the water at B, the leaves of the gate C, are opened by the levers C *b*, which is eaſily performed, the water on each ſide of the gate being in equilibrio: the veſſel then ſails into the lock. After this the gate C and the ſluice K are ſhut and the ſluice G opened, in order to fill the lock, till the water in the lock, and conſequently the veſſel, be upon a level with the water in the ſuperior canal D; as is repreſented in fig. 3. The gate A is then opened, and the veſſel paſſes into the canal D. If it be required to make a veſſel deſcend from the canal D into the inferior canal B, nothing more is neceſſary than to reverſe the order of theſe operations; the whole depending on the power of water to raiſe heavy bodies which float upon its ſurface.

It is needleſs to enumerate the many advantages which neceſſarily reſult from artificial navigations, as their utility is now ſo very apparent. Navigable canals indeed did not eſcape the obſervation of the ancients, of whoſe attempts to cut through large iſthmuſes, &c. in order to make a communication by water, we have many accounts. Herodotus relates, that the Cnidians, a people of Caria in Aſia Minor, deſigned to cut the iſthmus which joins that peninſula to the continent; but were ſuperſtitious enough to give up the undertaking becauſe they were interdicted by an oracle. Several kings of Egypt attempted to join the Red-Sea to the Mediterranean; and Soliman II. emperor of the Turks, employed 50,000 men on that great work, which was completed under the caliphate of Omar, but afterwards ſo neglected, that it is now difficult to diſcover any traces of it. Both the Greeks and Romans intended to make a canal acroſs the Iſthmus of Corinth, which joins the Morea and Achaia, in order to make a navigable paſſage by the Ionian ſea into the Archipelago. But, as the ancients were ignorant of the uſe of water-locks, their whole attention was employed in making level cuts, which is probably the principal reaſon why they ſo often failed. Charlemagne formed a deſign of joining the Rhine and the Danube, in order to make a communication between the Ocean and the Black ſea, by a canal from the river Almutz, which diſcharges itſelf into the Danube, to the Reditz, which falls into the

Maine, and this laſt falls into the Rhine near Mayence; for this purpoſe he employed a prodigious number of workmen; but he met with ſo many obſtacles from different quarters, that he was obliged to give up the attempt.

The French at preſent have many fine canals: that of Briare was begun under Henry IV. and finiſhed under the direction of cardinal Richelieu in the reign of Louis XIII. This canal makes a communication betwixt the Loire and the Seine by the river Loing. It extends 11 French great leagues from Briare to Montargis. It enters the Loire a little above Briare, and terminates in the Loing at Cepoi. There are 42 locks on this canal. The canal of Orleans, for making another communication between the Seine and the Loire, was begun in 1675, and finiſhed by Philip of Orleans, regent of France, during the minority of Louis XV. and is furniſhed with 20 locks. It goes by the name of the *canal of Orleans*; but it begins at the village of Combleux, which is a ſhort French league from the town of Orleans. But the greateſt and moſt uſeful work of this kind is the junction of the Ocean with the Mediterranean by the canal of Languedoc. It was propoſed in the reigns of Francis I. and Henry IV. and was undertaken and finiſhed under Louis XIV. It begins with a large reſervoir 4000 paces in circumference, and 24 feet deep, which receives many ſprings from the mountain Noire. This canal is about 64 leagues in length, is ſupplied by a number of rivulets, and is furniſhed with 104 locks, of about eight feet riſe each. In ſome places it paſſes over bridges of vaſt height; and in others it cuts through ſolid rocks for 1000 paces. At one end it joins the river Garonne near Tholouſe, and terminates at the other in the lake Tau, which extends to the port of Cette. It was planned by Francis Riquet in the year 1666, and finiſhed before his death, which happened in 1680.

In the Dutch, Auſtrian, and French Netherlands, are a great number of canals; that from Bruges to Oſtend carries veſſels of 200 tons. The Chineſe have alſo a great number of canals; that which runs from Canton to Pekin extends about 825 miles in length, and was executed about 800 years ago. It would, however, be an endleſs taſk to deſcribe the numberleſs canals in different parts of Europe. Indeed thoſe of Britain are become exceedingly numerous; and new projects for navigable cuts, in different parts where communications by water are important to the internal commerce of the country, are daily coming under the cognizance of the legiſlature. Reſpecting thoſe executed by that public-ſpirited nobleman the Duke of Bridgewater, ſee the biographical article BRINDLEY.

CANAL, in anatomy, a duct or paſſage through which any of the juices flow.

CANANOR, a large maritime town of Aſia, on the coaſt of Malabar, in a kingdom of the ſame name, with a very large and ſafe harbour. It formerly belonged to the Portugueſe, and had a ſtrong fort to guard it; but in 1683, the Dutch, together with the natives, drove them away; and after they became maſters of the town, enlarged the fortifications. They have but a very ſmall trade; but there is a town at the bottom of the bay independent of the Dutch, whoſe prince can bring 20,000 men into the field. The Dutch fort is large, and the governor's lodgings are at a good diſtance from the gate; ſo that, when there was a ſkirmiſh between the factory and the natives, he knew nothing of it till it was over. E. long. 78. 10. N. lat. 12. 0.

CANANOR, a ſmall kingdom of Aſia, on the coaſt of Malabar, whoſe king can raiſe a conſiderable army. The natives are generally Mahometans; and the country produces pepper, cardamoms, ginger, mirobolans, and tamarinds, in which they drive a conſiderable trade.

CANARA, a kingdom of Aſia on the coaſt of Malabar. The inhabitants are Gentoos, or Pagans; and there is a pagod, or temple, called *Ramtrut*, which is viſited every year by a great number of pilgrims. Here the cuſtom of burning the wives with their huſbands had its beginning, and is practiſed to this day. The country is generally governed by a woman, who keeps her court at a town called *Baydor*, two days journey from the ſea. She may marry whom ſhe pleaſes; and is not obliged to burn with her huſband, like her female ſubjects. They are ſo good obſervers of their laws, that a robbery or murder is ſcarce ever heard of among them. The Canarans have forts built of earth along the coaſt, which are garriſoned with 200 or 300 ſoldiers, to guard againſt the robberies of their neighbours. The lower grounds yield every year two crops of corn or rice; and the higher produce pepper, betel nuts, ſanders wood, iron, and ſteel. The Portugueſe clergy here live very looſely, and make no ſcruple of procuring women for ſtrangers.

CANARIA, or the GRAND CANARY, an iſland in the Atlantic Ocean, about 180 miles from the coaſt of Africa. It is about 100 miles in circumference, and 33 in diameter. It is a fruitful iſland, and famous for the wine that bears its name. It alſo abounds with apples, melons, oranges, citrons, pomegranates, figs, olives, peaches, and plantains. The fir and palm trees are the moſt common. The towns are, Canary the capital, Gualdera, and Geria.

CANARY, or CIVIDAD DE PALMAS, is the capital of the iſland of Canaria, with an indifferent caſtle, and a biſhop's ſee. It has alſo a court of inquiſition, and the ſupreme council of the reſt of the Canary iſlands; as alſo four convents, two for men and two for women. The town is about three miles in compaſs, and contains 12,000 inhabitants. The houſes are only one ſtory high, and flat at the top; but they are well built. The cathedral is a handſome ſtructure. W. long. 15. 20. N. lat. 28. 4.

CANARY-*Iſlands*, are ſituated in the Atlantic ocean, over againſt the empire of Morocco in Africa. They were formerly called the *Fortunate-Iſlands*, on account of the temperate healthy air, and excellent fruits. The land is very fruitful, for both wheat and barley produce 130 for one. The cattle thrive well, and the woods are full of all ſorts of game. The Canary ſinging birds are well known all over Europe. There are here ſugar-canes in great abundance; but the Spaniards firſt planted vines here, from whence we have the wine called *Canary* or *Sack*. Theſe iſlands were not entirely unknown to the ancients; but they were a long while forgot, till John de Betencourt diſcovered them in 1402. It is ſaid they were firſt inhabited by the Phœnicians, or Carthaginians, but on no certain foundation. The inhabitants are chiefly Spaniards; though there are ſome of the firſt people remaining, whom they call *Guanches*, a hardy, active, bold people, and living on the mountains, though ſomewhat civilized. The Spaniſh ſhips, when they ſail for the Weſt-Indies, rendezvous at theſe iſlands. Their number is 12, viz. Alegranza; Canaria; Ferro; Fuerteventura; Gomera; Gratioſa; Lancerotta; Madeira; Palma; Rocca; Salvages; and Teneriff. W. long. from 12, to 21. N. lat. from 27, 30. to 29, 30.

CANARY-*Bird*. See FRINGILLA. Theſe birds are much admired for their ſinging, and take their name from the place whence they originally came, viz. the Canary-iſlands; but of late years there is a ſort of birds brought from Germany, and eſpecially from Tirol, and therefore called *German birds*, which are much better than the others; though both are ſuppoſed to have originally come from the ſame place. The cocks never grow fat, and by ſome country people cannot be diſtinguiſhed from common green-birds, though the Canary-birds are much luſtier, have a longer tail, and differ much in the heaving of the paſſages of the throat when they ſing.

Canary-birds are diſtinguiſhed by different names at different times and ages. Such as are about three years old are called *runts*; thoſe above two are named *criſſs*; thoſe of the firſt year under the care of the old ones, are termed *branchers*; thoſe that are new-flown, and cannot feed themſelves, *puſhers*; and thoſe brought up by hand, *neſtlings*. They are bred in England as vigorous and healthy as in the country from whence they were firſt brought. The moſt proper cages for theſe birds are thoſe, in ſhape high and long, but narrow; for they ſhould have room to walk, which the common cylindrical cages do not afford. If theſe birds eat too much they grow over-fat, loſe their ſhape, and ſing little; and it is a very common error to feed them too well. At the time for building their neſts, there muſt be put into their cages ſome dried moſs and ſome ſtag's hair; and great care is to be taken in breeding the young, reſpecting the article of food. As ſoon as the young birds are eight days old, or ſomewhat more, and are able to eat and pick up food of themſelves, they are to be taken out of the cage in which they were hatched, and each put ſeparately into another cage, and hung up in a room where it may never have an opportunity of hearing the voice of any other bird. After they have been kept thus about eight days, they are to be excited to ſing by a bird pipe; but this is not to be blown too much, or in too ſhrill a manner, leſt they ſing themſelves to death.

For the firſt fifteen days the cages are to be covered with a black cloth, and for the fifteen days following with a green one. Five leſſons in a day from the pipe are ſufficient for theſe young creatures; and they muſt not be diſturbed with ſeveral ſounds at the ſame time. Two leſſons ſhould be given them early in the morning, one about the middle of the day, and two more at night.

The genius and temper of the ſeveral birds of this kind are very different. The males are almoſt always melancholy, and will not ſing unleſs they are excited to it by hearing others continually ſinging about them. The male bird of this kind will often kill the female put to him for breeding; and when there are ſeveral females together with the males, they will often do the ſame to one another from jealouſy. It is therefore not eaſy to manage their breeding well in this particular, unleſs in this manner. Let two female birds be put into one cage, and when they have lived together ſome time, they will have contracted a ſort of love for one another, which will not eaſily be diſſolved. Put a male bird into the cage with theſe two, and every thing will go well; their friendſhip will keep them from quarrelling about his favours, and from danger of his miſchievous diſpoſition; for if he attacks one of them in order to kill her, the other will immediately take her part; and after a few of theſe battles, the male will find that they are together an overmatch for him at fighting, and will then diſtribute his favours to them, and there will not fail of being a young breed or two, which are to be taken away from their parents, and educated as before directed. Some males watch the time of the female's laying, and devour the eggs as faſt as ſhe depoſits them. Others take the young ones in their beak as ſoon as hatched, and cruſh them to death againſt the ſides of the cage, or in ſome other way deſtroy them. When a male has been known once to have been guilty of this, he is to be ſhut up in a ſmall cage, in the middle of a large one in which the female is breeding her young, and thus he will often comfort her with ſinging all day long, while ſhe ſits upon the eggs or takes care of the young ones: and when the time of taking away, to put them into ſeparate cages, is come, the male is to be let out, and he will always after this live in friendſhip with the female. If the male become ſick during the time of the female's ſitting or bringing up her young, he muſt be removed immediately, and only brought to the ſide of her cage at certain times, that ſhe may ſee him, till he is perfectly cured; and then he is to be ſhut up again in his cage in the middle.—Canary-birds are various in their notes; ſome having a ſweet ſong, others a low note, others a long ſong, which is beſt, as having the greateſt variety of notes: but they ſing chiefly either the titlark or nightingale notes. See SONG *of birds*.

CANCALLE, a town of France, in the former province of Upper Britanny, by the ſea-ſide, where there is a road called *Cancalle Bay*. Here the Britiſh landed in 1758, in their way to St. Maloes, where they burnt a great number of ſhips in the harbour, and then retired without loſs. The town was in their power; but they acted like generous enemies, and did no injury to this nor any other on the coaſt. W. long. 0. 13. N. lat. 48. 41.

CANCELLIER, in falconry, is when a light brown hawk, in her ſtooping, turns two or three times upon the wing to recover herſelf before ſhe ſeizes.

CANCELLI, a term uſed to denote lattice windows, or thoſe made of croſs bars diſpoſed latticewiſe; it is alſo uſed for rails or balluſters incloſing the communion table, a court of juſtice, or the like, and for the network in the inſide of hollow bones.

CANCELLING, in the civil law, an act whereby a perſon conſents that ſome former deed be rendered null and void. This is otherwiſe called *reciſion*. The word comes from the Latin *cancellare* to encompaſs or pale a thing round. In the proper ſenſe of the word, *to cancel*, is to deface an obligation, by paſſing the pen from top to bottom, or acroſs it; which makes a kind of chequer lattice, which the Latins call *cancelli*.

CANCER, in zoology, a genus of inſects belonging to the order of inſecta aptera. The generic characters are theſe: they have eight legs (ſeldom either ten or ſix), beſides the two large claws that anſwer the purpoſe of hands. They have two eyes at a conſiderable diſtance from each other, and for the moſt part ſupported by a kind of pedunculi or footſtalks; the eyes are likewiſe elongated and moveable; they have two clawed palpi, and the tail is jointed. This genus includes the lobſter, ſhrimp, &c. See Plate 66.

There are no leſs than 87 ſpecies of cancer, diſtinguiſhed principally by the length of their tails and the margins of their breaſts. The following are the moſt remarkable: 1. The *gammarus*, or common lobſter, with a ſmooth thorax, ſhort ſerrated ſnout; very long antennæ; and between them two ſhorter ones, bifid; claws and fangs large, the greater tuberculated, the leſſer ſerrated on inner edge; four pair of legs; ſix joints in the tail; tail-fins rounded. It inhabits all the rocky ſhores of our iſland, but chiefly where there is a depth of water. In Llyn in Caernarvonſhire, a certain ſmall lobſter, nothing different except in ſize, burrows in the ſand. They are brought in vaſt quantities from the Orkney iſles, and many parts of the eaſtern coaſt of Scotland, to the London markets. Sixty or ſeventy thouſand are annually brought from the neighbourhood of Montroſe alone.—The lobſter was well known to the ancients, and is well deſcribed by Ariſtotle under the title of ἀστακός. It is found as far as the Helleſpont; and is called at Conſtantinople *liczuda* and *licpuda*.—Lobſters are afraid of thunder, and ſometimes caſt their claws on a great clap. It is ſaid that they will do the ſame on the firing of a great gun; and that, when men of war meet a lobſter boat, a jocular threat is uſed, that, if the maſter does not ſell them good lobſters, they will *ſalute* him.

This ſpecies is generally found in the cleareſt water, at the foot of rocks that impend over the ſea; a circumſtance which has given opportunity of examining more cloſely into the natural hiſtory of this animal, than of many others who live in an element that quite prohibits human reſearches, and

limits the attempts of the moft inquifitive. Some lobfters are taken by hand; but the greater quantity in pots, a fort of trap formed of twigs, and baited with garbage. Thefe are formed like a wire moufe-trap, fo that when the lobfter gets in, there is no return. They are faftened to a cord funk in the fea, and their place marked by a buoy. They begin to breed in the fpring, and continue breeding moft part of the fummer. They propagate *more humano*, and are extremely prolific. Dr. Bafter fays he counted 12,444 eggs under the tail, befides thofe that remained in the body unprotruded. They depofite thofe eggs in the fand, where they are foon hatched.

The cruft of the lobfter changes annually. Previous to their putting off their old one, they appear fick, languid, and reftlefs. They totally acquire a new coat in a few days; but during the time that they remain defencelefs, they feek fome very lonely place, for fear of being devoured by fuch of their brethren as are not in the fame fituation. It is alfo remarkable, that lobfters and crabs will renew their claws, if by accident they are torn off: it is very certain they will grow again in a few weeks, though they never attain to the fize of the firft. They are very voracious animals, and feed on fea-weeds, garbage, and all forts of dead bodies. The pincers of one of the lobfters large claws are furnifhed with knobs, and thofe of the other are always ferrated. With the former it keeps firm hold of the ftalks of fubmarine plants, and with the latter it cuts and minces its food very dextroufly. The knobbed or *numb* claw, as the fifhermen call it, is fometimes on the right and fometimes on the left fide indifferently. It is more dangerous to be feized by them with the cutting claw than the other; but, in either cafe, the quickeft way to get difengaged of the creature is to pull off its claw. The female or *hen* lobfter does not caft her fhell the fame year that fhe depofits her ova, or, in the common phrafe, is in *berry*. When the ova firft appear under her tail, they are fmall and extremely black; but they become in fucceffion almoft as large as ripe elder berries before they are depofited, and turn of a dark brown colour, efpecially towards the end of the time of her depofiting them. They continue full, and depofiting the ova in conftant fucceffion, as long as any of that black fubftance can be found in their body, which, when boiled, turns of a beautiful red colour, and is called their *coral*. Hen lobfters are found in berry at all times of the year, but chiefly in winter. It is a common miftake, that the berried hen is always in perfection for the table. When her berries appear large and brownifh, fhe will always be found exhaufted, watery, and poor. Though the ova be caft at all times of the year, they feem only to come to life during the warm fummer months of July and Auguft. Great numbers of them may then be found, under the appearance of tadpoles, fwimming about the little pools left by the tides among the rocks, and many alfo under their proper form from half an inch to four inches in length. In cafting their fhells, it is hard to conceive how the lobfter is able to draw the fifh of their large claws out, leaving the fhells entire and attached to the fhell of their body, in which ftate they are conftantly found. The fifhermen fay the lobfter pines before cafting, till the fifh of its large claw is no thicker than the quill of a goofe, which enables it to draw its parts through the joints and narrow paffages near the trunk. The new fhell is quite membranaceous at firft, but hardens by degrees. Lobfters only grow in fize while their fhells are in their foft ftate. They are chofen for the table, by their being heavy in proportion to their fize; and by the hardnefs of their fhells on their fides, which, when in perfection, will not yield to moderate preffure. Barnacles and other fmall fifh adhering to them are reckoned certain figns of fuperior goodnefs. Cock-lobfters are in general better than the hens in winter; they are diftinguifhed by the narrownefs of their tails, and by their having a ftrong fpine upon the centre of each of the tranfverfe proceffes beneath the tail, which fupport the four middle plates of their tails. The fifh of a lobfter's claw is more tender, delicate and eafy of digeftion, than that of the tail. In fummer, the lobfters are found near the fhore, and thence to about fix fathoms water; in winter, they are feldom taken in lefs than 12 or 15 fathoms. Like other infects, they are much more active and alert in warm weather than in cold. In the water, they can run nimbly upon their legs or fmall claws; and, if alarmed can fpring, tail foremoft, to a furprifing diftance, as fwift as a bird can fly. The fifherman can fee them pafs about 30 feet; and by the fwiftnefs of their motion, fuppofe they may go much farther. Athenæus remarks this circumftance, and fays, that "the incurvated lobfters will fpring with the activity of dolphins." Their eyes are raifed upon moveable bafes, which enables them to fee readily every way. When frightened, they will fpring from a confiderable diftance to their hold in the rock, and, what is not lefs furprifing than true, will throw themfelves into their hold in that manner through an entrance barely fufficient for their bodies to pafs.

2. The *ftrigofus*, or plated lobfter, with a pyramidal fpiny fnout; thorax elegantly plated, each plate marked near its junction with fhort ftriæ; claws much longer than the body, thick, echinated, and tuberculated; the upper fang trifid; only three legs fpiny on their fides; tail broad. The largeft of this fpecies is about fix inches long. It inhabits the coafts of Anglefea, under ftones and fuci. It is very active; and, if taken, flaps its tail againft the body with much violence and noife.

3. The *aftacus*, or craw-fifh, with a projecting fnout flightly ferrated on the fides; a fmooth thorax; back fmooth, with two fmall fpines on each fide; claws large, befet with fmall tubercles; two firft pair of legs clawed, the two next fubulated; tail confifting of five joints; the caudal fins rounded. It inhabits many of the rivers in England, lodged in holes which they form in the clayey banks. Cardan fays, that this fpecies indicates the goodnefs of water; for in the beft water they are boiled into the reddeft colour.

4. The *ferratus*, or prawn, with a long ferrated fnout bending upwards: three pair of very long filiform feelers; claws fmall, furnifhed with two fangs: fmooth thorax; five joints to the tail; middle caudal fin fubulated, two outmoft flat and rounded. It is frequent in feveral fhores among loofe ftones; fometimes found at fea, and taken on the furface over 30 fathoms depth of water; cinereous when frefh, and of a fine red when boiled.

5. The *crangon*, or fhrimp, with long flender feelers, and between them two projecting laminæ; claws with a fingle, hooked, moveable fang; three pair of legs; feven joints in the tail; the middle caudal fin fubulated, the four others rounded and fringed, a fpine on the exterior fide of each of the outmoft. It inhabits the fhores of Britain in vaft quantities, and is the moft delicious of the genus.

6. The *fquilla*, with a fnout like a prawn, but deeper and thinner; the feelers longer in proportion to the bulk; the fubcaudal fins rather larger; is, at full growth, not above half the bulk of the former.—It inhabits the coafts of Kent; and is fold in London under the name of the *white fhrimp*, as it affumes that colour when boiled.

7. The *atomos*, or atom-lobfter, with a flender body; filiform antennæ; three pair of legs near the head; behind which are two pair of oval veficulæ: beyond are three pair of legs, and a flender tail between the laft pair. It is very minute, and the help of the microfcope is often neceffary for its infpection.

9. The *locuft*, or locuft-lobfter, with four antennæ; two

pair of imperfect claws; the firſt joint ovated; body conſiſts of 14 joints, in which it differs from the former. It abounds, in ſummer, on the ſhores, beneath ſtones and algæ; leaps about with great agility.

10. The *diogenes*, ſoldier-crab, or hermit-crab, with rough claws; the left claw is the longeſt (this being the only difference between the *diogenes* and *bernardus*); the legs are ſubulated, and ſerrated along the upper ridge; the tail naked and tender, and furniſhed with a hook by which it ſecures itſelf in its lodging. This ſpecies is paraſitic; and inhabits the empty cavities of turbinated ſhells, changing its habitation according to its increaſe of growth from the ſmall *nerite* to the large *whelk*. Nature denies it the ſtrong covering behind, which ſhe has given to others of this claſs; and therefore directs it to take refuge in the deſerted caſes of other animals. They crawl very faſt with the ſhell on their back; and at the approach of danger draw themſelves within the ſhell, and, thruſting out the larger claw, will pinch very hard whatever moleſts them. Ariſtotle deſcribes it very exactly under the name of καρκινιον, By the moderns it is called the *ſoldier*, from the idea of its dwelling in a tent; or the *hermit*, from its retiring into a cell.

Nothing can be more diverting than to obſerve this animal when wanting to change its ſhell. The little ſoldier is ſeen buſily parading the ſhore along that line of pebbles and ſhells which is formed by the extremeſt wave; ſtill, however, dragging its old incommodious habitation at its tail, unwilling to part with one ſhell, even though a troubleſome appendage, till it can find another more convenient. It is ſeen ſtopping at one ſhell, turning it, and paſſing it by; going on to another, contemplating that for a while, and then ſlipping its tail from its old habitation to try on the new; this alſo is found to be inconvenient, and it quickly returns to its old ſhell again. In this manner it frequently changes, till at laſt it finds one, light, roomy, and commodious; to this it adheres, though the ſhell be ſometimes ſo large as to hide the body of the animal, claws and all. Yet it is not till after many trials, and many combats alſo, that the ſoldier is thus completely equipped; for there is often a conteſt between two of them for ſome well-looking favourite ſhell for which they are rivals. They both endeavour to take poſſeſſion; they ſtrike with their claws, they bite each other, till the weakeſt is obliged to yield by giving up the object of diſpute. It is then that the victor immediately takes poſſeſſion, and parades it in his new conqueſt three or four times backward and forward upon the ſtrand before his envious antagoniſt. When this animal is taken, it ſends forth a feeble cry, endeavouring to ſeize the enemy with its nippers; which if it ſucceeds it will ſooner die than forego.

The ſoldier-crabs frequent moſtly thoſe parts of the ſea ſhores which are covered with ſhrubs and trees producing various wild fruits on which they ſubſiſt; though they will alſo feed on the fragments of fiſh and other animal ſubſtances caſt on ſhore. When roaſted in the ſhell, they are eſteemed delicate. The ſoldier-crab, hung in the air, diſſolves into a kind of oil, which has been ſaid ſpeedily to cure the rheumatiſm, when rubbed upon the part.

11. The *vocans*, or ſand-crab, is but of a ſmall ſize; its colour light brown, or duſky white. It has eight legs, and two claws, one of which is double the ſize of the other: theſe claws ſerve both to defend and to feed themſelves with. The head has two ſquare holes, which are receptacles for its eyes; out of which it thruſts them, and draws them in again at pleaſure. Their abode is only on the ſandy ſhores of Ilathera, and many other of the Bahama iſlands. They run very faſt, and retreat from danger into little holes they make in the ſand.

12. The *graſſus*, or red mottled crab, hath a round body, the legs longer and larger than in other kinds; the claws red; except which, the whole is mottled in a beautiful manner with red and white. Theſe crabs inhabit the rocks hanging over the ſea; they are the nimbleſt of all others, and run with ſurpriſing agility along the upright ſide of a rock, and even under the rocks that hang horizontally below the water. This they are often neceſſitated to do in eſcaping the aſſaults of rapacious birds that purſue them. Theſe crabs never go to land; but frequent moſtly thoſe parts of the promontories and iſlands of rocks in and near the ſea, where, by the continual and violent agitation of the waves againſt the rocks, they are always wet, continually receiving the ſpray of the ſea, which often waſhes them into it; but they inſtantly return to the rock again, not being able to live under water, and yet requiring more of that element than any of the cruſtaceous kinds that are not fiſh.

13. The *granulatus*, or rough-ſhelled crab: theſe crabs are pretty large, and are commonly taken from the bottom of the ſea in ſhallow water; the legs are ſmall in proportion to the body; the two claws are remarkably large and flat. The whole ſhell is covered over with innumerable little tubercles like ſhagreen: the colour is brown, variouſly ſtained with purple.

14. The *cancer erythropus*, or red-claw crab, is of a ſmall ſize, and brown colour: it hath two claws of unequal bigneſs, red at the ends; and eight legs, which ſeem of leſs uſe to them than in other crabs; for when on the ground, they crawl with ſlow pace, dragging their bodies along; but they are moſtly ſeen graſping with their claws, and hanging to ſome ſea-plant, or other marine ſubſtance.

15. The *piſum*, or pea-crab, with a rounded and ſmooth thorax, entire and blunt; with a tail of the ſize of the body, which commonly is the bulk of a pea. It inhabits the muſcle, and has unjuſtly acquired the repute of being poiſonous. The ſwelling after eating of muſcles is wholly conſtitutional; for one that is affected by it, hundreds remain uninjured. Crabs either of this kind, or allied to them, the ancients believed to have been the conſentaneous inmates of the PINNÆ, and other bivalves; which, being too ſtupid to perceive the approach of their prey, were warned of it by their vigilant friend.

16. The *mænas*, or common crab, with three notches on the front; five ſerrated teeth on each ſide; claws ovated; next joint toothed; hind feet ſubulated; dirty green colour; red when boiled. It inhabits all our ſhores; and lurks under the algæ, or burrows under the ſand.

17. The *pagurus*, or black clawed crab, with a crenated thorax; ſmooth body; quinquedentated front; ſmooth claws and black tips; hind feet ſubulated. It inhabits the rocky coaſts; is the moſt delicious meat of any; caſts its ſhell between Chriſtmas and Eaſter. The calcined claws of this ſpecies were once uſed in medicine to correct acidities in the ſtomach and bowels.

18. The *velutinus*, or velvet-crab, with the thorax quinquedentated; body covered with ſhort, brown, velvet-like pile; claws covered with minute tubercles; ſmall ſpines round the top of the ſecond joint; hind legs broadly ovated. This is among the ſpecies taken notice of by Ariſtotle on account of their broad feet, which, he ſays, aſſiſt them in ſwimming, as web-feet do the water-fowl. It inhabits the weſtern coaſt of Angleſea.

19. The *horridus*, or horrid crab, with a projecting bifurcated ſnout, the end diverging; body heart-ſhaped; with the claws and legs covered with long and very ſharp ſpines.—It is a large ſpecies, and inhabits the rocks on the eaſtern coaſts of Scotland. It is common to Norway and Scotland, as many of the marine animals and birds are.

20. The *ruricola*, land-crab, or violet-crab, with a ſmooth entire thorax, and the two laſt joints of the feet armed with

ſpines. It inhabits the Bahama iſlands, as well as moſt lands between the tropics; and feeds upon vegetables.

Theſe animals live not only in a kind of orderly ſociety in their retreats in the mountains, but regularly once a year march down to the ſea-ſide in a body of ſome millions at a time. As they multiply in great numbers, they chooſe the month of April or May to begin their expedition; and then ſally out by thouſands from the ſtumps of hollow trees, from the clefts of rocks, and from the holes which they dig for themſelves under the ſurface of the earth. At that time the whole ground is covered with this band of adventurers; there is no ſetting down one's foot without treading upon them. The ſea is their place of deſtination, and to that they direct their march with right-lined preciſion. No geometrician could ſend them to their deſtined ſtation by a ſhorter courſe; they neither turn to the right nor left, whatever obſtacles intervene; and even if they meet with a houſe, they will attempt to ſcale the walls to keep the unbroken tenor of their way. But though this be the general order of their route, they, upon other occaſions, are obliged to conform to the face of the country; and if it is interſected with rivers, they are then ſeen to wind along the courſe of the ſtream. The proceſſion ſets forward from the mountains with the regularity of an army under the guidance of an experienced commander. They are commonly divided into three battalions; of which the firſt conſiſts of the ſtrongeſt and boldeſt males, that, like pioneers, march forward to clear the route and face the greateſt dangers. Theſe are often obliged to halt for want of rain, and to go into the moſt convenient encampment till the weather changes. The main body of the army is compoſed of females, which never leave the mountains till the rain is ſet in for ſome time, and then deſcend in regular battalia, being formed into columns of 50 paces broad, and three miles deep, and ſo cloſe that they almoſt cover the ground. Three or four days after this, the rear-guard follows, a ſtraggling undiſciplined tribe, conſiſting of males and females, but neither ſo robuſt nor ſo vigorous as the former. The night is their chief time of proceeding; but if it rains by day, they do not fail to profit by the occaſion; and they continue to move forward in their ſlow uniform manner. When the ſun ſhines and is hot upon the ſurface of the ground, they then make an univerſal halt, and wait till the cool of the evening. When they are terrified, they march back in a confuſed diſorderly manner, holding up their nippers, with which they ſometimes tear off a piece of the ſkin, and then leave the weapon where they inflicted the wound. They even try to intimidate their enemies; for they often clatter their nippers together, as if it were to threaten thoſe that come to diſturb them. But though they thus ſtrive to be formidable to man, they are much more ſo to each other; for they are poſſeſſed of one moſt unſocial property, which is, that if any of them by accident is maimed in ſuch a manner as to be incapable of proceeding, the reſt fall upon and devour it on the ſpot, and then purſue their route.

When, after a fatiguing march, and eſcaping a thouſand dangers (for they are ſometimes three months in getting to the ſhore), they have arrived at their deſtined port, they prepare to caſt their ſpawn. The peas are as yet within their bodies, and not excluded, as is uſual in animals of this kind, under the tail; for the creature waits for the benefit of ſea-water to help the delivery. For this purpoſe the crab has no ſooner reached the ſhore, than it eagerly goes to the edge of the water, and lets the waves waſh over its body two or three times. This ſeems only a preparation for bringing their ſpawn to maturity; for, without farther delay, they withdraw to ſeek a lodging upon land; in the mean time the ſpawn grows larger, is excluded out of the body, and ſticks to the barbs under the flap, or more properly the tail. This bunch is ſeen as big as an hen's egg, and exactly reſembling the roes of herrings. In this ſtate of pregnancy they once more ſeek the ſhore for the laſt time; and ſhaking off their ſpawn into the water, leave accident to bring it to maturity. At this time whole ſhoals of hungry fiſh are at the ſhore in expectation of this annual ſupply; the ſea to a great diſtance ſeems black with them; and about two thirds of the crabs' eggs are immediately devoured by theſe rapacious invaders. The eggs that eſcape are hatched under the ſand; and, ſoon after, millions at a time of the little crabs are ſeen quitting the ſhore, and ſlowly travelling up to the mountains. The old ones, however, are not ſo active to return; they have become ſo feeble and lean, that they can hardly creep along, and the fleſh at that time changes its colour. The moſt of them, therefore, are obliged to continue in the flat parts of the country till they recover, making holes in the earth, which they cover at the mouth with leaves and dirt, ſo that no air may enter. There they throw off their old ſhells, which they leave, as it were, quite whole; the place where they opened on the belly being unſeen. At that time they are quite naked, and almoſt without motion for ſix days together, when they become ſo fat as to be delicious food. They have then under their ſtomachs four large white ſtones, which gradually decreaſe in proportion as the ſhell hardens, and, when they come to perfection, are not to be found. It is at that time that the animal is ſeen ſlowly making its way back; and all this is moſt commonly performed in the ſpace of ſix weeks.

This animal, when poſſeſſed of its retreats in the mountains, is impregnable; for, only ſubſiſting upon vegetables, it ſeldom ventures out; and its habitation being in the moſt inacceſſible places, it remains for a great part of the ſeaſon in perfect ſecurity. It is only when impelled by the deſire of bringing forth its young, and when compelled to deſcend into the flat country, that it is taken. At that time the natives wait for its deſcent in eager expectation, and deſtroy thouſands; but diſregarding their bodies, they only ſeek for that ſmall ſpawn which lies on each ſide of the ſtomach within the ſhell, of about the thickneſs of a man's thumb. They are much more valuable upon their return after they have caſt their ſhell; for, being covered with a ſkin reſembling ſoft parchment, almoſt every part except the ſtomach may be eaten. They are taken in the holes by feeling for them with an inſtrument; they are ſought after by night, when on their journey, by flambeaux. The inſtant the animal perceives itſelf attacked, it throws itſelf on its back, and with its claws pinches moſt terribly whatever it happens to faſten on. But the dexterous crab-catcher takes them by the hinder legs in ſuch a manner that the nippers cannot touch him, and thus he throws them into his bag. Sometimes alſo they are caught when they take refuge in the bottoms of holes in rocks by the ſea-ſide, by clapping a ſtick to the mouth of the hole, which prevents their getting out; and then ſoon after, the tide coming, enters the hole, and the animal is found, upon its retiring, drowned in its retreat.

Theſe crabs are of various ſizes, the largeſt about ſix inches wide; they walk ſide-ways like the ſea-crab, and are ſhaped like them: ſome are black, ſome yellow, ſome red, and others variegated with red, white, and yellow mixed. Some of theſe are poiſonous; and ſeveral people have died of eating of the crabs, particularly of the black kind. The light-coloured are reckoned beſt; and, when full in fleſh, are very well taſted. In ſome of the ſugar iſlands they are eaten without danger; and are no ſmall help to the negro ſlaves, who on many of theſe iſlands would fare very hard without this reſource.

Cancer, in medicine, a roundiſh, unequal, hard, and livid tumour, generally ſeated in the glandular parts of the body;

ſuppoſed to be ſo called, becauſe it has long fibres with turgid veins ſhooting out from it, ſo as to reſemble, as it is thought, the figure of a crab-fiſh; or, others ſay, becauſe, like that fiſh, where it is once fixed, it is ſcarcely poſſible to remove it. See SURGERY.

CANCER, in aſtronomy, one of the twelve ſigns, repreſented on the globe in the form of a crab, and thus marked (♋) in books. It is the fourth conſtellation in the ſtarry zodiac, and that from which one quadrant of the ecliptic takes its denomination. The reaſon generally aſſigned for its name as well as figure, is a ſuppoſed reſemblance which the ſun's motion in this ſign bears to the crab-fiſh. As the latter walks backwards, ſo the former, in this part of his courſe, begins to go backwards, or recede from us; though the diſpoſition of ſtars in this ſign is by others ſuppoſed to have given the firſt hint to the repreſentation of a crab.

Tropic of CANCER, in aſtronomy, a leſſer circle of the ſphere parallel to the equator, and paſſing through the beginning of the ſign Cancer.

CANCHERIZANTE, or CANCHERIZATO, in the Italian muſic, a term ſignifying a piece of muſic that begins at the end, being the retrograde motion from the end of a ſong, &c. to the beginning.

CANCROMA, or BOAT-BILL, in ornithology, a genus of birds belonging to the order of *Grallæ*; the characters of which are: The bill is broad, with a keel along the middle; the noſtrils are ſmall, and lodged in a furrow; the tongue is ſmall; and the toes are divided. See Plate 58.

There are two *ſpecies*; viz. 1. The *Cochlearia*, or Creſted Boat-bill, is of the ſize of a fowl; the length 22 inches. The bill is four inches long, and of a ſingular form, not unlike a boat with the keel uppermoſt, or, as ſome think, like the bowls of two ſpoons, placed with the hollow parts together: the upper mandible has a prominent ridge at the top, and on each ſide of this, a long channel, at the bottom of which the noſtrils are placed; theſe are oval, and ſituated obliquely; the general colour of the bill is duſky, or in ſome ſpecimens dark brown: the ſkin between the under jaw capable of diſtenſion: from the hind head ſprings a long black creſt, the feathers which compoſe it narrow, and end in a point; the middle ones are ſix inches in length, the others leſſen by degrees, the outer ones being not more than one inch: between the bill and the eye the ſkin is bare and duſky; the plumage on the forehead white; the reſt of the bird of a pale blueiſh aſh-colour; acroſs the lower part of the neck behind is a tranſverſe band of browniſh black, which paſſes forwards on each ſide towards the breaſt, ending in a point, but does not encompaſs it: the fore part of the neck, and under parts, are blueiſh white, except the belly and thighs, which are rufous: the feathers which hang over the breaſt are looſe, like thoſe of the heron: the tail is three inches and a half long, and the wings, when cloſed, reach nearly to the end of it; the leg is three inches in length; and the thigh from its inſertion to the knee, four; the middle toe two inches and a half; the bare part above the knee one inch and a half; the colour of the bare parts yellowiſh brown; claws black; the toes are connected at the baſe by a membrane, which, as in the umbre, is deepeſt in the outer one.—It inhabits Cayenne, Guiana, and Braſil, and chiefly frequents ſuch parts as are near the water: in ſuch places it perches on the trees which hang over the ſtreams, and, like the king's-fiſher, drops down on the fiſh which ſwim beneath. It has been thought to live on crabs likewiſe, whence the Linnæan name.

2. The *Cancrophaga*, or Brown Boat-bill, a diſtinct ſpecies, according to Linnæus, but which Mr. Latham conſiders as only a variety, is of the ſize of the former; the head and creſt the ſame; the upper parts, inſtead of an aſh-colour, are of a pale rufous brown; the tail rufous aſh; and the under parts wholly of a cream colour; the bill and legs of a yellow brown. Its place and manners the ſame with thoſe of the preceding.

CANDAHAR, a province of Perſia, bounded on the north by the province of Balk; on the eaſt, by that of Cabul; on the ſouth, by Buchor and Sableſtan; and on the weſt, by Sigeſtan. There have been bloody wars between the Indians and Perſians on account of this province; but in 1650 it fell to the Perſians. The inhabitants are known by the name of *Aghuans*, or *Afghans*, who have often endeavoured to throw off the yoke. But, in 1737, they were ſeverely puniſhed for the attempt.

CANDAHAR, the capital of the above province, is ſeated on a mountain; and, being a place of great trade, has a conſiderable fortreſs. The caravans that travel from Perſia and the parts about the Caſpian Sea to the Eaſt Indies, chooſe to paſs through Candahar, becauſe there is no danger of being robbed on this road, and proviſions are very reaſonable. The religion is Mahometaniſm, but there are many Banians and Guebres. E. long. 67. 5. N. lat. 33. 0.

CANDELARES (from *candela* a candle), the name of an order in the former editions of Linnæus's Fragments of a natural method, conſiſting of theſe three genera, *rhizophora*, *nyſſa*, and *mimuſops*. They are removed, in the later editions, into the order HOLORACEÆ. See BOTANY, Part III.

CANDIA, an iſland in the Mediterranean, formerly Crete, lying to the S. of the Archipelago. The capital is of the ſame name, which, though populous formerly, is now little better than a deſert, there being nothing but rubbiſh, except at the bazar or market place. Neither is the harbour of Candia now fit for anything but boats: however, the walls of the town are ſtanding, and it is the fee of a Greek archbiſhop. This iſland was taken by the Turks in 1669, after a war of 25 years. It was attempted to be retaken by the Venetians in 1692, but without effect. The products are corn, wine, oil, wool, ſilk, and excellent honey. The air is good; and it is chiefly inhabited by Greeks, who bear a good character. Mount Ida, ſo famous in hiſtory, is in the middle of this iſland, and is nothing but a huge, ugly, ſharp-pointed eminence, with not the leaſt ſhadow of a landſcape; no delightful grotto, no bubbling ſpring, no purling rivulet, are to be ſeen there now. Candia is 200 miles in length, and 50 in breadth. It is 500 miles S. W. of Conſtantinople. Long. 25. 23. E. Lat. 35. 10. N.

CANDIAC (John Lewis), a premature genius born at Candiac in the dioceſe of Niſmes in France, in 1719. In the cradle he diſtinguiſhed his letters: at 13 months, he knew them perfectly: at three years of age, he read Latin, either printed or in manuſcript: at four, he tranſlated from that tongue: at ſix, he read Greek and Hebrew; was maſter of the principles of arithmetic, hiſtory, geography, heraldry, and the ſcience of medals; and had read the beſt authors on almoſt every branch of literature. He died of a complication of diſorders, at Paris, in the year 1726.

CANDIDATE, a perſon who aſpires to ſome public office. In the Roman commonwealth, candidates were obliged to wear a white gown during the two years of their ſoliciting a place. This garment, according to Plutarch, they wore without any other clothes, that the people might not ſuſpect they concealed money for purchaſing votes, and alſo that they might more eaſily ſhow to the people the ſcars of thoſe wounds they had received in fighting for the defence of the commonwealth. The candidates uſually declared their pretenſions a year before the time of election, which they ſpent in making intereſt and gaining friends. Various arts of popularity were practiſed for this purpoſe, and frequent circuits made round the city, and viſits and compliments to all ſorts of perſons, the proceſs of which was called *ambitus*. See AMBITUS.

CANDIDATI MILITES, an order of soldiers, among the Romans, who served as the emperor's body-guards to defend him in battle. They were the tallest and strongest of the whole troops, and most proper to inspire terror. They were called *candidati*, because clothed in white, either that they might be more conspicuous, or because they were considered in the way of preferment.

CANDISH, a considerable province in Asia, in the dominions of the Great Mogul, bounded by Chytor and Malva on the north, Orixa on the east, Decan on the south, and Guzarat on the west. It is populous and rich; and abounds in cotton, rice, and indigo. Brampore is the capital town.

CANDLE, a small taper of tallow, wax, or spermaceti; the wick of which is commonly of several threads of cotton, spun and twisted together. A tallow-candle, to be good, must be half sheep's and half bullock's tallow; for hog's tallow makes the candle gutter, and always gives an offensive smell, with a thick black smoke. The wick ought to be pure, sufficiently dry, and properly twisted; otherwise the candle will emit an inconstant vibratory flame, which is both prejudicial to the eyes and insufficient for the distinct illumination of objects.

There are two sorts of tallow candles; the one dipped, the other moulded: the former are the common candles; the others are the invention of the sieur le B-ge of Paris. As to the method of making candles in general:—The tallow must be cut into pieces, that it may melt the sooner and be in no danger of burning or turning black. When perfectly melted and skimmed, it is poured into a tub, through a coarse sieve of horse-hair, after which it is fit to be used. The wicks are made of spun cotton, which the tallow-chandlers buy in skains, and which they wind up into bottoms or clues. Thence they are cut out, with an instrument contrived for expedition, into pieces of the length of the candle required; and put on the sticks or broaches, or else placed in the moulds, as the candles are intended to be either dipped or moulded.

Wax-candles are made of a cotton or flaxen wick, slightly twisted, and covered with white or yellow wax. Of these, there are several kinds: some of a conical figure, used to illuminate churches, and in processions, funeral ceremonies, &c. (see TAPER); others of a cylindrical form, used on ordinary occasions. The wax candles used in drawing-rooms, &c. are cast in moulds like those of tallow, the moulds being previously oiled to prevent their sticking. There are however a sort of wax-candles called *drawn wax*, so called, because they are actually drawn in the manner of wire, by means of two large rollers of wood, turned by a handle. These, turning backwards and forwards several times, pass the wick through melted wax contained in a brass bason, and at the same time through the holes of an instrument like that used for drawing wire, fastened at one side of the bason.

Wax candles have been charged with very considerable duties by different acts of parliament. Tallow candles are also under the excise, more especially mould candles which are very properly deemed a luxury.

The Roman candles were at first little strings dipt in pitch, or surrounded with wax; though afterwards they made them of the papyrus, covered likewise with wax; and sometimes also of rushes, by stripping off the outer rind, and only retaining the pith.—For religious offices, wax candles were had; for vulgar uses, those of tallow. Lord Bacon proposes candles of various compositions and ingredients, as also of different sorts of wicks; with experiments of the degrees of duration, and light of each. Some good housewives bury their candles in flour or bran, which it is said increases their lasting almost half; but why this should happen has not been explained.

The following experiments were made to determine the real and comparative value of burning candles of different sorts and sizes.

	Numb. of candles in 1 lb.	Weight of one candle. Oz. Dr.	The time one candle lasted Hr. Min.	The time that 1 lb. will last. Hr. Min.	The expence in 12 hours when candles are at 6*d.* per dozen, which also shews the proportion of the expence at any price per dozen. Farthings and 100th parts.
Small wick.	$18\frac{1}{5}$	0 14	3 15	59 26	4.85
Large wick.	19	0 $13\frac{1}{2}$	2 40	50 34	5.70
	$16\frac{1}{2}$	0 15^{1}	2 40	44 2	6.54
	12	1 5^{1}	3 27	41 24	6.96
*	$10\frac{3}{4}$	1 8	3 36	38 24	7.50
*	$7\frac{3}{4}$	2 1	4 9	32 12	8.94
*	8	2 0	4 15	34 0	8.47
	$5\frac{3}{4}$	2 13	5 19	30 15	9.53
	Mould-candles.				Mould-candl. at 7*s.* per doz.
	$5\frac{7}{8}$	2 12	7 20	42 39	7.87
	4	4 0	9 3	36 20	9.28

In this statement, it is to be remarked, that the time that one candle lasted was taken from an average of several trials of each size.—It is observable, in optics, that the flame of two candles joined give a much stronger light than both of them separate. This idea was first suggested by Dr. Franklin.

An ingenious way of lighting a candle by a small spark of electricity, invented by Dr. Ingenhousz, is recorded in the Phil. Transf. vol. xviii. It is done by a small phial, having eight or ten inches of metallic coating, or even less, charged with electricity, which may be done at any time of the night by a person who has an electrical machine in his room. "When I have occasion to light a candle (says he), I charge a small coated phial, whose knob is bent outwards, so as to hang a little over the body of the phial; then I wrap some loose cotton over the extremity of a long brass pin or a wire, so as to stick moderately fast to its substance. I next roll this extremity of the pin wrapped up with cotton in some fine powder of resin, which I always keep in readiness upon the table for this purpose, either in a wide-mouthed phial or in a loose paper; this being done, I apply the extremity of the pin or wire to the external coating of the charged phial, and bring as quickly as possible the other extremity wrapped round with cotton to the knob: the powder of resin takes fire, and communicates its flame to the cotton, and both together burn long enough to light a candle. As I do not want more than half a minute to light my candle in this way, I find it a readier method than kindling it by a flint and steel, or calling a servant. I have found, that powder of white or yellow resin lights easier than that of brown. The *farina lycopodii* may be used for the same purpose, but it is not so good as the powder of resin, because it does not take fire quite so readily, requiring a stronger spark not to miss: besides, it is soon burnt away. By dipping the cotton in oil of turpentine, the same effect may be as readily obtained, if you take a jar somewhat greater in size. This oil will inflame so much the readier if you strew a few fine particles of brass upon it. The pin dust is the best for this purpose; but as this oil is scattered about by the explosion, and when kindled fills the room with much more smoke than the powder of resin, I prefer the last."

CANDLE-*Bombs*, a name given to fmall glafs bubbles, having a neck about an inch long, with a very flender bore, by means of which a fmall quantity of water is introduced into them, and the orifice afterwards clofed up. This ftalk being put through the wick of a burning candle, the vicinity of the flame foon rarefies the water into a fteam, by the elafticity of which the glafs is broken with a loud crack.

CANDLE is a term alfo applied to an odoriferous mafs fhaped like a candle, and the ufe of which is to fumigate rooms where there is contagion or any noxious fmell. Thus the *candela fumalis*, or the *candela pro fuffitu odorata*, confifts of aromatic powders, mixed up with a third or more of the charcoal of willow or lime tree, and reduced to a proper confiftence with a mucilage of gum tragacanth, labdanum, or turpentine. It excites a grateful fmell without any flame, and corrects the ftate of the air.

Medicated CANDLE, the fame with BOUGIE.

CANDLE: Sale or auction by inch of candle, is when a fmall piece of candle, being lighted, the byftanders are allowed to bid for the merchandize that is felling; but the moment the candle is out, the commodity is adjudged to the laft bidder.—There is alfo an excommunication by inch of candle; when the finner is allowed to come to repentance while a candle continues burning; but after it is confumed he remains excommunicated to all intents and purpofes.

Rufh-CANDLES, ufed in different parts of England, are made of the pith of a fort of rufhes, peeled or ftripped of the fkin, except on one fide, and dipped in melted tallow.

CANDLE-*Wood*, flips of pine about the thicknefs of a finger, ufed in New England and other colonies to burn inftead of candles, giving a very good light. The French inhabitants of Tortuga ufe flips of yellow fantal-wood for the fame purpofe, and under the fame denomination, which yields a clear flame though of a green colour.

CANDLEBERRY TREE, in botany, the Englifh name of the MYRICA.

CANDLEMAS, a feaft of the church held on the fecond day of February, in honour of the purification of the Virgin Mary. It is borrowed from the practice of the ancient Chriftians, who on that day ufed abundance of lights both in their churches and proceffions, in memory, as is fuppofed, of our Saviour's being on that day declared by Simeon "to be a light to lighten the Gentiles." In imitation of this cuftom, the Roman-catholics on this day confecrate all the tapers and candles which they ufe in their churches during the whole year. At Rome, the Pope performs that ceremony himfelf; and diftributes wax-candles to the cardinals and others, who carry them in proceffion through the great hall of the Pope's palace. This ceremony was prohibited in England by an order of council in the year 1548.

CANDLEMAS (in Scotland) is made one of the four terms of the year for paying or receiving rents or borrowed money, &c. —In the courts of law, Candlemas term begins on the 15th of January, and ends on the 3d of February.

CANDLESTICK, an inftrument to hold a candle, made in different forms, and of all forts of matter. The golden candleftick was one of the facred utenfils made by Mofes to be placed in the Jewifh tabernacle. It was made of hammered gold, a talent in weight. It confifted of feven branches, fupported by a bafe or foot. Thefe branches were adorned at equal diftances with fix flowers like lilies, and with as many bowls and knobs placed alternately. Upon the ftock and fix branches of the candleftick were the golden lamps, which were immoveable, wherein were put oil and cotton. Thefe feven lamps were lighted every evening, and extinguifhed every morning. The lamps had their tongs or fnuffers to draw the cotton in or out, and difhes underneath them to receive the fparks or droppings of the oil. This candleftick was placed in the antichamber of the fanctuary on the fouth fide, and ferved to illuminate the altar of perfume and the tabernacle of the fhew-bread. When Solomon had built the temple of the Lord, he placed in it ten golden candlefticks of the fame form as that defcribed by Mofes, five on the north and five on the fouth fide of the holy place. But after the Babylonifh captivity, the golden candleftick was again placed in the temple, as it had been before in the tabernacle by Mofes. This facred utenfil, upon the deftruction of the temple by the Romans, was lodged in the temple of peace built by Vefpafian; and the reprefentation of it is ftill to be feen on the triumphal arch at the foot of mount Palatine, on which Vefpafian's triumph is delineated.

CANDY, a large kingdom of Afia, in the ifland of Ceylon. It contains about a quarter of the ifland; and as it is encompaffed with high mountains, and covered with thick forefts, through which the roads and paths are narrow and difficult, the king has them guarded to prevent his fubjects from going into other countries. It is full of hills, from whence rivulets proceed which are full of fifh; but as they run among the rocks, they are not fit for boats: however, the inhabitants are very dexterous in turning them to water their land, which is fruitful in rice, pulfe, and hemp. The king is abfolute, and his fubjects are idolaters. The capital town is of the fame name.

CANDY, a town of Afia, and capital of a kingdom of the fame name, in the ifland of Ceylon. It has often been burnt by the Portuguefe, when they were mafters of thefe coafts. The houfes are very poor, low, and badly furnifhed. E. long. 79. 12. N. lat. 7. 35.

CANDY, or *Sugar-Candy*, a preparation of fugar made by melting and cryftallizing it fix or feven times over, to render it hard or tranfparent. It is of three kinds, white, yellow, and red. The white comes from the loaf-fugar, the yellow from the caffonado, and the red from the mufcavado.

CANDYING, the act of preferving vegetable fubftances, by boiling them in fugar. The performance of this originally belonged to the apothecaries, but is now become a part of the bufinefs of the confectioner.

CANE, in botany. See ARUNDO and CALAMUS.

CANE denotes alfo a walking-ftick. It is cuftomary to adorn it with a head of gold, filver, agate, &c. Some are without knots, and very fmooth and even; others are full of knots about two inches diftance from one another: thefe laft have very little elafticity. The canes of Bengal are the moft beautiful of any the Europeans bring into Europe. Some of them are fo fine, that people work them into bowls or veffels, which being varnifhed over in the infide, with black or yellow lacca, will hold liquors as well as glafs or china-ware does; and the Indians ufe them for that purpofe.

CANE is alfo the name of a long meafure, which differs according to the feveral countries where it is ufed. At Naples the cane is equal to 7 feet $3\frac{1}{2}$ inches Englifh meafure: the cane of Tholoufe and the Upper Languedoc is equal to the varre of Arragon, and contains 5 feet $8\frac{1}{2}$ inches; at Montpellier, Provence, Dauphiné, and the Lower Languedoc, to 6 Englifh feet $5\frac{1}{2}$ inches.

CANEA, a confiderable town of the ifland of Candia, with a good harbour. The environs are adorned with forefts of olive-trees, mixed with fields, vineyards, gardens, and brooks, bordered with myrtle-trees and laurel-rofes. It was taken by the Turks in 1645, after a glorious defence of two months, in which the victors loft 20,000 men. Long. 24. 15. E. Lat. 35. 20. N.

CANELLA, in botany; a genus of the monogynia order, belonging to the dodecandria clafs of plants; and in the natural method ranking under the 12th order, *Holoraceæ*. The

Barlow, sculp.

calyx is three-lobed; the petals are five; the antheræ 16, growing to an urceolated or bladder-shaped nectarium; and the fruit is a trilocular berry, with two seeds. There is but one species, the alba; which grows usually about 20 feet high, and eight or ten inches in thickness, in the thick woods of most of the Bahama islands. The leaves are narrow at the stalk, growing wider at their ends, which are broad and rounding, having a middle rib only; they are very smooth, and of a light shining green. In May and June the flowers, which are pentapetalous, come forth in clusters at the ends of the branches: they are red, and very fragrant, and are succeeded by round berries, of the size of large peas, green, and when ripe (which is in February) purple, containing two shining black seeds, flat on one side, otherwise not unlike in shape to a kidney bean: these seeds in the berry are enveloped in a slimy mucilage. The whole plant is very aromatic, the bark particularly, being more used in distilling, and in greater esteem, in the more northern parts of the world than in Britain. See Plate 63.

The bark is the canella alba of the shops. It is brought to us rolled up into long quills, thicker than cinnamon, and both outwardly and inwardly of a whitish colour, lightly inclining to yellow. Infusions of it in water are of a yellowish colour, and smell of the canella; but they are rather bitter than aromatic. Tinctures in rectified spirit have the warmth of the bark, but little of its smell. Proof-spirit dissolves the aromatic as well as the bitter matter of the canella, and is therefore the best menstruum.

The canella is the interior bark freed from an outward thin rough one, and dried in the shade. The shops distinguish two sorts of canella, differing from each other in the length and thickness of the quills: they are both the bark of the same tree; the thicker being taken from the trunk, and the thinner from the branches. This bark is a warm pungent aromatic, though not of the most agreeable kind; nor are any of the preparations of it very grateful.

Canella alba is often employed where a warm stimulant to the stomach is necessary, and as a corrigent of other articles. It is now, however, but little used in composition by the London college; the only officinal formula which it enters being the pulvis aloeticus: but in the Edinburgh Pharmacopœia it is more frequently noticed. It is not only a good and cheap aromatic, but very suitable for covering the taste of some other articles.—This bark has been confounded with that called Winter's bark, which belongs to a very different tree. See Wintera.

CANELLE, or Cane-Land, a large country in the island of Ceylon, called formerly the *kingdom of Cota*. It contains a great number of cantons, the principal of which are occupied by the Dutch.

CANEPHORÆ, in Grecian antiquity, virgins who, when they became marriageable, presented certain baskets full of little curiosities to Diana, in order to get leave to depart out of her train, and change their state of life.

CANEPHORIA, in Grecian antiquity, a ceremony which made part of a feast, celebrated by the Athenian virgins on the eve of their marriage-day. At Athens the canephoria consisted in this: that the maid, conducted by her father and mother, went to the temple of Minerva, carrying with her a basket full of presents to engage the goddess to make the marriage-state happy; or, as the scholiast of Theocritus has it, the basket was intended as a kind of honourable amends made to that goddess, the protectrix of virginity, for abandoning her party; or as a ceremony to appease her wrath. Suidas calls it a festival in honour of Diana.

Canephoria is also the name of a festival in honour of Bacchus, celebrated particularly by the Athenians, on which the young maids carried golden baskets full of fruit, which baskets were covered, to conceal the mystery from the uninitiated.

CANES, in Egypt and other eastern countries, a poor sort of buildings for the reception of strangers and travellers. People are accommodated in these with a room at a small price, but with no other necessaries; so that, excepting the room, there are no greater accommodations in these houses than in the deserts, only that there is a market near.

Canes *Venatici*, in astronomy, the grey-hounds, two new constellations, first established by Hevelius, between the tail of the Great Bear and Bootes's arms, above the Coma Berenices. The first is called *asterion*, being that next the Bear's tail; the other *chara*. They comprehend 23 stars, of which Tycho only observed two. The longitudes and latitudes of each are given by Hevelius. In the British Catalogue they are 25.

CANETO, a strong town of Italy in the duchy of Mantua, seated on the river Oglio, which was several times taken and retaken by the French and Imperialists. E. long. 10. 45. N. lat. 40. 55.

CANGA, in the Chinese affairs, a wooden clog borne on the neck, by way of punishment for certain offences. The canga is composed of two pieces of wood notched, to receive the criminal's neck; the load lies on his shoulders, and is more or less heavy according to the quality of his offence. Some cangas weigh 200lb. the generality from 50 to 60. The Mandarins condemn to the punishment of the canga; and sentence of death is sometimes changed for this kind of punishment.

CANGE (Charles du Fresne sieur du), one of the most learned writers of his time, was born at Amiens in 1601, and studied at the Jesuits college in that city. Afterwards he applied himself to the study of the law at Orleans, and gained great reputation by his works; among which are, 1. The history of the empire of Constantinople under the French emperors. 2. John Cinnamus's six books of the history of the affairs of John and Manuel Comnenus, in Greek and Latin, with historical and philological notes. 3. *Glossarium ad Scriptores mediæ et infimæ Latinitatis.*

CANGI, Ceangi, or *Cangani*, anciently a people of Britain, concerning whose situation antiquaries have been much perplexed. They are all the same people. Cambden discovered some traces of them in many different and distant places, as in Somersetshire, Wales, Derbyshire, and Cheshire; and he might have found as plain vestiges of them in Devonshire, Dorsetshire, Essex, Wiltshire, &c. Horsley and some others are no less perplexed and undetermined in their opinions on this subject. But Mr. Baxter seems to have discovered the true cause of all this perplexity, by observing that the Cangi or Ceangi were not a distinct nation seated in one particular place, but such of the youth of many different nations as were employed in pasturage, in feeding the flocks and herds of their respective tribes. Almost all the ancient nations of Britain had their ceangi, their pastoritia pubes, the keepers of their flocks and herds, who ranged about the country in great numbers, as they were invited by the season and plenty of pasture for their cattle. This is the reason that vestiges of their name are to be found in so many different parts of Britain; but chiefly in those parts which are most fit for pasturage. These ceangi of the different British nations, naturally brave, and rendered still more hardy by their way of life, were constantly armed for the protection of their flocks from wild beasts; and these arms they occasionally employed in the defence of their country and their liberty.

CANGIAGIO, or Cambiasi (Ludovico), one of the most eminent of the Genoese painters, was born in 1527. His works at Genoa are very numerous; and he was employed by the king of Spain to adorn part of the Escurial. It is remarked of him, that he was not only a most expeditious and rapid painter, but also that he worked equally well with both hands; and by

that unuſual power, he executed more deſigns, and finiſhed more grand works with his own pencil, in a much ſhorter time, than moſt other artiſts could do with ſeveral aſſiſtants. He died in the year 1585.

In the late French king's collection at Paris, there is a Sleeping Cupid, as large as life, and likewiſe Judith with her attendant; which are painted by Cangiagio, and are an honour to that maſter. In the Pembroke collection at Wilton alſo is a picture reputed the work of Cangiagio, repreſenting Chriſt bearing his croſs.

CANICULA, is a name proper to one of the ſtars of the conſtellation *canis major*, called alſo ſimply the *dog-ſtar*: by the Greeks σείριος, *ſirius*. Canicula is the tenth in order in the Britannic catalogue; in Tycho's and Ptolemy's it is the ſecond. It is ſituated in the mouth of the conſtellation; and is of the firſt magnitude, being the largeſt and brighteſt of all the ſtars in the heavens.

CANICULUM, or CANICULUS, in the Byzantine antiquities, a golden ſtandiſh or ink-veſſel, decorated with precious ſtones, wherein was kept the ſacred *encauſtum*, or red ink, wherewith the emperors ſigned their decrees, letters, &c. The word is by ſome derived from *canis*, or *caniculus*; alluding to the figure of a dog which it repreſented, or rather becauſe it was ſupported by the figures of dogs. The caniculum was under the care of a particular officer of ſtate.

CANINA, the north part of the ancient Epirus, a province of Greece, which now belongs to the Turks, and lies off the entrance of the gulf of Venice. The principal town is of the ſame name, and is ſeated on the ſea-coaſt, at the foot of the mountains of Chimera. E. long. 19. 25. N. lat. 40. 55.

CANINANA, in zoology, the name of a ſpecies of ſerpent found in America, and eſteemed one of the leſs poiſonous kinds. It grows to about two feet long; and is green on the back, and yellow on the belly. It feeds on eggs and ſmall birds; the natives cut off the head and tail, and eat the body as a delicate diſh.

CANINE, whatever partakes of, or has any relation to the nature of a dog.

CANINE *appetite*, the ſame with BULIMY.

CANINE *madneſs*, or Hydrophobia; ſee MEDICINE.

CANINE *Teeth*, are two ſharp-edged teeth in each jaw; one on each ſide, placed between the inciſores and molares.

CANINI (John Angelo and Marc Anthony), brothers and Romans, celebrated for their love of antiquities. John excelled in deſigns for engraving on ſtones, particularly heads; Marc engraved them. They were encouraged by Colbert to publiſh a ſucceſſion of heads of the heroes and great men of antiquity deſigned from medals, antique ſtones, and other ancient remains; but John died at Rome ſoon after the work was begun: Marc Anthony, however, procuring aſſiſtance, finiſhed and publiſhed it in Italian in 1669. The cuts of this edition were engraved by Canini, Picard, and Valet; and a curious explanation is given, which diſcovers the ſkill of the Caninis in hiſtory and mythology. The French edition of Amſterdam, 1731, is ſpurious.

CANIS, or DOG, in zoology, a genus of quadrupeds, belonging to the order of feræ. The characters of the dog are theſe: He has ſix fore-teeth in the upper jaw, thoſe in the ſides being longer than the intermediate ones, which are lobated; in the under jaw there are likewiſe ſix fore-teeth, thoſe on the ſides being lobated. He has ſix grinders in the upper, and ſeven in the lower jaw. The teeth called *dog-teeth* are four, one on each ſide, both in the lower and upper jaw; they are ſharp-pointed, bent a little inward, and ſtand at a diſtance from any of the reſt. See Plates 64 and 65. There are 14 ſpecies of this genus, viz.

1. The FAMILIARIS, or Domeſtic Dog, is diſtinguiſhed from the other ſpecies by having his tail bent to the left ſide; which mark is ſo ſingular, that perhaps the tail of no other quadruped is bent in this manner. Of this ſpecies there are a great number of varieties. Linnæus enumerates 11, and Buffon gives figures of no leſs than 27. The maſtiff is about the ſize of a wolf, with the ſides of the lips hanging down, and a full robuſt body. The large Daniſh dog differs only from the former in being fuller in the body, and generally of a larger ſize. The grey-hound is likewiſe the ſame with the maſtiff; but its make is more ſlender and delicate. Indeed the difference betwixt theſe three dogs, although perfectly diſtinguiſhable at firſt ſight, is not greater than that betwixt a Dutchman, a Frenchman, and an Italian. The ſhepherd's dog, the wolf-dog, and what is commonly called the *Siberian dog*, to which may be joined the Lapland dog, the Canada dog, and, in general, all thoſe which have ſtraight ears and a pointed ſnout, are all one kind, differing only in thickneſs, the roughneſs or ſmoothneſs of their ſkin, the length of their legs and tails. The hound or beagle, the terrier, the braque or harrier, and the ſpaniel, may be conſidered as the ſame kind: they have the ſame form and the ſame inſtincts; and differ only in the length of their legs and ſizes of their ears, which in each of them are long, ſoft, and pendulous. The bull-dog, the ſmall Daniſh dog, the Turkiſh dog, and the Iceland dog, may likewiſe be conſidered as the ſame kind, all the varieties in their appearance taking their riſe merely from climate. For inſtance, the Turkiſh dog, which has no hair, is nothing elſe but the ſmall Daniſh dog tranſported to a warm climate, which makes the hair fall off. A dog of any kind loſes its hair in very warm climates. But this is not the only change which ariſes from difference of climate. In ſome countries, the voice is changed; in others, dogs become altogether ſilent. In ſome climates they loſe the faculty of barking, and howl like wolves, or yelp like foxes. Warm climates even change their form and inſtincts: they grow ill ſhaped, and their ears become ſtraight and pointed. It is only in temperate climates that dogs preſerve their natural courage, ardour, and ſagacity.

Dr. Caius has left, among ſeveral other tracts relating to natural hiſtory, one written expreſsly on the ſpecies of Britiſh dogs: beſides a deſcription of the variety of dogs then exiſting in this country, he has added a ſyſtematic table of them, which we ſhall here inſert, and explain by a brief account of each kind.

SYNOPSIS of BRITISH DOGS.

I. The moſt generous kinds.	Dogs of chace.	Hounds.	Terrier Harrier Blood-hound
			Gaze-hound Grey-hound Leviner, or Lyemmer Tumbler
	Fowlers.		Spaniel Setter Water-ſpaniel, or finder
	Lap Dogs		Spaniel gentle, or comforter.
II. Farm Dogs.			Shepherd's dog Maſtiff, or ban dog.
III. Mongrels.			Wappe Turnſpit Dancer.

1. α. The firſt variety is the *terrarius* or terrier, which takes its name from its ſubterraneous employ; being a ſmall kind of hound uſed to force the fox or other beaſts of prey out of their holes; and, in former times, rabbits out of their burrows into nets. β. The *leverarius*, or harrier, is a ſpecies well known at preſent: it derives its name from its uſe, that of hunting the hare; but under this head may be placed the fox-hound, which is only a ſtronger and fleeter variety, applied to a different chace. γ. The *ſanguinarius*, blood-hound, or *ſleut hounde* of the Scots, was a dog of great uſe, as already noticed under the article *Blood-Hound*.

The next ſubdiviſion of this ſpecies of dogs comprehends thoſe that hunt by the eye; and whoſe ſucceſs depends either upon the quickneſs of their ſight, their ſwiftneſs, or their ſubtlety. δ. The *agaſæus*, or gaze-hound, was the firſt: it chaſed indifferently the fox, hare, or buck. It would ſelect from the herd the fatteſt and faireſt deer; purſue it by the eye; and if loſt for a time, recover it again by its ſingular diſtinguiſhing faculty; nay, ſhould the beaſt rejoin the herd, this dog would fix unerringly on the ſame. This ſpecies is now loſt, or at leaſt unknown to us. ε. The next kind is the *leporarius*, or grey-hound. Dr. Caius informs us, that it takes its name *quod præcipui gradus ſit inter canes*, "the firſt in rank among dogs:" that it was formerly eſteemed ſo, appears from the foreſt-laws of king Canute, who enacted that no one under the degree of a gentleman ſhould preſume to keep a grey-hound; and ſtill more ſtrongly from an old Welſh ſaying which ſignifies, that "you may know a gentleman by his hawk, his horſe, and his grey-hound."

The variety called the *Highland grey-hound*, and now become very ſcarce, is of very great ſize, ſtrong, deep-cheſted, and covered with long rough hair. This kind was much eſteemed in former days, and uſed in great numbers by the powerful chieftains in their magnificent hunting-matches. It had as ſagacious noſtrils as the blood-hound, and was as fierce. ζ. The third ſpecies is the *levinarius*, or lorarius; the leviner or lyemmer: the firſt name is derived from the lightneſs of the kind; the other from the old word *lyemme*, a thong; this ſpecies being uſed to be led in a thong, and ſlipped at the game. Our author ſays, that this dog was a kind that hunted both by ſcent and ſight; and in the form of its body obſerved a medium between the hound and the grey-hound. This probably is the kind now known among us by the name of the *Iriſh grey-hound*, a dog now extremely ſcarce in that kingdom, the late king of Poland having procured from them as many as poſſible. They were of the kind called by Buffon *le grand Danois*, and probably imported there by the Danes who long poſſeſſed that kingdom. Their uſe ſeems originally to have been for the chace of wolves, with which Ireland ſwarmed till the latter end of the laſt century. As ſoon as theſe animals were extirpated, the numbers of the dogs decreaſed: for, from that period, they were kept only for ſtate. η. The *vertagus*, or tumbler, is a fourth ſpecies; which took its prey by mere ſubtilty, depending neither on the ſagacity of its noſe, nor its ſwiftneſs: if it came into a warren, it neither barked, nor ran on the rabbits; but by a ſeeming neglect of them, or attention to ſomething elſe, deceived the object till it got within reach, ſo as to take it by a ſudden ſpring. This dog was leſs than the hound, more ſcraggy, had prickt-up ears, and, by Dr. Caius's deſcription, ſeems to anſwer to the modern lurcher.

The third ſubdiviſion of the more generous dogs comprehends thoſe which were uſed in fowling. θ. Firſt, the *Hiſpaniolus*, or ſpaniel; from the name it may be ſuppoſed that we were indebted to Spain for this breed. There were two varieties of this kind: the firſt uſed to ſpring the game, which are the ſame with our ſtarters. The other variety was uſed only for the net, and was called *index* or the ſetter; a kind well known at preſent. This kingdom has been long remarkable for producing dogs of this ſort, particular care having been taken to preſerve the breed in the utmoſt purity. They are ſtill diſtinguiſhed by the name of *Engliſh ſpaniels*: ſo that, notwithſtanding the derivation of the name, it is probable they are natives of Great Britain. ι. The *aquaticus*, or finder, was another ſpecies uſed in fowling; and the ſame with our water-ſpaniel: it was uſed to find or recover the game that was ſhot. κ. The *Melitæus*, or *fotor*, the ſpaniel gentle or comforter of Dr. Caius (the modern lap-dog), was the laſt of this diviſion. The Malteſe little dogs were as much eſteemed by the fine ladies of paſt times as thoſe of Bologna are among the moderns. Old Holingſhed is ridiculouſly ſevere on the ladies in his days for their exceſſive paſſion for theſe little animals; which is ſufficient to prove that, in the reign of Queen Elizabeth, it was reckoned a novelty.

2. The ſecond grand diviſion of dogs comprehends the *ruſtici*, or thoſe that were uſed in the country. α. The firſt ſpecies is the *paſtoralis*, or ſhepherd's dog; which is the ſame that is uſed at preſent, either in guarding our flocks, or in driving herds of cattle. This kind is ſo well trained for theſe purpoſes as to attend to every part of the herd, be it ever ſo large, confine them to the road, and force in every ſtraggler, without doing it the leaſt injury. β. The next is the *villaticus*, or *catenarius*; the maſtiff or ban dog; a ſpecies of great ſize and ſtrength, and a very loud barker. Caius tells us that three of theſe were reckoned a match for a bear; and four for a lion: but from an experiment made in the Tower of London, that noble quadruped was found an unequal match for only three. Two of the dogs were diſabled in the combat, but the third forced the lion to ſeek for ſafety by flight. The Engliſh bull-dog ſeems to belong to this ſpecies; and probably is the dog our author mentions under the title of *laniarius*. Great-Britain was ſo noted for its maſtiffs, that the Roman emperors appointed an officer in this iſland under the name of *procurator cynegii*, whoſe ſole buſineſs was to breed, and tranſmit from hence to the amphitheatre, ſuch as would prove equal to the combats of the place. Gratius, Cynegeticon, lin. 175, ſpeaks in high terms of the excellence of the Britiſh dog. Strabo alſo tells us, that the maſtiffs of Britain were trained to war, and were uſed by the Gauls in their battles; and it is certain a well-trained maſtiff might be of uſe in diſtreſſing ſuch half-armed and irregular combatants as the adverſaries of the Gauls ſeem generally to have been before they were conquered by the Romans.

3. The laſt diviſion is that of the *degeneres*, or curs. α. The firſt of theſe was the *wappe*, a name derived from its note: its only uſe was to alarm the family by barking, if any perſon approached the houſe. β. Of this claſs was the *verſator*, or turn-ſpit; and laſtly, the *ſaltator* or dancing-dog; or ſuch as was taught variety of tricks, and carried about by idle people as a ſhew. Theſe *degeneres* were of no certain ſhape, being mongrels or mixtures of all kinds of dogs.

M. de Buffon has given a genealogical table of all the known dogs, in which he makes the *chien de berger*, or ſhepherd's dog, the origin of all, becauſe it is naturally the moſt ſenſible. This table or pedigree is intended not only to exhibit the different kinds of dogs, but to give an idea of their varieties as ariſing from a degeneration in particular climates, and from a commixture of the different races. It is conſtructed in the form of a geographical chart, preſerving as much as poſſible the poſition of the different climates to which each variety naturally belongs. The ſhepherd's dog, as already mentioned, is the root of the tree. This dog, when tranſported into Lapland, or other very cold climates, aſſumes an ugly appearance, and ſhrinks into a ſmaller ſize: but in Ruſſia, Iceland, and Siberia, where the climate is leſs rigorous, and the people a

little more advanced in civilization, he seems to be better accomplished. These changes are occasioned solely by the influence of those climates, which produce no great alteration in the figure of this dog; for in each of these climates, his ears are erect, his hair thick and long, his aspect wild, and he barks less frequently, and in a different manner, than in more favourable climates, where he acquires a finer polish. The Iceland dog is the only one that has not his ears entirely erect; for their extremities are a little inclined; and Iceland, of all the northern regions, has been longest inhabited by half-civilized men.

The same shepherd's dog, when brought into temperate climates, and among a people perfectly civilized, as Britain, France, Germany, would, by the mere influence of the climate, lose his savage aspect, his erect ears, his rude, thick, long hair, and assume the figure of a bull dog, the hound, and the Irish grey-hound. The bull dog and Irish grey-hound have their ears still partly erect, and very much resemble, both in their manners and sanguinary temper, the dog from which they derive their origin. The hound is farthest removed from the shepherd's dog; for his ears are long and entirely pendulous. The gentleness, docility, and even the timidity of the hound, are proofs of his great degeneration, or rather of the great perfection he has acquired by the long and careful education bestowed on him by man.

The hound, the harrier, and the terrier, constitute but one race; for it has been remarked, that in the same litter, hounds, harriers, and terriers, have been brought forth, though the female hound had been covered by only one of these three dogs. The common harrier may connect with the Dalmatian dog, or harrier of Bengal, because they differ only in having more or fewer spots on their coat. We may also link the turn-spit, or terrier with crooked legs, with the common terrier; because the defect in the legs of the former has originally proceeded from a disease similar to the rickets, with which some individuals had been affected, and transmitted the deformity to their descendants.

The hound, when transported into Spain and Barbary, where all animals have fine, long, bushy hair, would be converted into the spaniel and water-dog. The great and small spaniel, which differ only in size, when brought into Britain, have changed their white colour into black, and become, by the influence of climate, the great and little king Charles's dog. To these may be joined the pyrame, which is only a king Charles's dog, black like the others, but marked with red on the four legs, and a spot of the same colour above each eye, and on the muzzle.

The Irish grey-hound, transported to the north, is become the great Danish dog; and, when carried to the south, was converted into the common grey-hound. The largest grey-hounds come from the Levant, those of a smaller size from Italy; and those Italian grey-hounds, carried into Britain, have been still farther diminished.—The great Danish dog, transported into Ireland, the Ukraine, Tartary, Epirus, and Albania, has been changed into the Irish grey-hound, which is the largest of all dogs.—The bull dog, transported from Britain to Denmark, is become the little Danish dog; and the latter, brought into warm climates, has been converted into the Turkish dog. All these races, with their varieties, have been produced by the influence of climate, joined to the effects of shelter, food, and education. The other dogs are not pure races, but have proceeded from commixtures of those already described. Some naturalists have marked, in a table, the double origin of these mongrels.—The grey-hound and Irish grey-hound have produced the mongrel grey-hound, called also the grey-hound with wolf's hair. The muzzle of this mongrel is less pointed than that of the true grey-hound, which is very rare in France.—The great Danish dog and the large spaniel have produced the Calabrian dog, which is a beautiful animal, with long bushy hair, and larger than the Irish grey-hound.—The spaniel and terrier have produced the dog called *burgos*.—From the spaniel and little Danish dog has proceeded the lion dog, which is now very rare.

The dogs with long, fine, crisped hair, called the *bouffe-dogs*, and which are larger than the water-dog, proceed from the spaniel and water-dog.—The little water-dog comes from the water-dog and small spaniel.—From the bull-dog and Irish grey-hound proceeds a mongrel called the *mastiff*, which is larger than the bull-dog, and resembles the latter more than the Irish grey-hound.—The pug-dog proceeds from the bull-dog and small Danish dog.

All these dogs are simple mongrels, and are produced by the commixture of two pure races. But there are other dogs, called *double mongrels*, because they proceed from the junction of a pure race with a mongrel. The bastard pug-dog is a double mongrel from a mixture of the pug-dog with the little Danish dog. The Alicant dog is also a double mongrel, proceeding from the pug-dog and small spaniel. The Maltese, or lap-dog, is a double mongrel, produced between the small spaniel and little water-dog.

Lastly, there are dogs which may be called *triple mongrels*, because they are produced by two mixed races. Of this kind are the Artois and Illois dogs, which are produced by the pug-dog and the bastard pug-dog; to which may be added the dogs called *street-dogs*, which resemble no particular kind, because they proceed from races which have previously been several times mixed.

Such of our readers as wish to direct their inquiries still farther will find a systematic catalogue of all the known dogs, arranged by Mr. Pennant in his History of Quadrupeds. Having thus traced the varieties of the Dog, and noticed the peculiarities of each, we shall now give its general natural history.

From the structure of the teeth, it might be concluded *à priori* that the dog is a carnivorous animal. He does not, however, eat indiscriminately every kind of animal substance. There are some birds, as the columbus arcticus, which the water-dog will lay hold of with keenness, but will not bring out of the water, because its smell is exceedingly offensive to him. He will not eat the bones of a goose, crow, or hawk; but he devours even the putrid flesh of most other animals. He is possessed of such strong digestive powers, as to draw nourishment from the hardest bones. When flesh cannot be procured, he will eat fish, fruits, succulent herbs, and bread of all kinds. When oppressed with sickness, to which he is very subject, especially in the beginning of summer, and before ill weather, in order to procure a puke, he eats the leaves of the quicken-grass, the bearded wheat-grass, or the rough cock's foot grass, which gives him immediate relief. When he steals a piece of flesh, as conscious of the immorality of the action, he runs off with his tail hanging and bent in betwixt his legs. His drink is water, which he takes in small quantities at a time, by licking with his tongue. He is in some measure obliged to lick in this manner, otherwise his nose would be immersed in the water. His excrements are generally hard scybals, which, especially after eating bones, are white, and once went by the absurd name of *album græcum*. This album græcum was for a long time in great repute as a drug; but it is now entirely disregarded. He does not throw out his excrements promiscuously upon every thing that happens to be in the way, but upon stones, trunks of trees, or barren places. This is a wise institution of nature; for the excrements of a dog destroy almost every vegetable or animal substance. They are of such an acrid nature, that if a man's shoe touches them when re-

cently expelled, that particular part will rot in a few days. He obſerves the ſame method in making his urine, which he throws out ſideways. It is remarkable, that a dog will not paſs a ſtone or a wall againſt which any other dog has piſſed, without following his example, although a hundred ſhould occur in a few minutes, in ſo much that it is aſtoniſhing how ſuch a quantity can be ſecreted ſo expeditiouſly.

The dog is an animal not only of quick motion, but remarkable for travelling very long journeys. He can eaſily keep up with his maſter, either on foot or horſeback, for a whole day. When fatigued, he does not ſweat, but lolls out his tongue. Every kind of dog can ſwim; but the water-dog excels in that reſpect.

The dog runs round when he is about to lie down, in order to diſcover the moſt proper ſituation. He lies generally on his breaſt, with his head turned to one ſide, and ſometimes with his head above his two fore feet. He ſleeps little, and even that does not ſeem to be very quiet; for he often ſtarts, and ſeems to hear with more acuteneſs in ſleep than when awake. Dogs have a tremulous motion in ſleep, frequently move their legs, and bark, which is an indication of dreaming. They are poſſeſſed of the ſenſe of ſmelling in a very high degree. They can trace their maſter by the ſmell of his feet in a church, or in the ſtreets of a populous city; but this ſenſation is not equally ſtrong in every kind. The hound can trace game, or his maſter's ſteps, 24 hours afterwards. He barks more furiouſly the nearer he approaches the fowls, unleſs he be beaten and trained to ſilence. The dog eats enviouſly, with oblique eyes; is an enemy to beggars; bites at a ſtone flung at him; is fond of licking wounds; howls at certain notes in muſic, and often urines on hearing them.

With regard to the propagation of dogs, the females admit the males before they are 12 months old. They remain in ſeaſon 10, 12, or even 15 days, during which time they will admit a variety of males. They come in ſeaſon generally twice in the year, and more frequently in the cold than in the hot months. The male diſcovers the condition of the female by the ſmell; but ſhe ſeldom admits him the firſt ſix or ſeven days. One coitus will make her conceive a great number of young; but, when not reſtrained, ſhe will admit ſeveral dogs every day; ſhe ſeems to have no choice or predilection, except in favour of large dogs: from this circumſtance it ſometimes happens, that a ſmall female, who has admitted a maſtiff, periſhes in bringing forth her young. During the time of copulation, theſe animals cannot ſeparate themſelves, but remain united ſo long as the erection ſubſiſts. This is owing to the ſtructure of the parts. The dog has not only a bone in his penis, but in the middle of the corpus cavernoſum there is a large hollow, which is diſtended in the time of erection to a conſiderable bulk. The female, on the other hand, has a larger clitoris than perhaps any other animal: beſides, a large firm protuberance riſes in the time of copulation, and remains perhaps longer than that of the male, and prevents him from retiring till it ſubſides: accordingly, after the act of copulation is over, the male turns about in order to reſt himſelf on his legs, and remains in that poſition till the parts turn flaccid. The female goes with young about nine weeks. They generally bring forth from ſix to twelve puppies. Thoſe of a ſmall ſize bring forth five, four, and ſometimes but two. They continue to copulate and bring forth during life, which laſts generally about 14 or 15 years. The whelps are commonly blind, and cannot open their eyes till the 10th or 12th day: the males are like the dog, the females like the bitch. In the fourth month they loſe ſome of their teeth, which are ſoon ſucceeded by others.

The dog has ſo ſtrong a reſemblance to the wolf and the fox, that he is commonly ſuppoſed to be the production of one or other of thoſe animals tamed and civilized. Buffon informs us, that he kept a young dog and a young wolf together till they were three years of age, without their diſcovering the leaſt inclination to copulate. He made the ſame experiment upon a dog and a fox; but their antipathy was rather increaſed when the female was in ſeaſon. From theſe experiments he concludes, that dogs, wolves, and foxes, are perfectly diſtinct genera of animals. There have, however, lately been two inſtances to the contrary; one in conſequence of an experiment made by the late Mr. Hunter, and the other by a keeper of wild animals in Holborn, who turned a wolf to a Pomeranian bitch in heat. The congreſs was immediate, and as uſual between dog and bitch; and ſhe produced ten puppies. Mr. Pennant ſaw one of them at Gordon Caſtle, that had very much the reſemblance of a wolf, and alſo much of its nature; being ſlipped at a weak deer, it inſtantly caught at the animal's throat, and killed it. He could not learn, he ſays, whether this mongrel continued its ſpecies; but another of the ſame kind did, and ſtocked the neighbourhood of Fochabers, in the county of Moray, where it was kept, with a multitude of curs of a moſt wolfiſh aſpect.

With regard to the natural diſpoſition of the dog; in a ſavage ſtate, he is fierce, cruel, and voracious; but, when civilized and accuſtomed to live with men, he is poſſeſſed of every amiable quality. He ſeems to have no other deſire than to pleaſe and protect his maſter. He is gentle, obedient, ſubmiſſive, and faithful. Theſe diſpoſitions, joined to his almoſt unbounded ſagacity, juſtly claim the eſteem of mankind. Accordingly no animal is ſo much careſſed or reſpected: he is ſo ductile, and ſo much formed to pleaſe, that he aſſumes the very temper of the family in which he lives.

An animal endowed with ſuch uncommon qualities muſt anſwer many uſeful purpoſes. His fidelity and vigilance are daily employed to protect our perſons, our flocks, or our goods. The acuteneſs of his ſmell gains him employment in hunting: he is frequently employed as a turnſpit: at Bruſſels, and in Holland, he is trained to draw little carts to the herb-market; and in the northern regions draws a ſledge with his maſter in it, or loaden with proviſions. The Kamtſchatkans, Eſquimaux, and Greenlanders, ſtrangers to the ſofter virtues, treat theſe poor animals with great neglect. The former, during ſummer, the ſeaſon in which they are uſeleſs, turn them looſe to provide for themſelves; and recall them in October into their uſual confinement and labour. From that time till ſpring they are fed with fiſh-bones and *opana*, i. e. putrid fiſh preſerved in pits, and ſerved up to them mixed with hot water. Thoſe uſed for draught are caſtrated; and four, yoked to the carriage, will draw five poods, or an hundred and ninety Engliſh pounds, beſides the driver; and thus loaden, will travel 30 verſts, or 20 miles a-day; or if unloaden, on hardened ſnow, on ſliders of bone, a hundred and fifty verſts, or a hundred Engliſh miles.

It is pretty certain, Mr. Pennant obſerves, that the Kamtſchatkan dogs are of wolfiſh deſcent; for wolves abound in that country, in all parts of Siberia, and even under the arctic circle. If their maſter is flung out of his ſledge, they want the affectionate fidelity of the European kind, and leave him to follow, never ſtopping till the ſledge is overturned, or elſe ſtopped by ſome impediment. The great traveller of the 13th century, Marco Polo, had knowledge of this ſpecies of conveyance from the merchants who went far north to traffic for the precious furs. He deſcribes the ſledges; adds, that they were drawn by ſix great dogs; and that they changed them and the ſledges on the road, as we do at preſent in going poſt. The Kamtſchatkans make uſe of the ſkins of dogs for clothing, and the long hair for ornament: ſome nations are fond of them as a food; and reckon a fat dog a great delicacy. Both the

Afiatic and American favages ufe thefe animals in facrifices to their gods, to befpeak favour, or avert evil. When the Koreki dread any infection, they kill a dog, wind the inteftines round two poles, and pafs between them.

The Greenlanders are not better mafters. They leave their dogs to feed on mufcles or berries; unlefs in a great capture of feals, when they treat them with the blood and garbage. Thefe people alfo fometimes eat their dogs; ufe the fkins for coverlets, for clothing, or to border and feam their habits; and their beft thread is made of the guts. Thefe northern dogs in general are large; and in the frigid parts at leaft have the appearance of wolves; are ufually white, with a black face; fometimes varied with black and white, fometimes all white; rarely brown or all black; have fharp nofes, thick hair, and fhort ears; and feldom bark, but fet up a fort of growl or favage howl. They fleep abroad; and make a lodging in the fnow, lying with only their nofes out. They fwim moft excellently; and will hunt in packs the ptarmigan, arctic fox, polar bear, and feals lying on the ice. The natives fometimes ufe them in the chafe of the bear. They are exceffively fierce; and, like wolves, inftantly fly on the few domeftic animals introduced into Greenland. They will fight among themfelves even to death. Canine madnefs is unknown in Greenland. Supplying to the natives the place of horfes, the Greenlanders faften to their fledges from four to ten; and thus make their vifits in favage ftate, or bring home the animals they have killed. Egede fays that they will travel over the ice 15 German miles in a day, or 60 Englifh, with fledges loaden with their mafters and five or fix large feals.

Thofe of the neighbouring ifland of Iceland have a great refemblance to them. As to thofe of Newfoundland, it is not certain that there is any diftinct breed: moft of them are curs, with a crofs of the maftiff: fome will, and others will not take the water, abfolutely refufing to go in. The country was found uninhabited, which makes it more probable that they were introduced by the Europeans; who ufe them, as the factory does in Hudfon's bay, to draw firing from the woods to the forts. The favages who trade to Hudfon's bay make ufe of the wolfifh kind to draw their furs.

It is fingular, that the race of European dogs fhow as ftrong an antipathy to this American fpecies as they do to the wolf itfelf. They never meet with them, but they fhow all poffible figns of diflike, and will fall on and worry them; while the wolfifh breed, with every mark of timidity, puts its tail between its legs, and runs from the rage of the others. This averfion to the wolf is natural to all genuine dogs; for it is well known that a whelp, which has never feen a wolf, will at firft fight tremble, and run to its mafter for protection: an old dog will inftantly attack it. Yet thefe animals may be made to breed with one another, as has been already fhewn. The dog is liable to many difeafes, as the fcab, the hydrophobia, &c. and he is alfo very fubject to the tænia or tape-worm, efpecially if he drinks dirty water.

II. The fecond fpecies of this genus is the Lupus, or Wolf. See Pl. 66. He has a long head, pointed nofe, ears erect and fharp, long legs well clothed with hair; tail bufhy and bending down, with the tip black; head and neck afh-coloured; body generally pale brown tinged with yellow: fometimes found white, and fometimes entirely black. The wolf is larger and fiercer than a dog. His eyes fparkle, and there is a great degree of fury and wildnefs in his looks. He draws up his claws when he walks, to prevent his tread from being heard. His neck is fhort, but admits of very quick motion to either fide. His teeth are large and fharp; and his bite is terrible, as his ftrength is great. The wolf, cruel, but cowardly and fufpicious, flies from man; and feldom ventures out of the woods, except preffed by hunger: but when this becomes extreme, he braves danger, and will attack men, horfes, dogs, and cattle of all kinds; even the graves of the dead are not proof againft his rapacity.

Unlike the dog, he is an enemy to all fociety, and keeps no company even with thofe of his own fpecies. When feveral wolves appear together, it is not a fociety of peace, but of war; it is attended with tumult and dreadful prowlings, and indicates an attack upon fome large animal, as a ftag, an ox, or a formidable maftiff. This military expedition is no fooner finifhed than they feparate, and each returns in filence to his folitude. There is even little intercourfe between the males and females: they feel the mutual attractions of love but once a year, and never remain long together. The females come in feafon in winter: many males follow the fame female; and this affociation is more bloody than the former; for they growl, chafe, fight, and tear one another, and often facrifice him that is preferred by the female. The female commonly flies a long time, fatigues her admirers, and retires, while they fleep, with the moft alert or moft favourite male.

The feafon of love continues only twelve or fifteen days; it commences with the oldeft females; the young ones are not fo early difpofed. The males have no marked period, but are equally ready at all times. They go from female to female, according as they are in a condition to receive them. They begin with the old females about the end of December, and finifh with the young ones in the month of February, or beginning of March. The time of geftation is about three months and a half; and young whelps are found from the end of April to the month of July. The wolves copulate like the dogs, and have an offeous penis, furrounded with a ring, which fwells, and hinders them from feparating. When the females are about to bring forth, they fearch for a concealed place in the inmoft receffes of the foreft. After fixing on the fpot, they make it fmooth and plain for a confiderable fpace, by cutting and tearing up with their teeth all the brambles and brufh-wood. They then bring great quantities of mofs, and prepare a commodious bed for their young, which are generally five or fix, though fometimes they bring forth feven, eight, and even nine, but never lefs than three. They come into the world blind, like the dogs; the mother fuckles them fome weeks, and foon learns them to eat flefh, which fhe prepares for them by tearing it into fmall pieces. Some time after fhe brings them field-mice, young hares, partridges, and living fowls. The young wolves begin by playing with thefe animals, and at laft worry them; then the mother pulls off the feathers, tears them in pieces, and gives a part to each of her young. They never leave their den till the end of fix weeks or two months. They then follow their mother, who leads them to drink in the hollow trunk of a tree, or in fome neighbouring pool. She conducts them back to the den, or, when any danger is apprehended, obliges them to conceal themfelves elfewhere. Though, like other females, the fhe-wolf is naturally more timid than the male; yet when her young are attacked, fhe defends them with intrepidity; fhe lofes all fenfe of danger, and becomes perfectly furious. She never leaves them till their education is finifhed, till they are fo ftrong as to need no affiftance or protection, and have acquired talents fit for rapine, which generally happens in ten or twelve months after their firft teeth (which commonly fall out in the firft month) are replaced.

Wolves acquire their full growth at the end of two or three years, and live 15 or 20 years. When old, they turn whitifh, and their teeth are much worn. When full, or fatigued, they fleep, but more during the day than the night, and it is always a kind of flight flumber. They drink often; and in the time of drought, when there is no water in the hollows, or in the trunks of old trees, they repair, feveral times in a day, to the

brooks or rivulets. Though extremely voracious, if ſupplied with water, they can paſs four or five days without meat.

The wolf has great ſtrength, more eſpecially in the anterior parts of the body, in the muſcles of the neck and jaws. He carries a ſheep in his mouth, and, at the ſame time, outruns the ſhepherd; ſo that he can only be ſtopped or deprived of his prey by dogs. His bite is cruel, and always more obſtinate in proportion to the ſmallneſs of the reſiſtance; for when an animal can defend itſelf, he is cautious and circumſpect. He never fights but from neceſſity, and not from motives of courage. When wounded with a ball, he cries; and yet, when diſpatching him with bludgeons, he complains not. When he falls into a ſnare, he is ſo overcome with terror, that he may be either killed or taken alive without reſiſtance: he allows himſelf to be chained, muzzled, and led where you pleaſe, without exhibiting the leaſt ſymptom of reſentment or diſcontent.

The ſenſes of the wolf are very acute, but particularly his ſenſe of ſmelling, which often extends farther than his eye. He likewiſe ſcents living animals very far, and hunts them a long time by this property. Though he prefers living to dead animals; yet he devours the moſt putrid carcaſes. He is fond of human fleſh; and, if ſtronger, he would perhaps eat no other. Wolves have been known to follow armies, to come in troops to the field of battle, where bodies are careleſsly interred, to tear them up, and to devour them with inſatiable avidity: and, when once accuſtomed to human fleſh, theſe animals ever after attack men, prefer the ſhepherd to the flock, devour women, and carry off children. Wolves of this vicious diſpoſition are called *loups garoux* by the French peaſants, who ſuppoſe them to be poſſeſſed with ſome evil ſpirits; and of this nature were the *were wulfs* of the old Saxons.

The wolf inhabits the continents of Europe, Aſia, Africa, and America; Kamtſchatka, and even as high as the arctic circle. The wolves of North America are the ſmalleſt; and, when reclaimed, are the dogs of the natives: the wolves of Senegal are largeſt and fierceſt; they prey in company with the lion. Thoſe of the Cape are grey ſtriped with black; others are black. They are found in Africa as low as the Cape; and are believed to inhabit New Holland, animals reſembling them having been ſeen there by the late circumnavigators. Dampier's people alſo ſaw ſome half-ſtarved animals in the ſame country, which they ſuppoſed to be wolves. In the eaſt, and particularly in Perſia, wolves are exhibited as ſpectacles to the people. When young, they are learned to dance, or rather to perform a kind of wreſtling with a number of men. Chardin tells us, that a wolf, well educated in dancing, is ſold at 500 French crowns. This fact proves, that theſe animals, by time and reſtraint, are ſuſceptible of ſome kind of education. M. Buffon brought up ſeveral of them: "When young, or during their firſt year (he informs us), they are very docile, and even careſſing; and, if well fed, neither diſturb the poultry nor any other animal: but, at the age of 18 months or two years, their natural ferocity appears, and they muſt be chained, to prevent them from running off and doing miſchief. I brought up one till the age of 18 or 19 months, in a court along with fowls, none of which he ever attacked; but, for his firſt eſſay, he killed the whole in one night, without eating any of them. Another, having broken his chain, ran off, after killing a dog with whom he had lived in great familiarity."

Whole countries are ſometimes obliged to arm, in order to deſtroy the wolves. Princes have particular equipages for this ſpecies of hunting, which is both uſeful and neceſſary. Hunters diſtinguiſh wolves into *young, old,* and *very old*. They know them by the tracks of their feet. The older the wolf, his feet are the larger. The ſhe-wolf's feet are longer and more ſlender; her heel is alſo ſmaller, and her toes thinner. A good blood-hound is neceſſary for hunting the wolf: and, when he falls into the ſcent, he muſt be coaxed and encouraged; for all dogs have an averſion from the wolf, and proceed with coldneſs in the chace. When the wolf is raiſed, the grey-hounds are let looſe in pairs, and one is kept for diſlodging him, if he gets under cover; the other dogs are led before as a reſerve. The firſt pair are let looſe after the wolf, and are ſupported by a man on horſeback; then the ſecond pair are let looſe at the diſtance of ſeven or eight hundred paces; and, laſtly, the third pair; when the other dogs begin to join and to teaſe the wolf. The whole together ſoon reduce him to the laſt extremity; and the hunters complete the buſineſs by ſtabbing him with daggers. The dogs have ſuch a reluctance to the wolf's fleſh, that it muſt be prepared and ſeaſoned before they will eat it. The wolf may alſo be hunted with beagles or hounds; but as he darts always ſtraight forward, and runs for a whole day without ſtopping, the chace is irkſome, unleſs the beagles be ſupported with grey-hounds, to teaſe him, and give the hounds time to come up.

Wolves are now ſo rare in the populated parts of America, that the inhabitants leave their ſheep the whole night unguarded: yet the governments of Pennſylvania and New Jerſey did ſome years ago allow a reward of twenty ſhillings, and the laſt even thirty ſhillings, for the killing of every wolf. Tradition informed them what a ſcourge thoſe animals had been to the colonies; ſo they wiſely determined to prevent the like evil. In their infant ſtate, wolves came down in multitudes from the mountains, often attracted by the ſmell of the corpſes of hundreds of Indians who died of the ſmall-pox, brought among them by the Europeans: but the animals did not confine their inſults to the dead, but even devoured in their huts the ſick and dying ſavages.

Beſides being hunted, wolves are deſtroyed by pitfalls, traps, or poiſon. A peaſant in France who kills a wolf, carries its head from village to village, and collects ſome ſmall reward from the inhabitants: the Kirghis-Coſſacks take the wolves by the help of a large hawk called *berkut,* which is trained for the diverſion, and will faſten on them and tear out their eyes. Britain, a few centuries ago, was much infeſted by them. It was, as appears by Hollingſhed, very noxious to the flocks in Scotland in 1577; nor was it entirely extirpated till about 1680, when the laſt wolf fell by the hand of the famous Sir Ewen Cameron. We may therefore with confidence aſſert the non-exiſtence of theſe animals, notwithſtanding M. de Buffon maintains that the Engliſh declare to the contrary. It has been a received opinion, that the other parts of theſe kingdoms were in early times delivered from this peſt by the care of king Edgar. In England he attempted to effect it, by commuting the puniſhments of certain crimes into the acceptance of a certain number of wolves tongues from each criminal; and in Wales, by converting the tax of gold and ſilver into an annual tax of 300 wolves heads. But, notwithſtanding theſe endeavours, and the aſſertions of ſome authors, his ſcheme proved abortive. We find, that ſome centuries after the reign of that Saxon monarch, theſe animals were again increaſed to ſuch a degree as to be deemed the object of royal attention: accordingly Edward I. iſſued out his royal mandate to Peter Corbet to ſuperintend and aſſiſt in the deſtruction of them in the ſeveral counties of Glouceſter, Worceſter, Hereford, Salop, and Stafford; and in the adjacent county of Derby (as Cambden, p. 902, informs us) certain perſons at Wormhill held their lands by the duty of hunting and taking the wolves that infeſted the country, whence they were ſtyled *woolve-hunt*. To look back into the Saxon times, we find, that in Athelſtan's reign, wolves abounded ſo in Yorkſhire, that a retreat was built at Flixton in that county, "to defend paſſengers from the

wolves, that they ſhould not be devoured by them:" and ſuch ravages did theſe animals make during winter, particularly in January, when the cold was ſevereſt, that the Saxons diſtinguiſhed that month by the name of the *wolf-month*. They alſo called an out-law *wolf's head*, as being out of the protection of the law, proſcribed, and as liable to be killed as that deſtructive beaſt. Ireland was infeſted by wolves for many centuries after their extinction in England; for there are accounts of ſome being found there as late as the year 1710, the laſt preſentment for killing of wolves being made in the county of Cork about that time.

In many parts of Sweden the number of wolves has been conſiderably diminiſhed by placing poiſoned carcaſes in their way: but in other places they are found in great multitudes. Hunger ſometimes compels them to eat lichens: theſe vegetables were found in the body of one killed by a ſoldier; but it was ſo weak, that it could ſcarcely move. It probably had fed on the lichen vulpinus, which is a known poiſon to theſe animals. Madneſs, in certain years, is apt to ſeize the wolf. The conſequences are often very melancholy. Mad wolves will bite hogs and dogs, and the laſt again the human ſpecies. In a ſingle pariſh 14 perſons were victims to this dreadful malady. The ſymptoms are the ſame with thoſe attendant on the bite of a mad dog. Fury ſparkles in their eyes; a glutinous ſaliva diſtils from their mouths; they carry their tails low, and bite indifferently men and beaſts. It is remarkable that this diſeaſe happens in the depth of winter, ſo can never be attributed to the rage of the dog-days. Often, towards ſpring, wolves get upon the ice of the ſea, to prey on the young ſeals, which they catch aſleep: but this repaſt often proves fatal to them; for the ice, detached from the ſhore, carries them to a great diſtance from land, before they are ſenſible of it. In ſome years a large diſtrict is by this means delivered from theſe pernicious beaſts; which are heard howling in a moſt dreadful manner, far in the ſea. When wolves come to make their attack on cattle, they never fail attempting to frighten away the men by their cries; but the ſound of the horn makes them fly like lightning.

There is nothing valuable in the wolf but his ſkin, which makes a warm durable fur. His fleſh is ſo bad, that it is rejected with abhorrence by all other quadrupeds; and no animal but a wolf will voluntarily eat a wolf. The ſmell of his breath is exceedingly offenſive. As, to appeaſe hunger, he ſwallows indiſcriminately every thing he can find, corrupted fleſh, bones, hair, ſkins half tanned and covered with lime, he vomits frequently, and empties himſelf oftener than he fills. In fine, the wolf is conſummately diſagreeable; his aſpect is baſe and ſavage, his voice dreadful, his odour inſupportable, his diſpoſition perverſe, his manners ferocious; odious and deſtructive when living, and, when dead, he is perfectly uſeleſs.

III. The Hyæna has a ſtraight jointed tail, with the hair of its neck erect, ſmall naked ears, and four toes on each foot. See Pl. 66. It inhabits Aſiatic Turkey, Syria, Perſia, and Barbary. Like the jackal, it violates the repoſitories of the dead, and greedily devours the putrid contents of the grave; like it, preys on the herds and flocks; yet, for want of other food, will eat the roots of plants, and the tender ſhoots of the palms: but, contrary to the nature of the former, it is an unſociable animal; is ſolitary, and inhabits the chaſms of the rocks. The ſuperſtitious Arabs, when they kill one, carefully bury the head, leſt it ſhould be employed for magical purpoſes; as the neck was of old by the Theſſalian ſorcereſs: "*Viſcera non lyncis, non diræ nodus hyænæ defuit.*" The ancients were wild in their opinion of the hyæna; they believed that its neck conſiſted of one bone without any joint; that it changed its ſex; imitated the human voice; had the power of charming the ſhepherds, and, as it were, riveting them to the place they ſtood on—no wonder that an ignorant Arab ſhould attribute preternatural powers to its remains. They are cruel, fierce, and untameable animals, of a moſt malevolent aſpect; have a ſort of obſtinate courage, which will make them face ſtronger quadrupeds than themſelves. Kempfer relates, that he ſaw one which had put two lions to flight, regarding them with the utmoſt coolneſs. Their voice is hoarſe, a diſagreeable mixture of growling and roaring.

Mr. Pennant deſcribes a variety of this ſpecies, undiſtinguiſhed by former naturaliſts, which he calls the *ſpotted hyæna*. See the plate. It has a large and flat head; ſome long hairs above each eye; very long whiſkers on each ſide of the noſe; a ſhort black mane; hair on the body ſhort and ſmooth; ears ſhort and a little pointed, their outſide black, inſide cinereous; face and upper part of the head black; body and limbs reddiſh brown, marked with diſtinct black round ſpots; the hind legs with black tranſverſe bars; the tail ſhort, black, and full of hair. It inhabits Guinea, Ethiopia, and the Cape: lives in holes in the earth, or cliffs of the rocks; preys by night; howls horribly; breaks into the folds, and kills two or three ſheep; devours as much as he can, and carries away one for a future repaſt; will attack mankind, ſcrape open graves, and devour the dead. Boſman has given this creature the name of *jackal*; by which Buffon being miſled, makes it ſynonymous with the common jackal. This hyæna is called the *tiger-wolf* by the coloniſts at the Cape, where it is a very common and formidable beaſt of prey. Of this animal, formerly but imperfectly known, a very full account is given by Dr. Sparmann in his voyage to the Cape.

IV. The Mexicanus has a ſmooth crooked tail. The body is aſh-coloured, variegated with yellow ſpots. It is a native of Mexico, and is called the *mountain-cat* by Seba. It agrees with the European wolf in its manners; attacks cattle and ſometimes men.

V. The Vulpes, or Fox, has a ſtraight tail, white at the point. His body is yellowiſh, or rather ſtraw coloured; his ears are ſmall and erect; his lips are whitiſh, and his fore feet black. From the baſe of the tail a ſtrong ſcent is emitted, which to ſome people is very fragrant, and to others extremely diſagreeable. The fox is a native of almoſt every quarter of the globe, and is of ſuch a wild and ſavage nature that it is impoſſible fully to tame him. He is eſteemed to be the moſt ſagacious and the moſt crafty of all beaſts of prey. The former quality he ſhows in his method of providing himſelf with an aſylum, where he retires from preſſing dangers, where he dwells, and where he brings up his young: and his craftineſs is chiefly diſcovered by the ſchemes he falls upon in order to catch lambs, geeſe, hens, and all kinds of ſmall birds. The fox fixes his abode on the border of the wood, in the neighbourhood of cottages: he liſtens to the crowing of the cocks and the cries of the poultry. He ſcents them at a diſtance; he chooſes his time with judgment; he conceals his road as well as his deſign; he ſlips forward with caution, ſometimes even trailing his body, and ſeldom makes a fruitleſs expedition. If he can leap the wall, or get in underneath, he ravages the court-yard, puts all to death, and then retires ſoftly with his prey, which he either hides under the herbage, or carries off to his kennel. He returns in a few minutes for another, which he carries off, or conceals in the ſame manner, but in a different place. In this way he proceeds till the progreſs of the ſun, or ſome movements perceived in the houſe, advertiſe him that it is time to ſuſpend his operations, and to retire to his den. He plays the ſame game with the catchers of thruſhes, woodcocks, &c. He viſits the nets and bird-lime very early in the morning, carries off ſucceſſively the birds which are entangled, and lays them in different places, eſpecially near the ſides of high-ways, in the furrows, under the herbage or bruſh-wood, where they ſome-

times lie two or three days; but he knows perfectly where to find them when he is in need. He hunts the young hares in the plains, ſeizes old ones in their ſeats, never miſſes thoſe which are wounded, digs out the rabbits in the warrens, diſcovers the neſts of partridges and quails, ſeizes the mothers on the eggs, and deſtroys a vaſt quantity of game. The fox is exceedingly voracious; beſides fleſh of all kinds, he eats, with equal avidity, eggs, milk, cheeſe, fruits, and particularly grapes. When the young hares and partridges fail him, he makes war againſt rats, field-mice, ſerpents, lizards, toads, &c. Of theſe he deſtroys vaſt numbers; and this is the only ſervice he does to mankind. He is ſo fond of honey, that he attacks the wild bees, waſps, and hornets. They at firſt put him to flight by a thouſand ſtings; but he retires only for the purpoſe of rolling himſelf on the ground, to cruſh them; and he returns ſo often to the charge, that he obliges them to abandon the hive, which he ſoon uncovers, and devours both the honey and wax. In a word, he eats fiſh, lobſters, graſs-hoppers, &c.

The fox is not eaſily, and never fully tamed: he languiſhes when deprived of liberty; and, if kept too long in a domeſtic ſtate, he dies of chagrin. Foxes produce but once a year; and the litter commonly conſiſts of four or five, ſeldom ſix, and never leſs than three. When the female is full, ſhe retires, and ſeldom goes out of her hole, where ſhe prepares a bed for her young. She comes in ſeaſon in the winter; and young foxes are found in the month of April. When ſhe perceives that her retreat is diſcovered, and that her young have been diſturbed, ſhe carries them off one by one, and goes in ſearch of another habitation. The young are brought forth blind; like the dogs, they grow 18 months, or two years, and live 13 or 14 years. The fox, as well as the congenerous wolf, will produce with the dog kind, as noticed above.

The ſenſes of the fox are equally good as thoſe of the wolf; his perception is more delicate; and the organs of his voice are more pliant and perfect. The wolf ſends forth only frightful howlings; but the fox barks, yelps, and utters a mournful cry like that of the peacock. He varies his tone according to the different ſenſations with which he is affected: he has an accent peculiar to the chace, the tone of deſire, of complaint, and of ſorrow. He has another cry expreſſive of acute pain, which he utters only when he is ſhot, or has ſome of his limbs broken; for he never complains of any other wound; and, like the wolf, allows himſelf to be killed with a bludgeon without complaining; but he always defends himſelf to the laſt with great courage and bravery. His bite is obſtinate and dangerous; and the ſevereſt blows will hardly make him quit his hold. His yelping is a ſpecies of barking, and conſiſts of a quick ſucceſſion of ſimilar tones; at the end of which he generally raiſes his voice ſimilar to the cry of the peacock. In winter, and particularly during froſt and ſnow, he yelps perpetually: but, in ſummer, he is almoſt entirely ſilent, and during this ſeaſon he caſts his hair. He ſleeps ſound, and may be eaſily approached without waking: he ſleeps in a round form, like the dog; but when he only repoſes himſelf, he extends his hind legs, and lies on his belly. It is in this ſituation that he ſpies the birds along the hedges, and meditates ſchemes for their ſurpriſe. The fox flies when he hears the exploſion of a gun, or ſmells gunpowder. He is exceedingly fond of grapes, and does much miſchief in vineyards. Various methods are daily employed to deſtroy foxes: they are hunted with dogs; iron traps are frequently ſet at their holes; and their holes are ſometimes ſmoked to make them run out, that they may the more readily fall into the ſnares, or be killed with dogs or fire-arms.

The chace of the fox requires leſs apparatus, and is more amuſing than that of the wolf. To the latter every dog has great reluctance: but all dogs hunt the fox ſpontaneouſly and with pleaſure; for, though his odour be ſtrong, they often preſer him to the ſtag or the hare. He may be hunted with terriers, hounds, &c. Whenever he finds himſelf purſued, he runs to his hole; the terriers with crooked legs, or turnſpits, go in with moſt eaſe. This mode anſwers very well when we want to carry off a whole litter of foxes, both mother and young. While the mother defends herſelf againſt the terriers, the hunters remove the earth above, and either kill or ſeize her alive. But, as the holes are often under rocks, the roots of trees, or ſunk too deep in the ground, this method is frequently unſucceſsful. The moſt certain and moſt common method of hunting foxes is to begin with ſhutting up their holes, placing a man with a gun near the entrance, and then to ſearch about with dogs. When they fall in with him, he immediately makes for his hole; but, when he comes up to it, he is met with a diſcharge from the gun. If he eſcapes the ſhot, he runs with full ſpeed, takes a large circuit, and returns again to the hole, where he is fired upon a ſecond time; but, finding the entrance ſhut, he now endeavours to eſcape by darting ſtraight forward, with the deſign of never reviſiting his former habitation. He is then purſued by the hounds, whom he ſeldom fails to fatigue, becauſe he purpoſely paſſes through the thickeſt parts of the foreſt or places of the moſt difficult acceſs, where the dogs are hardly able to follow him; and, when he takes to the plains, he runs ſtraight out, without ſtopping or doubling.

Of all animals the fox has the moſt ſignificant eye, by which it expreſſes every paſſion of love, fear, hatred, &c. It is remarkably playful; but, like all ſavage creatures half reclaimed, will on the leaſt offence bite thoſe it is moſt familiar with. It is a great admirer of its buſhy tail, with which it frequently amuſes and exerciſes itſelf, by running in circles to catch it: and, in cold weather, wraps it round its noſe. The ſmell of this animal is in general very ſtrong, but that of the urine is remarkably fetid. This ſeems ſo offenſive even to itſelf, that it will take the trouble of digging a hole in the ground, ſtretching its body at full length over it; and there, after depoſiting its water, covers it with the earth, as the cat does its dung. The ſmell is ſo obnoxious, that it has often proved the means of the fox's eſcape from the dogs; who have ſo ſtrong an averſion to the filthy effluvia, as to avoid encountering the animal it came from. It is ſaid the fox makes uſe of its urine as an expedient to force the cleanly badger from its habitation: whether that is the means, is rather doubtful; but that the fox makes uſe of the badger's hole is certain, not through want of ability to form its own retreat, but to ſave itſelf ſome trouble; for after the expulſion of the firſt inhabitant, the fox improves as well as enlarges it conſiderably, adding ſeveral chambers, and providently making ſeveral entrances to ſecure a retreat from every quarter. In warm weather, it will quit its habitation for the ſake of baſking in the ſun, or to enjoy the free air; but then it rarely lies expoſed, but chooſes ſome thick brake, that it may reſt ſecure from ſurprize. Crows, magpies, and other birds, who conſider the fox as their common enemy, will often, by their notes of anger, point out its retreat. The ſkin of this animal is furniſhed with a warm ſoft fur, which in many parts of Europe is uſed to make muffs and to line clothes. Vaſt numbers are taken in le Vallais, and the Alpine parts of Switzerland. At Lauſanne there are furriers who are in poſſeſſion of between 2000 and 3000 ſkins, all taken in one winter.

Of the fox there are ſeveral varieties derived from colour; as, 1. The field-fox, or *alopex* of Linnæus, who makes it a diſtinct ſpecies; but it is every way the ſame with the common fox, except in the point of the tail, which is black. 2. The croſs-fox, with a black mark paſſing tranſverſely from ſhoulder to ſhoulder, with another along the back to the tail. It inhabits

the coldeſt parts of Europe, Aſia, and North-America—a valuable fur, thicker and ſofter than the common ſort; great numbers of the ſkins are imported from Canada. 3. The black fox is the moſt cunning of any, and its ſkin the moſt valuable; a lining of it is, in Ruſſia, eſteemed preferable to the fineſt ſables: a ſingle ſkin will ſell for 400 rubles. It inhabits the northern parts of Aſia and North-America. The laſt is inferior in goodneſs. 4. The brant-fox, as deſcribed by Geſner and Linnæus, is of a fiery redneſs; and called by the firſt *brand-fuchs*, by the laſt *brandræf*; it is ſcarce half the ſize of the common fox: the noſe is black, and much ſharper; the ſpace round the ears ferruginous; the forehead, back, ſhoulders, thighs, and ſides black mixed with red, aſh-colour, and black; the belly yellowiſh; the tail black above, red beneath, and cinereous on its ſide. It is a native of Pennſylvania. 5. The corſac-fox, with upright ears, ſoft downy hair; tail buſhy; colour in ſummer pale tawny, in winter grey: the baſe and tip of the tail black; a ſmall kind. It inhabits the deſerts beyond the Yaik; lives in holes; howls and barks; is caught by the Kirgis Coſſacks with falcons and grey-hounds; 40 or 50,000 are annually taken and ſold to the Ruſſians, at the rate of 40 kopeiks, or 20 pence, each: the former uſe their ſkins inſtead of money: great numbers are ſent into Turkey. 6. There are three varieties of foxes found in the mountainous parts of Britain, which differ a little in form, but not in colour, from each other. They are diſtinguiſhed in Wales by as many different names. The *milgi*, or *grey-hound-fox*, is the largeſt, talleſt, and boldeſt; and will attack a grown ſheep or wedder: the *maſtiff-fox* is leſs, but more ſtrongly built: the *corgi*, or *cur-fox*, is the leaſt; lurks about hedges, out-houſes, &c. and is the moſt pernicious of the three to the feathered tribe. The firſt of theſe varieties has a white tag or tip to the tail; the laſt a black. When hunted, they never run directly forward, but make a great many doublings and turnings; and when in danger of being taken, they emit ſuch a ſmell from their poſteriors that the hunters can hardly endure it.

VI. The Lagopus, or arctic-fox, with a ſharp noſe; ſhort rounded ears, almoſt hid in the fur; long and ſoft hair, ſomewhat woolly; ſhort legs; toes covered on all parts, like that of a common hare, with fur; tail ſhort and more buſhy than that of the common fox, of a blueiſh grey or aſh-colour, ſometimes white: the young of the grey are black before they come to maturity: the hair much longer in winter than ſummer, as is uſual with animals of cold climates. It inhabits the countries bordering on the Frozen Sea; Kamſchatka; the iſles between it and America, and the oppoſite parts of America diſcovered in captain Bering's expedition, 1741; is again found in Greenland, Iceland, Spitzbergen, Nova Zembla, and Lapland. It burrows under ground, forms holes many feet in length, and ſtrews the bottom with moſs. In Greenland and Spitzbergen it lives in the clefts of rocks, not being able to burrow, by reaſon of the froſt: two or three pair inhabit the ſame hole. They are in heat about Lady-day; and during that time they continue in the open air, but afterwards take to their holes. They go with young nine weeks: like dogs, they continue united in copulation: they bark like that animal, for which reaſon the Ruſſians call them *peſzti*, or dogs. They have all the cunning of the common fox; prey on geeſe, ducks and other water-fowl, before they can fly, on grouſe of the country, on hares, and the eggs of birds; and in Greenland (through neceſſity) on berries, ſhell-fiſh, or any thing the ſea flings up. But their principal food in the north of Aſia and in Lapland is the leming, or Lapland marmot: thoſe of the countries laſt mentioned are very migratory, purſuing the leming, which is a wandering animal: ſometimes theſe foxes will deſert the country for three or four years, probably in purſuit of their prey; for it is well known that the migrations of the leming are very inconſtant, it appearing in ſome countries only once in ſeveral years. The people of Jeneſea ſuſpect they go to the banks of the Oby. Their chief rendezvous is on the banks of the Frozen Sea, and the rivers that flow into it, where they are found in great troops. The Greenlanders take them either in pitfalls dug in the ſnow, and baited with the capelin fiſh; or in ſprings made with whalebone, laid over a hole made in the ſnow, ſtrewed over at bottom with the ſame kind of fiſh; or in traps made like little huts, with flat ſtones, with a broad one by way of door, which falls down (by means of a ſtring baited on the inſide with a piece of fleſh) whenever the fox enters and pulls at it. The Greenlanders preſerve the ſkins for traffic; and in caſes of neceſſity eat the fleſh. They alſo make buttons of the ſkins; and ſplit the tendons, and make uſe of them inſtead of thread. The blue furs are much more eſteemed than the white.

VII. The Indica, or antarctic-fox, (the *coyotl* of Fernandez, the *loup-renard* of Bougainville) has ſhort pointed ears; irides hazel; head and body cinereous brown; hair more woolly than that of the common fox, reſembling much that of the arctic; legs daſhed with ruſt-colour; tail duſky, tipped with white, ſhorter and more buſhy than that of the common fox, to which it is about one-third ſuperior in ſize. It has much the habit of the wolf, in ears, tail, and ſtrength of limbs. The French therefore call it *loup-renard*, or wolf-fox. It may be a wolf degenerated by climate. The largeſt are thoſe of Senegal: the next are the European: thoſe of North America are ſtill ſmaller. The Mexican wolves, which Mr. Pennant apprehends to be this ſpecies, are again leſs; and this, which inhabits the Falkland iſles, near the extremity of South America, is dwindled to the ſize deſcribed. This is the only land animal of thoſe diſtant iſles: it has a fetid ſmell, and barks like a dog. It lives near the ſhores; kennels like a fox; and forms regular paths from bay to bay, probably for the conveniency of ſurpriſing the water-fowl, on which it lives. It is at times very meagre, from want of prey; and is extremely tame. The iſlands were probably ſtocked with thoſe animals by means of maſſes of ice broken from the continent, and carried by the currents.

VIII. The Grey-fox of Cateſby, &c. has a ſharp noſe; ſharp, long, upright ears; legs long; colour grey, except a little redneſs about the ears. It inhabits Carolina, and the warmer parts of North America. It differs from the arctic fox in form, and the nature of its dwelling; agrees with the common fox in the firſt, varies from it in the laſt. It never burrows, but lives in hollow trees; it gives no diverſion to the ſportſman; for after a mile's chace, it takes to its retreat; it has no ſtrong ſmell; it feeds on poultry, birds, &c. Theſe foxes are eaſily made tame; their ſkins, when in ſeaſon, are made uſe of for muffs.

IX. The Silver-fox of Louiſiana. It reſembles the common fox in form, but has a moſt beautiful coat. The ſhort hairs are of a deep brown; and over them ſpring long ſilvery hairs, which give the animal a very elegant appearance. They live in foreſts abounding in game, and never attempt the poultry which run at large. The woody eminences in Louiſiana are every where pierced with their holes.

X. The Barbary-fox (*le chacal*, Buff.), or jackal-adive, has a long and ſlender noſe, ſharp upright ears, long buſhy tail; colour, a very pale brown; ſpace above and below the eyes, black; from behind each ear there is a black line, which ſoon divides into two, which extend to the lower part of the neck; and the tail is ſurrounded with three broad rings. This ſpecies is of the ſize of the common fox, but the limbs are ſhorter, and the noſe is more ſlender. M. de Buffon informs us, that Mr.

CANIS.


Shepherd's Dog.
Harrier.
Pomeranian Dog.
Danifh Dog.
Gre-Hound.
King Charles's Dog.
Bull Dog.
Maftiff.
Hound.

CANIS.


Spaniel.
Turnspit.
Shock Dog.
Pug Dog.
Small Water Dog.
Lion Dog.
Siberian Dog.
Naked Turkish Dog
Mongrel Turkish Dog.
Iceland Dog.
Great Water Dog.
Mongrel Hound.

CANIS.


The Wolf
Jackal adive
Isatis
The Fox
Zerda
Striped Hyena
Spotted Hyena
Hermit Crab
CANCER.
Plated Lobster
Horrid Crab
Violet Crab
Barlow sculp

Bruce told him this animal was common in Barbary, where it was called *thaleb*. But Mr. Pennant obſerves, that Mr. Bruce ſhould have given it a more diſtinguiſhing name; for *thaleb*, or *taleb*, is no more than the Arabic name for the common fox, which is alſo frequent in that country.

XI. The AUREUS-SCHACKAL, or Jackal, as deſcribed by Mr. Pennant, has yellowiſh brown irides; ears erect, formed like thoſe of a fox, but ſhorter and leſs pointed: hairy and white within; brown without, tinged with duſky: head ſhorter than that of a fox, and noſe blunter: lips black, and ſomewhat looſe: neck and body very much reſembling thoſe of that animal, but the body more compreſſed: the legs have the ſame reſemblance, but are longer: tail thickeſt in the middle, tapering to the point: five toes on the fore-feet; the inner toe very ſhort, and placed high: four toes on the hind feet; all are covered with hair even to the claws. The hairs are much ſtiffer than thoſe of a fox, but ſcarcely ſo ſtiff as thoſe of a wolf; ſhort about the noſe; on the back, three inches long; on the belly ſhorter. Thoſe at the end of the tail four inches long. Colour of the upper part of the body a dirty tawny; on the back, mixed with black: lower part of the body of a yellowiſh white: tail tipt with black; the reſt of the ſame colour with the back: the legs of an unmixed tawny brown; the fore legs marked (but not always) with a black ſpot on the knees; but on no part are thoſe vivid colours which could merit the title of *golden*, beſtowed on it by Kæmpfer. The length of this animal from the noſe to the root of the tail is little more than twenty-nine inches Engliſh: the tail, to the ends of the hairs, ten three quarters; the tip reaching to the top of the hind legs: the height, from the ſpace between the ſhoulders to the ground, rather more than eighteen inches and a half; the hind parts a little higher. This ſpecies inhabits all the hot and temperate parts of Aſia, India, Perſia, Arabia, Great Tartary, and about Mount Caucaſus, Syria, and the Holy Land. It is found in moſt parts of Africa, from Barbary to the Cape of Good Hope.

Profeſſor Gueldenſtaedt, the able deſcriber of this long-loſt animal, remarks, that the cæcum entirely agrees in form with that of a dog, and differs from that of the wolf and fox. And Mr. Pennant obſerves, that there is the ſame agreement in the teeth with thoſe of a dog; and the ſame variation in them from thoſe of the two other animals. Theſe circumſtances ſtrengthen the opinion entertained by ſome writers, that the dogs of the old world did derive their origin from one or other of them. The jackals have indeed ſo much the nature of dogs, as to give reaſonable cauſe to imagine that they are at leaſt the *chief* ſtock from which is ſprung the various races of thoſe domeſtic animals.

The wild ſchakals go in packs of 40, 50, and even 200, and hunt like hounds in full cry from evening to morning. They deſtroy flocks and poultry, but in a leſs degree than the wolf or fox: ravage the ſtreets of villages, and gardens near towns, and will even deſtroy children, if left unprotected. They will enter ſtables and out-houſes, and devour ſkins, or any thing made of that material. They will familiarly enter a tent, and ſteal whatſoever they can find from the ſleeping traveller. In default of living prey, they will feed on roots and fruits; and even on the moſt infected carrion: they will greedily diſinter the dead, and devour the putrid carcaſes; for which reaſon, in many countries the graves are made of a great depth. They attend caravans, and follow armies, in hopes that death will provide them a banquet.

Their voice naturally is a howl. Barking, Mr. Pennant obſerves, is latently inherent; and in their ſtate of nature ſeldom excited: but its different modifications are adventitious, and expreſſive of the new paſſions and affections gained by a domeſtic ſtate. Their howlings and clamours in the night are dreadful, and ſo loud that people can ſcarcely hear one another ſpeak. Dellon ſays, their voice is like the cries of a great many children of different ages mixed together: when one begins to howl, the whole pack join in the cry. Kempfer ſays, that every now and then a ſort of bark is intermixed; which confirms what is above aſſerted by Mr. Pennant. Dellon agrees in the account of their being tamed, and entertained as domeſtic animals. During day they are ſilent. They dig burrows in the earth, in which they lie all day, and come out at night to range for prey: they hunt by the noſe, and are very quick of ſcent. The females breed only once a-year; and go with young only four weeks; they bring from ſix to eight at a time. Both Mr. Gueldeſtaedt and Mr. Bell contradict the opinion of their being very fierce animals. This animal is vulgarly called the *Lion's Provider*, from an opinion that it rouzes the prey for that bad-noſed quadruped. The fact is, every creature in the foreſt is ſet in motion by the fearful cries of the jackals; the lion, and other beaſts of rapine, by a ſort of inſtinct, attend to the chace, and ſeize ſuch timid animals as betake themſelves to flight at the noiſe of this nightly pack.

XII. The MESOMELAS, or *Capeſch* of Schreber, the *tenlie* or *kenlie* of the Hottentots, has erect yellowiſh brown ears, mixed with a few ſcattered black hairs: the head is of a yellowiſh brown, mixed with black and white, growing darker towards the hind part: the ſides are of a light brown, varied with duſky hairs: the body and alſo the back part of the legs are of a yellowiſh brown, lighteſt on the body; the throat, breaſt, and belly white. On the neck, ſhoulders, and back, is a bed of black; broad on the ſhoulders, and growing narrower to the tail: when the hairs are ſmooth, the part on the neck ſeems barred with white; that on the ſhoulders with white conoid marks, one within the other, the end pointing to the back: when the hairs are ruffled, theſe marks vaniſh, or grow leſs diſtinct, and a hoarineſs appears in their ſtead. The tail is buſhy, of a yellowiſh brown; marked on the upper part with a longitudinal ſtripe of black, and towards the end encircled with two rings of black, and is tipt with white. In length, the animal is two feet three quarters, to the origin of the tail: the tail is one foot. The ſpecies inhabits the countries about the Cape of Good Hope, and probably is found as high as the line.

XIII. The THOUS has a ſmooth crooked tail; the upper part of its body is grey, and its belly white. It is about the ſize of a large cat; and, according to Linnæus, is found at Surinam; it is mentioned by no other naturaliſt.

XIV. The ZERDA. This animal has a very pointed viſage; large bright black eyes; very large ears, of a bright roſe-colour, internally lined with long hairs; the orifice ſo ſmall as not to be viſible, probably covered with a valve or membrane: the legs and feet are like thoſe of a dog; the tail is taper: colour between a ſtraw and pale brown. Length from noſe to tail ten inches; ears, three inches and a half long; tail, ſix: height, not five. It inhabits the vaſt deſart of Saara, which extends beyond mount Atlas. It burrows in the ſandy ground, which ſhows the neceſſity of the valves to the ears; and is ſo exceſſively ſwift, that it is very rarely taken alive. It feeds on inſects, eſpecially locuſts: ſits on its rump: is very vigilant: barks like a dog, but much ſhriller, and that chiefly in the night: never is obſerved to be ſportive. We are indebted to Mr. Eric Skioldebrand, the late Swediſh conſul at Algiers, for our knowledge of this ſingular animal. He never could procure but one alive, which eſcaped before he examined its teeth: the genus is very uncertain: the form of its head and legs, and ſome of its manners, determined Mr. Pennant to rank it in this genus. That which was in poſſeſſion of Mr. Skioldebrand fed freely from the hand, and would eat bread or boiled meat. Buffon has given a figure of this animal; but from the authority of Mr. Bruce aſcribes to it a different place, and different manners. He ſays that it is found to the ſouth of the Palus Tritonides, in Libya; that it has ſomething of the nature

of the hare, and something of the squirrel; and that it lives on the palm-trees, and feeds on the fruits.

CANIS *Major*, the great dog in astronomy, a constellation of the southern hemisphere, below Orion's feet, though somewhat to the westward of him; whose stars Ptolemy makes 29; Tycho observed only 13; Hevelius 21; in the Britannic catalogue they are 31.

CANIS *Minor*, the little dog in astronomy, a constellation of the northern hemisphere; called also by the Greeks, *Procyon*, and by the Latins *Antecanis* and *Canicula*. The stars in the constellation canis minor, are in Ptolemy's catalogue, 2; in Tycho's, 5; in Hevelius's, 13; and in the Britannic catalogue, 14.

CANISIUS (Henry), a native of Nimeguen, and one of the most learned men of his time, was professor of canon law at Ingolstadt; and wrote a great number of books; the principal of which are, 1. *Summa Juris Canonici*. 2. *Antiquæ lectiones*, a very valuble work. He died in the year 1609.

CANITZ (the baron of), a German poet and statesman, was of an ancient and illustrious family in Brandenburg, and born at Berlin in 1564, five months after his father's death. After his early studies, he travelled to France, Italy, Holland, and England; and upon his return to his country, was charged with important negociations by Frederic II. Frederic III. employed him also. Canitz united the statesman with the poet; and was conversant in many languages, dead as well as living. His German poems were published for the tenth time, in 1750, in 8vo. He is said to have taken Horace for his model, and to have written purely and delicately. But he did not content himself with barely cultivating the fine arts in himself; he gave all the encouragement he could to them in others. He died at Berlin, in 1699, privy counsellor of state, aged 45.

CANKER, a disease incident to trees, proceeding chiefly from the nature of the soil. It makes the bark rot and fall off. If the canker be in a bough, cut it off; in a large bough, at some distance from the stem; in a small one, close to it. Paring it off close and smooth, and rubbing the exposed part with tar to prevent the depredations of insects, has been recommended as a useful practice, particularly for fruit trees.

CANKER, among farriers. See FARRIERY.

CANNA, in botany; a genus of the monogynia order, belonging to the monandria class of plants; and in the natural method ranking under the eighth order, *Scitamineæ*. The corolla is erect, and divided into six parts, with a distinct lip bipartite and rolled back; the style lanceolate, and growing to the corolla; the calyx is triphyllous.

The *Species* are, 1. The *indica*, or common broad-leaved flowering cane, is a native of both Indies; the inhabitants of the British islands in America call it *Indian shot*, from the roundness and hardness of the seeds. It hath a thick, fleshy, tuberous root, which divides into many irregular knobs; it sends out many large oval leaves, without order. At their first appearance the leaves are like a twisted horn; but afterwards expand and are near a foot long, and five inches broad in the middle; lessening gradually to both ends, and terminated in a point. The stalks are herbaceous, arising four feet high, and are encompassed by the broad leafy foot-stalks of the leaves; at the upper part of the stalk the flowers are produced in loose spikes, each being at first covered with a leafy hood, and turns to a brown colour. The flowers are succeeded by a fruit or capsule, oblong, rough, and crowned with the three-cornered empalement of the flower which remains. When the fruit is ripe, the capsule opens lengthwise into three cells, filled with round, shining, hard, and black seeds. 2. The *latifolia*, with a pale red flower, is a native of Carolina, and some other northern provinces of America. 3. The *glauca*, with a very large flower, is a native of South America. 4. The *lutea*, with obtuse oval leaves, is less common in America than the other sorts. 5. The *coccinea* hath larger leaves than any of the other species, and the stalk rises much higher. The flowers are produced in large spikes; and are of a bright crimson, or rather scarlet colour.

These plants must always be kept in pots of rich earth, to be moved to shelter in winter. They are propagated by seeds sown on a hot-bed, in the spring; and in summer, when the plants are a little advanced in growth, prick them separately in small pots of rich earth, plunging them also in the hot-bed, giving shade, water, and fresh air; to which last harden them by degrees, till they bear it fully. In October they must be removed into a very good stove or green-house.

CANNABIS, in botany; a genus of the pentandria order, belonging to the dioecia class of plants; and in the natural method ranking under the 53d order, *Scabridæ*. The calyx of the male is quinquepartite, with no corolla. In the female the calyx is monophyllous, entire, and gaping at the side; there is no corolla, but two styles; the fruit is a nut, bivalved, within the closed calyx. Of this there is but one species, viz. the sativa. This is propagated in the rich fenny parts of Lincolnshire in great quantities, for its bark, which is useful for cordage, cloth, &c. and the seeds abound with oil. Hemp is always sown on a deep, moist, rich soil, such as is found in Holland, Lincolnshire, the fens of the island of Ely, where it is cultivated to great advantage, as it might be in many other parts of England where there is a soil of the same kind; but it will not thrive on clayey or stiff cold land. The ground on which hemp is designed to be sown, should be well ploughed, and made very fine by harrowing. About the middle of April the seed may be sown; three bushels is the usual allowance for an acre, but two are sufficient. In the choice of the seed, the heaviest and brightest coloured should be preferred; and particular care should be had to the kernel of the seed. For the greater certainty in this matter, some of the seeds should be cracked, to see whether they have the germ or future plant perfect: for, in some places, the male plants are drawn out too soon from the female, i. e. before they have impregnated the female plants with the farina; in which case, though the seeds produced by these females may seem fair to the eye, yet they will not grow, according to the doctrine of Linnæus. When the plants are come up, they should be hoed out in the same manner as is practised for turnips, leaving them two feet apart; observe also to cut down all the weeds, which, if well performed, and in dry weather, will destroy them. This crop, however, will require a second hoeing in about six weeks after the first; and, if this is well performed, the crop will requre no further care. The first season for pulling hemp is usually about the middle of August, when they begin to pull what they call the *fimble hemp*, being that which is composed of the male plants; but it would be the much better method to defer this for a fortnight or three weeks longer, until those male plants have fully shed their farina or dust, without which the seeds will prove only empty husks. These male plants decay soon after they have shed their farina. The second pulling is a little after Michaelmas, when the seeds are ripe. This is usually called *karle hemp*, and consists of the female plants which were left. This karle hemp is bound in bundles of a yard compass, according to statute measure, which are laid in the sun for a few days to dry; and then it is stacked up, or housed, to keep it dry till the seed can be threshed out. An acre of hemp, on a rich soil, will produce near three quarters of seed, which, together with the unwrought hemp, is worth from six to eight pounds. Hemp is esteemed very effectual for destroying weeds: but this it accomplishes by impoverishing the ground, and thus robbing them of their nourishment; so that a crop of it must not be repeated on the same spot.

CANAL.

Fig. 1.

Perspective View of part of a Canal with Locks.

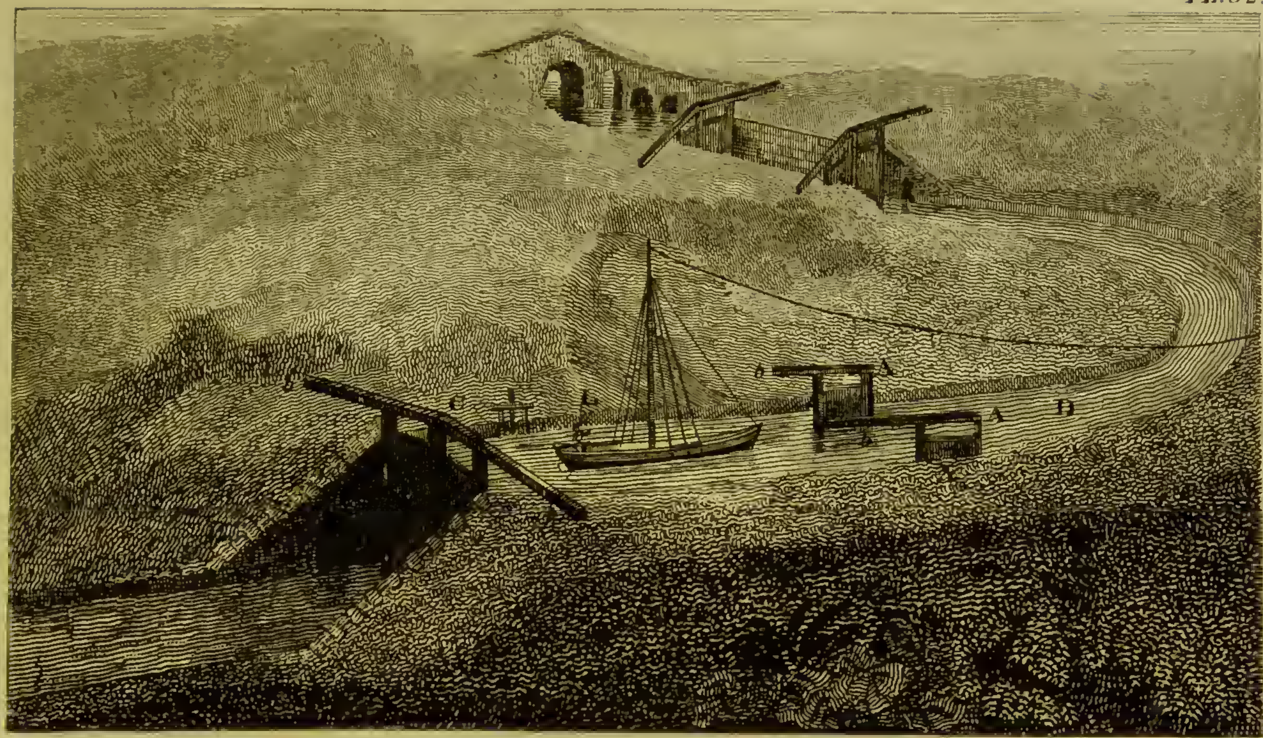


Fig. 2. Section of a Lock.

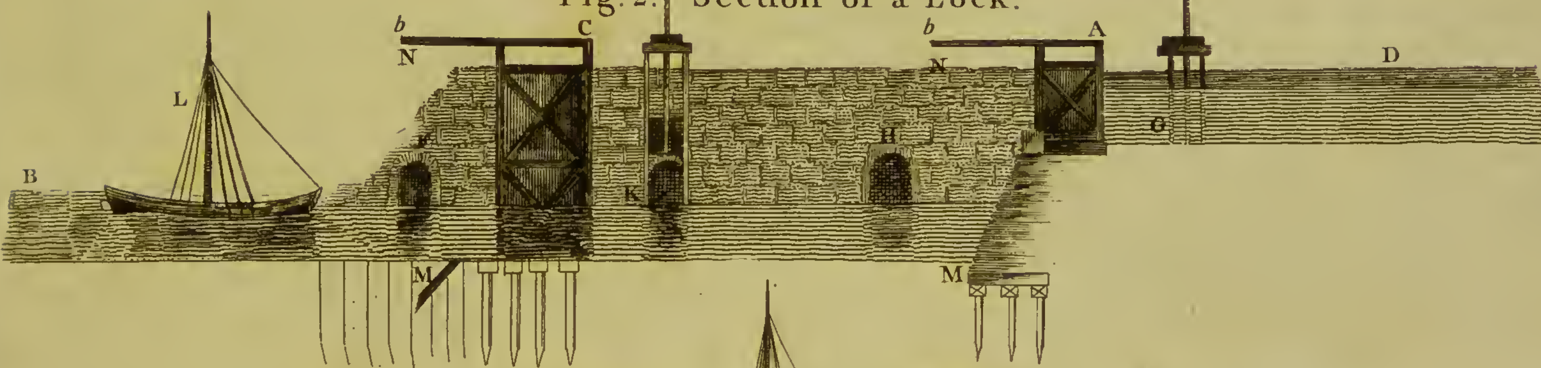


Fig. 3. Section of a Lock full of Water.

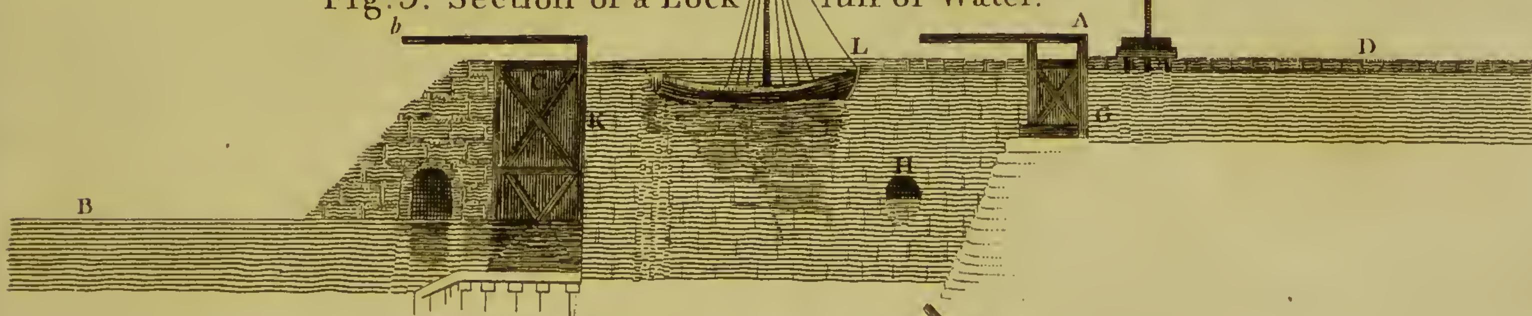
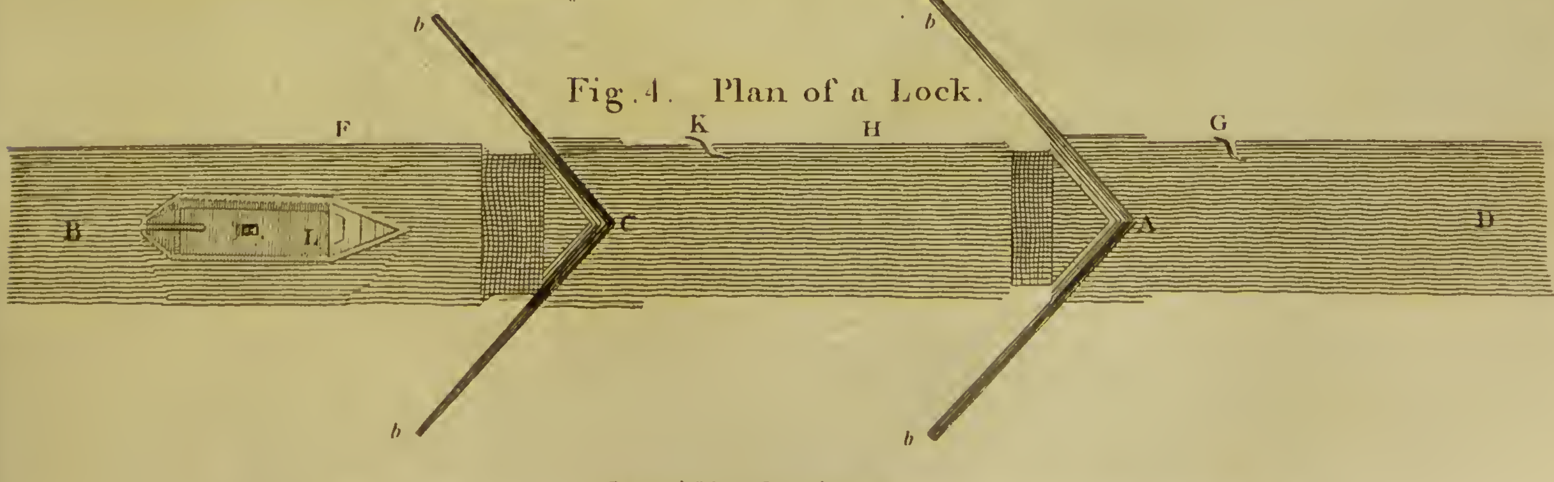


Fig. 4. Plan of a Lock.



Druidical Circle.

Some feeds of a large kind of hemp growing in China were lately fent by the Eaft India Company to the Society for the Encouragement of Arts, Manufactures, and Commerce, who diftributed them to the members and other gentlemen who appeared likely to cultivate them; and from experiments made in confequence, the plant has been found to fucceed perfectly in this climate. The firft trials were rather unpromifing, the hemp produced from the foreign feeds proving of very little value. But the Rev. Dr. Hinton of Northwold, who made the above trial in 1786, having accidentally faved fome ripe feeds of the crop, fowed them in May 1787 on a fpot of good land. They came up well, and attained as much perfection as ordinary hemp. The produce, when dreffed, weighed at the rate of 95 ftone 7 pounds and 12 ounces per acre (being above 30 ftone more, he fays, than the ufual crops of hemp in that neighbourhood): and at the rate of three bufhels two pecks and half a pint of feed per acre were faved. Dr. Hinton fuppofes that the feeds brought from China failed principally, if not entirely, by having been two years old, at which age hempfeed feldom vegetates. Now that it is found to ripen with us, frefh feeds can always be obtained. It will yet, however, require a few years to determine whether this fpecies will continue to retain its great fize, or will degenerate and become the common hemp of France. From the leaves of hemp pounded and boiled in water, the natives of the Eaft Indies prepare an intoxicating liquor, of which they are very fond. The plant, when frefh, has a rank narcotic fmell; the water in which the ftalks are foaked, in order to feparate the tough rind for mechanic ufes, is faid to be violently poifonous, and produce its effects almoft as foon as drunk. The feeds alfo have fome fmell of the herb, and their tafte is unctuous and fweetifh: they are recommended, boiled in milk, or triturated with water into an emulfion, againft coughs, heat of urine, &c.

CANNEQUINS, in commerce, white cotton cloths brought from the Eaft Indies. They are a proper commodity for trading on the coaft of Guinea, particularly about the rivers Senegal and Gambia. Thefe linens are folded in a fquare form, and are about eight ells long.

CANNEL COAL. See AMPELITES.

CANNES, a town of France, in the former province of Provence, feated on the coaft of the Mediterranean Sea, with a harbour and a caftle. E. long. 7. 7. N. lat. 43. 34.

CANNIBAL, a modern term for an anthropophagus or man-eater, more efpecially in the Weft Indies. See ANTHROPOPHAGI.

CANNON, a great gun or piece of ordnance, defigned for throwing balls, by the help of gunpowder. The invention of brafs cannon is by Laney afcribed to J. Owen: he fays, that they were firft known in England in the year 1535; but yet acknowledges, that in 1346 there were four pieces of cannon in the Englifh army at the battle of Creffy, and that thefe were the firft that were known in France. And Mezeray relates, that king Edward, by five or fix pieces of cannon, ftruck terror into the French army, it being the firft time they had feen any of thefe thundering machines; though others affirm that cannon were known alfo in France at the fame time; but that the French king in his hurry to attack the Englifh, and in confidence of his victory, left all his cannon behind him as ufelefs incumbrances. The Germans however carry the invention ftill farther back, and attribute it to Albertus Magnus, a Dominican monk, about the year 1250. But Voffius rejects all thefe opinions, and finds cannon in China almoft 1700 years ago. According to him they were mounted by the emperor of Kitey in the year of Chrift 85. For the cafting of cannon, fee FOUNDERY. For their different parts, proportions, management, operations, and effects, fee GUN and GUNNERY.

CANNON, with letter-founders and printers, the name of the largeft fize of letters that are in ufe.

CANNONADE, the application of artillery to the purpofes of war, or the direction of its efforts againft fome diftant object intended to be feized or deftroyed, as a fhip, battery, or fortrefs. See GUNNERY.

CANNULA, in furgery, any kind of a tube made of different metals, but principally of filver and lead. They are applied by furgeons to a variety of purpofes, and confequently are of various figures; fome being oval, fome round, fome crooked, &c.

CANO, a kingdom of Africa, in Negroland, with a town of the fame name. It is bounded by Zaara on the north, by the river Niger on the fouth, the kingdom of Agades on the weft, and that of Caffina on the eaft. Some of the inhabitants are herdfmen, and others till the ground and dwell in villages. It produces corn, rice, and cotton. Here are alfo many deferts, and mountains covered with woods, in which are wild citrons and lemon trees. The walls and houfes of the towns are made of clay, and the principal inhabitants are merchants. E. long. 16. 18. N. lat. 21. 5.

CANOBIA, a town of Italy, in the duchy of Milan, feated on the weftern bank of Lago Maggiore, or the Greater Lake. E. long. 8. 47. N. lat. 45. 55.

CANOE, a fort of Indian boat or veffel, formed of the trunk of a tree hollowed, and fometimes of feveral pieces of the bark put together. Canoes are of various fizes, according to the ufes for which they may be defigned, or the countries wherein they are formed. The largeft are made of the cotton tree: fome of them will carry between 20 and 30 hogfheads of fugar or molaffes. Some are made to carry fail, and for this purpofe are fteeped in water till they become pliant; after which their fides are extended, and ftrong beams placed between them, on which a deck is afterwards laid that ferves to fupport their fides. The other forts very rarely carry fail, unlefs when going before the wind: their fails are made of a fort of fhort filk grafs or rufhes. They are commonly rowed with paddles, which are pieces of light wood fomewhat like a corn-fhovel; and, inftead of rowing with it horizontally like an oar, they manage it perpendicularly. The fmall canoes are very narrow, having only room for one perfon in breadth, and feven or eight lengthwife. The rowers, who are generally American favages, are very expert in managing their paddles uniformly, and in balancing the canoes with their bodies; which would be difficult for a ftranger to do, how well accuftomed foever to the conducting of European boats, becaufe the canoes are extremely light, and liable to be overturned. The American Indians, when they are under the neceffity of landing to avoid a waterfall, or of croffing the land from one river to another, carry their canoes on their heads, till they arrive at a place where they can launch them again. This is the general conftruction of canoes, and method of managing them: but fome nations have veffels going under the name of canoes, which differ confiderably from the above; as the inhabitants of Greenland, Hudfon's-bay, Otaheite, &c.

CANON, a perfon who poffeffes a prebend, or revenue allotted for the performance of divine fervice, in a cathedral, or collegiate church. Canons are of no great antiquity. Pafchier obferves, that the name canon was not known before Charlemagne; at leaft the firft we hear of are in Gregory de Tours, who mentions a college of canons inftituted by Baldwin XVI. archbifhop of that city, in the time of Clotharius I. The common opinion attributes the inftitution of this order to Chrodegangus, bifhop of Metz, about the middle of the eighth century.

Originally canons were only priefts, or inferior ecclefiaftics,

who lived in community; residing by the cathedral church, to assist the bishop; depending entirely on his will; supported by the revenues of the bishoprick; and living in the same house, as his domestics, or counsellors, &c. They even inherited his moveables, till the year 817, when this was prohibited by the council of Aix-la-Chapelle, and a new rule substituted in the place of that which had been appointed by Chrodegangus, and which was observed for the most part in the west till the twelfth century. By degrees, these communities of priests, shaking off their dependence, formed separate bodies; whereof the bishops, however, were still heads. In the tenth century, there were communities or congregations of the same kind established even in cities where there were no bishops: these were called collegiates, as they used the terms congregation and collegiate indifferently: the name chapter now given to these bodies, being much more modern. Under the second race of the French kings, the canonical, or collegiate life, had spread itself all over the country; and each cathedral had its chapter, distinct from the rest of the clergy. They had the name canon from the Greek κανων, which signifies three different things; a rule, a pension or fixed revenue to live on, and a catalogue or matricula; all which are applicable to them.

In time, the canons freed themselves from their rules, the observance relaxed, and, at length, they ceased to live in community: yet they still formed bodies; pretending to other functions besides the celebration of the common office in the church; yet assuming the rights of the rest of the clergy; making themselves as a necessary council of the bishop; taking upon them the administration of a see during a vacancy, and the election of a bishop to supply it. There are even some chapters exempt from the jurisdiction of the bishop, and owning no head but their dean. After the example of cathedral chapters, collegiate ones also continued to form bodies, after they had abandoned living in community.

CANONS are of various kinds; as, *Cardinal* CANONS, which are those attached, and, as the Latins call it, *incardinati* to a church, as a priest is to a parish. *Domicellary* CANONS, were young canons, who, not being in orders, had no right in any particular chapters. *Expectative* CANONS, were such as, without having any revenue or prebend, had the title and dignities of canons, a voice in the chapter, and a place in the choir, till such time as a prebend should fall. *Foreign* CANONS, were such as did not officiate in the canonries to which they belonged. To these were opposed mansionary canons, or canons residentiary. *Lay* or *honorary* CANONS, are such among the laity as have been admitted, out of honour and respect, into some chapter of canons. *Regular* CANONS, are canons that still live in community; and who, like religious, have, in process of time, to the practice of their rules, added the solemn profession of vows. They are called regulars, to distinguish them from those secular canons who abandon living in community, and at the same time the observance of the canons made as the rule of the clergy, for the maintenance of the ancient discipline. The canons subsisted in their simplicity till the eleventh, some say the twelfth century, when some of them, separating from the community, took with them the name of canons, or acephalous priests, because they declined to live in community with the bishop; and those who were left thenceforth acquired the denomination of canons regular, and adopted most of the professions of the rule of St. Augustine. This order of regular canons of St. Augustine was brought into England by Adelwald, confessor to Henry I. who erected a priory at Nostel in Yorkshire; and obtained for them the church of Carlisle as an episcopal see, with the privilege of choosing their own bishop. They were singularly protected and encouraged by Henry I. who gave them the priory of Dunstable in 1107; and by queen Maud, who, in the following year, gave them the priory of the Holy Trinity in London. It appears, that under the reign of Edward I. they had 53 priories. *Tertiary* CANONS, were those who had only the third part of the revenues of the canonicate.

CANON, in an ecclesiastical sense, is a law or rule, either of doctrine or discipline, enacted especially by a council, and confirmed by the authority of the sovereign. Canons are properly decisions of matters of religion; or regulations of the policy and discipline of a church, made by councils, either general, national, or provincial. Such are the canons of the council of Nice, or Trent, &c. There have been various collections of the canons of the Eastern councils; but four principal ones, each ampler than the preceding. The first, according to Usher, A. D. 380, containing only those of the first oecumenical council, and the first provincial ones: they were but 164 in number. To these, Dionysius Exiguus, in the year 520, added the 50 canons of the apostles, and those of the other general councils. The Greek canons in this second collection end with those of the council of Chalcedon; to which are subjoined those of the council of Sardica, and the African councils. The fourth and last collection comes down as low as the second council of Nice; and it is on this that Balsamon and Zonaras have commented.

Apostolical CANONS, are those which have been usually ascribed to St. Clement, Bellarmin, Baronius, &c. who will have them to be genuine canons of the apostles: Cotelerius observes, that they cannot be ascribed to the apostles or Clement, because they are not received with other books of scripture, are not quoted by the writers of the first ages, and contain many things not agreeable to the apostolical times: Hincmar, De Marca, Beveridge, &c. take them to be framed by the bishops who were the apostles disciples in the second or third century: S. Basnage is of opinion, that they were collected by an anonymous writer in the fifth century; but Daille, &c. maintain them to have been forged by some heretic in the sixth century; and S. Basnage conjectures, that some of them are ancient, and others not older than the seventh century. The Greek church allow only 85 of them, and the Latins only 50; though there are 84 in the edition given of them in the Corpus Juris Canonici.

CANON is also used for the authorised catalogue of the sacred writings. See BIBLE. The ancient canon, or catalogue of the books of the Old Testament, was made by the Jews, and is ordinarily attributed to Ezra; who is said to have distributed them into the law, the prophets, and the hagiographa, to which our Saviour refers, Luke, chap. xxiv. ver. 44. The same division is also mentioned by Josephus. This is the canon allowed to have been followed by the primitive church, till the Council of Carthage; and, according to St. Jerom, it consisted of no more than 22 books; answering to the number of the Hebrew alphabet; though at present they are classed into 24 divisions. That council however enlarged the canon very considerably, taking into it the apocryphal books; which the council of Trent has further enforced. The Romanists, in defence of this canon, say, that it is the same with that of the council of Hippo, held in 393; and with that of the third council of Carthage, in 397, at which were present 46 bishops, and, among the rest, St. Augustine; who declared that they received it from their fathers. Their canon of the New Testament perfectly agrees with ours. It consists of books that are well known; some of which have been universally acknowledged; such are the four Gospels, the Acts of the Apostles, thirteen Epistles of St. Paul, one Epistle of St. Peter, and one Epistle of St. John: and others, concerning which doubts were entertained, but which were afterwards received as genuine; such are the Epistle to the Hebrews, that of James, the second

of Peter, the ſecond and third of John, that of Jude, and the Revelation. Theſe books were written at different times, and they are authenticated, not by the decrees of councils, or infallible authority, but by ſuch kind of evidence as is thought ſufficient in the caſe of any other ancient writings. Some of the fathers diſtinguiſh the inſpired writings into three claſſes; proto-canonical, deutero-canonical, and apocryphal.

Paſchal Canon, a table of the moveable feaſts, ſhowing the day of Eaſter, and the other feaſts depending on it, for a cycle of 19 years. The paſchal canon is ſuppoſed to be the calculation of Euſebius of Cæſarea, and to have been done by order of the council of Nice.

Canon, in monaſtic orders, a book wherein the religious of every convent have a fair tranſcript of the rules of their order, frequently read among them as their local ſtatutes. This is alſo called *regula*, as containing the rule and inſtitution of their order. The canon differs from the miſſale, martyrologium, and necrologium.

Canon, again, is uſed for the catalogue of ſaints acknowledged and canonized in the Roman church.

Canon is alſo uſed, by way of eminence, in the Romiſh church, for the ſecret words of the maſs, from the preface to the *Pater*; in the middle of which the prieſt conſecrates the hoſt. The common opinion is, that the canon of the maſs commences with *Te igitur*, &c. The people are to be on their knees, hearing the canon; and are to rehearſe it to themſelves, ſo as not to be heard.

Canon, in the ancient muſic, is a rule or method of determining the intervals of notes. Ptolemy, rejecting the Ariſtoxenian way of meaſuring the intervals in muſic, by the magnitude of a tone (which was ſuppoſed to be formed by the difference between a diapente and a diateſſaron), thought that muſical intervals ſhould be diſtinguiſhed, according to the ratios or proportions which the ſounds terminating thoſe intervals bear to one another, when conſidered according to their degree of acuteneſs or gravity; which, before Ariſtoxenus, was the old Pythagorean way. He therefore made the diapaſon conſiſt in a double ratio; the diapente, in a ſeſquialterate; the diateſſaron, in a ſeſquitertian; and the tone itſelf, in a ſeſquioctave; and all the other intervals, according to the proportion of the ſounds that terminate them: wherefore taking the canon (as it is called) for a determinate line of any length, he ſhows how this canon is to be cut accordingly, ſo that it may repreſent the reſpective intervals: and this method anſwers exactly to experiment, in the different lengths of muſical chords. From this canon, Ptolemy and his followers have been called *Canonici*; as thoſe of Ariſtoxenus were called *Muſici*.

Canon, in modern muſic, is a kind of fugue, which they call a *perpetual fugue*, becauſe the different parts beginning one after another, repeat inceſſantly the ſame air.

Formerly, ſays Zarlino, they placed, at the head of perpetual fugues, particular directions which ſhowed how this kind of fugues was to be ſung; and theſe directions being properly the rules by which perpetual fugues were compoſed were called *canoni, rules*, or *canons*. From this cuſtom, others taking the title for the thing ſignified, by a metonimy, termed this kind of compoſition *canon*. Such canons as are compoſed with facility, and of conſequence moſt generally uſed, begin the fugue either with the octave or the uniſon; that is to ſay, that every part repeats in the ſame tone the melody of the preceding. In order to form a canon of this kind, it is only neceſſary for the compoſer to make an air according to his taſte; to add in ſcore as many parts as he chooſes, where the voices in octave or uniſon repeat the ſame melody; then forming a ſingle air from all theſe parts ſucceſſively executed, to try whether this ſucceſſion may form an entire piece which will give pleaſure, as well in the harmony as the melody.

In order to execute ſuch a *canon*, he who ſings the firſt part begins alone, and continues till the air is finiſhed; then recommences immediately, without any ſuſpenſe of ſound or interruption of time. As ſoon as he has ended the firſt couplet, which ought to ſerve for the perpetual ſubject upon which the whole *canon* has been compoſed, the ſecond part begins and repeats the ſame couplet, whilſt the firſt who had begun purſues the ſecond: others in ſucceſſion begin, and proceed the ſame way, as ſoon as he who proceeds has reached the end of the firſt couplet. Thus, by inceſſantly recommencing, an univerſal cloſe can never be found, and the *canon* may be repeated as long as the ſingers pleaſe.

A perpetual fugue may likewiſe conſiſt of parts which begin with the intervals of a fourth or fifth; or, in other words, every part may repeat the melody of the firſt, a fourth or a fifth higher or lower. It is then neceſſary that the whole *canon* ſhould be invented *di prima intenzione*, as the Italians ſay; and that ſharps or flats ſhould be added to the notes, whoſe natural gradations do not anſwer exactly, by a fourth or fifth, to the melody of the preceding part, and produce the ſame intervals with itſelf. Here the compoſer cannot pay the leaſt regard to modulation; his only care is, that the melody may be the ſame, which renders the formation of a *canon* more difficult; for at every time when any part reſumes the fugue, it takes a new key; it changes the tone almoſt at every note, and what is ſtill worſe, no part is at the ſame time found in the ſame tone with another; hence it is that this kind of *canons*, in other reſpects far from being eaſy to be purſued, never produces a pleaſing effect, however good the harmony may be, and however properly it may be ſung.

There is a kind of *canon*, extremely difficult, and boaſting no other merit but the pains which have been thrown away in its compoſition. This may be called a *double canon inverted*, as well by the inverſions which are practiſed in it with reſpect to the melody of the parts, as by thoſe which are found among the parts themſelves, in ſinging. The reader may conſult Rouſſeau's Dictionary in this article, where he is referred to plate D, fig. 11. for two examples of canons of this ſort extracted from Bontempi, who likewiſe gives rules for their compoſition.

In order to form a *canon* in which the harmony may be a little varied, it is neceſſary that the parts ſhould not follow each other in a too rapid ſucceſſion, and that the one ſhould only begin a conſiderable time after the other. When they follow one another ſo immediately as at the diſtance of a ſemibreve or a minim, the duration is not ſufficient to admit a great number of chords, and the canon muſt of neceſſity exhibit a diſagreeable monotony; but it is a method of compoſing, without much difficulty, a canon in as many parts as the compoſer chooſes. For a *canon* of four bars only, will conſiſt of eight parts if they follow each other at the diſtance of half a bar; and by each bar which is added, two parts will conſtantly be gained.

The emperor Charles VI. who was a great muſician, and compoſed extremely well, took much pleaſure in compoſing and ſinging *canons*. Italy is ſtill replete with moſt beautiful *canons* compoſed for this prince, by the beſt maſters in that country. To what has been ſaid by Rouſſeau, we need only ſubjoin, that the Engliſh *catch* and the Italian *canon* are much the ſame; as any intelligent reader may perceive, from comparing the ſtructure and execution of the Engliſh *catch* with the account of *canons* which has now been given.

Canon, in geometry and algebra, a general rule for the ſolution of all caſes of a like nature with the preſent inquiry.

Thus every laſt ſtep of an equation is a canon; and, if turned into words, becomes a rule to ſolve all queſtions of the ſame nature with that propoſed.

Canon-*Law*, a collection of eccleſiaſtical laws, ſerving as the rule and meaſure of church-government. The power of making laws was exerciſed by the church before the Roman empire became Chriſtian. The canon-law that obtained throughout the Weſt, till the 12th century, was the collection of canons made by Dionyſius Exiguus in 520, the capitularies of Charlemagne, and the decrees of the popes from Sircus to Anaſtaſius. The canon-law, even when papal authority was at its height in England, was of no force when it was found to contradict the prerogative of the king, the laws, ſtatutes, and cuſtoms of the realm, or the doctrine of the eſtabliſhed church. The eccleſiaſtical juriſdiction of the ſee of Rome in England was founded on the canon-law; and this created quarrels between kings and ſeveral archbiſhops and prelates who adhered to the papal uſurpation. Beſides the foreign canons, there were ſeveral laws and conſtitutions made here for the government of the church: but all theſe received their force from the royal aſſent; and if, at any time, the eccleſiaſtical courts did, by their ſentence, endeavour to enforce obedience to ſuch canons, the courts at common law, upon complaints made, would grant prohibition. The authority veſted in the church of England of making canons was aſcertained by a ſtatute of Henry VIII. commonly called the *act of the clergy's ſubmiſſion*; by which they acknowledged, that the convocation had always been aſſembled by the king's writ; ſo that though the power of making canons reſided in the clergy met in convocation, their force was derived from the authority of the king's aſſenting to and confirming them. The old canons continued in full force till the reign of James I. when the clergy being aſſembled in convocation, the king gave them leave to treat and conſult upon canons; which they did, and preſented them to the king, who gave them the royal aſſent: theſe were a collection out of the ſeveral preceding canons and injunctions. Some of theſe canons are now obſolete. In the reign of Charles I. ſeveral canons were paſſed by the clergy in convocation.

CANONESS, in the Romiſh church, a woman who enjoys a prebend, affixed, by the foundation, to maids, without their being obliged to renounce the world or make any vows.

CANONICA, in philoſophical hiſtory, an appellation given by Epicurus to his doctrine of logic. It was called *canonica*, as conſiſting of a few canons or rules for directing the underſtanding in the purſuit and knowledge of truth. Epicurus's *canonica* is repreſented as a very ſlight and inſufficient logic by ſeveral of the ancients, who put a great value on his ethics and phyſics. Laertius even aſſures us that the Epicureans rejected logic as a ſuperfluous ſcience; and Plutarch complains that Epicurus made an unſkilful and prepoſterous uſe of ſyllogiſms. But theſe cenſures ſeem too ſevere. Epicurus was not averſe to the ſtudy of logic, but even gave better rules in this art than thoſe philoſophers who aimed at no glory but that of logics. He only ſeems to have rejected the dialectics of the ſtoics, as full of vain ſubtleties and deceits, and fitted rather for parade and diſputation than real uſe. The ſtreſs of Epicurus's *canonica* conſiſts in his doctrine of the criteria of truth. All queſtions in philoſophy are either concerning words or things: concerning things we ſeek their truth; concerning words, their ſignification: things are either natural or moral; and the former are either perceived by ſenſe or by the underſtanding. Hence, according to Epicurus, ariſe three criterions of truth, viz. ſenſe, anticipation or prænotion, and paſſion. The great canon or principal of Epicurus's logic is, that the ſenſes are never deceived; and therefore that every ſenſation or perception of an appearance is true.

CANONICAL, ſomething that belongs to, or partakes of, the nature of a rule or canon.

Canonical *Hours*, are certain ſtated times of the day, conſigned, more eſpecially by the Romiſh church, to the offices of prayer and devotion. Such are *matins*, *lauds*, *ſixth*, *ninth*, *veſpers*, &c. In our country the canonical hours are from eight to twelve in the forenoon, before or after which marriage cannot be legally performed in any pariſh-church.

Canonical *Obedience*, is that ſubmiſſion which, by the eccleſiaſtical laws, the inferior clergy are to pay to their biſhops, and religious to their ſuperiors.

Canonical *Sins*, in the ancient church, thoſe which were capital or mortal. Such eſpecially were idolatry, murder, adultery, hereſy, and ſchiſm.

Canonical *Puniſhments*, are thoſe which the church may inflict; ſuch as excommunication, degradation, and penance, in Roman Catholic countries; alſo faſting, alms, whipping, &c.

Canonical *Life*, the method or rule of living preſcribed by the ancient clergy who lived in community. The canonical life was a kind of medium between the monaſtic and clerical lives. Originally the orders of monks and clerks were entirely diſtinct; but pious perſons, in proceſs of time, inſtituted colleges of prieſts and canons, where clerks brought up for the miniſtry, as well as others already engaged therein, might live under a fixed rule, which, though ſomewhat more eaſy than the monaſtic, was yet more reſtrained than the ſecular. This was called a *canonical life*, and thoſe who embraced it *canons*. Authors are divided about the founder of the canonical life. Some will have it to be founded by the apoſtles; others aſcribe it to pope Urban I. about the year 1230, who is ſaid to have ordered biſhops to provide ſuch of their clergy as were willing to live in community with neceſſaries out of the revenues of their churches. The generality attribute it to St. Auguſtine, who having gathered a number of clerks to devote themſelves to religion, inſtituted a monaſtery within his epiſcopal palace, where he lived in community with them. Onuphrius Panvinius brings the inſtitution ſomewhat lower; according to him, pope Gelaſius I. about the year 495, placed the firſt regular canons of St. Auguſtin in the Lateran church.

Canonical *Letters*, in the ancient church, were a ſort of teſtimonials of the orthodox faith, which the biſhops and clergy ſent each other to keep up the catholic communion, and diſtinguiſh orthodox Chriſtians from Arians and other heretics. They were denominated *canonical*, either as being compoſed according to a certain rule or form, or becauſe they were given to the *canonici*, that is, thoſe comprehended in the canon or catalogue of their church. When they had occaſion to travel into other dioceſes or countries, dimiſſory and recommendatory letters, alſo letters of peace, &c. were ſo many ſpecies of canonical letters.

Canonical is alſo an appellation given to thoſe epiſtles in the New Teſtament more frequently called *catholic* or *general* epiſtles.

CANONICUM, in a general ſenſe, denotes a tax or tribute; but the term is more particularly uſed in the Greek church for a fee paid by the clergy to biſhops, archbiſhops, and metropolitans, for degrees and promotions.

Canonicum alſo denotes a due of firſt-fruits, paid by the Greek laity to their biſhops, or, according to Du Cange, to their prieſts. The *canonicum* is aſſeſſed according to the number of houſes or chimnies in a place. The emperor Iſaac Comnenus made a conſtitution for regulating the *canonicum* of biſhops, which was confirmed by another made in 1086, by his nephew Alexis Comnenus. A village containing thirty fires, was to pay for its *canonicum* one piece of gold, two of ſilver, one ſheep, ſix buſhels of barley, ſix of wheat flour, ſix meaſures of wine, and thirty hens.

CANONIST, a perfon fkilled in or who makes profeffion of the ftudy and practice of the canon law. Canonifts and civilians are ufually combined in the fame perfons: and hence the title of *doctor juris utriufque*, or *legum doctor*, ufually expreffed in abbreviature, LL. D. or J. U. D.

CANONIZATION, a ceremony in the Romifh church, by which perfons deceafed are ranked in the catalogue of the faints. It fucceeds beatification. Before a beatified perfon is canonized, the qualifications of the candidate are ftrictly examined into, in fome confiftories held for that purpofe; after which, one of the confiftorial advocates, in the prefence of the pope and cardinals, makes the panegyric of the perfon who is to be proclaimed a faint, and gives a particular detail of his life and miracles: which done, the holy father decrees his canonization, and appoints the day. It has been the rule for about a century, not to enter into the inquiries prior to canonization, till 50 years at leaft after the death of the perfon to be canonized. By the ceremony of canonization, it appears that this rite of the modern Romans has fomething in it very like the apotheofis or deification of the ancient Romans, and, in all probability, takes its rife from it; at leaft feveral ceremonies of the fame nature are confpicuous in both.

CANONRY, the benefice filled by a canon. It differs from a prebend, in that the prebend may fubfift without the canonicate: whereas the canonicate is infeparable from the prebend: again, the rights of fuffrage, and other privileges, are annexed to the canonicate, and not to the prebend.

CANOPUS, in aftronomy, a ftar of the firft magnitude in the rudder of Argo, a conftellation of the fouthern hemifphere.

Canopus, in Pagan mythology, one of the deities of the ancient Egyptians; according to fome, the god of water.

CANOPY, in architecture and fculpture, a magnificent kind of decoration, ferving to cover and crown an altar, throne, tribunal, pulpit, chair, or the like. The word is formed from the barbarous Latin *canopeum*, of κωνωπειον, *a net fpread over a bed to keep off the gnats*, from κωνωψ, *a gnat*. Canopies are alfo borne over the head in proceffions of ftate, after the manner of umbrellas. The canopy of an altar is more peculiarly called *Ciborium*. The Roman grandees had their canopies, or fpread veils, called *thenfæ*, over their chairs: the like were alfo in temples over the ftatues of the gods. The modern cardinals ftill retain the ufe of canopies.

CANOSA, a town of Puglia in Italy, occupying part of the fite of the ancient Canufium. According to Strabo, the old city was founded by Diomede. It afterwards became a Roman colony, and one of the moft confiderable cities of this part of Italy for extent, population, and magnificence in building.

CANSO, a fea-port town of Acadia, or Nova Scotia, in North America, feated on a narrow ftrait which feparates Nova Scotia from Cape Breton. Near this town is a fine fifhery for cod. W. long. 62. N. lat. 46.

CONSTAT, a town of Swabia, in Germany, in the duchy of Wirtemberg, fituated on the river Neckar, in E. long. 7. 9. N. 48. 51.

CANT, a quaint affected manner of fpeaking, adapted chiefly to the lower fort. Skinner racks his invention for the origin of this word; which he fucceffively deduces from the German, Flemifh, and Saxon tongues. According to the general opinion, Cant is originally the proper name of a Cameronian preacher in Scotland, who by exercife had obtained the faculty of talking in the pulpit in fuch a tone and dialect as was underftood by none but his own congregation. Since Andrew Cant's time, the word has been extended to fignify all fudden exclamations, and whining unmufical tones, efpecially in praying and preaching. But this origin of the word has been difputed by others; and perhaps the true derivation is from the Latin *cantare* "to fing."

Cant is alfo applied to words and phrafes affected by particular perfons or profeffions for low ends, and not authorifed by the eftablifhed language. The difference between *cant* and *technical* feems to be this: the former is reftrained to words introduced out of folly, affectation, or impofture; the latter is applied to fuch as are introduced for the fake of clearnefs, precifion, and fignificancy.

Cant is alfo ufed to denote a fale by auction. The origin of the word in this fenfe is dubious; it may come, according to fome, from *quantum*, how much; according to others, from *cantare*, to fing or cry aloud; agreeably to which, we fometimes alfo call it an *outcry*.

Cant-*Timbers*, in fhip-building, thofe timbers which are fituated at the two ends of a fhip. They derive their name from being *canted*, or raifed obliquely from the keel; in contradiftinction from thofe whofe planes are perpendicular to it. The upper ends of thofe on the bow, or fore-part of the fhip, are inclined to the ftern; as thofe in the after, or hind-part, incline to the ftern-poft above. See Ship-*Building*.

CANTABRICA, in botany: a fynonime of a fpecies of Convolvulus.

CANTABRUM, in antiquity, a large kind of flag ufed by the Roman emperors, diftinguifhed by its peculiar colour, and bearing on it fome words or motto of good omen, to encourage the foldiers.

CANTACUZENUS (Johannes), of Conftantinople, a celebrated ftatefman, general, and hiftorian, was born in that city, of a very ancient and noble family. He was bred to letters and to arms, and admitted to the higheft offices of the ftate. The emperor Andronicus loaded him with wealth and honour; made him generaliffimo of his forces; and was defirous of having him join in the government, but this he refufed. Andronicus dying in 1341, left to Cantacuzenus the care of the empire, till his fon John Paleologus, who was then but nine years of age, fhould be fit to take it upon himfelf. This truft he faithfully difcharged; till the emprefs dowager and her faction forming a party againft him, declared him a traitor. On this the principal nobility and the army befought him to afcend the throne; and accordingly he was crowned on the 21ft of May 1341. This was followed by a cruel war, which lafted five years; when he admitted John a partner with him in the empire, and their union was confirmed by his giving him his daughter in marriage. Sufpicions and enmities, however, foon arifing, the war broke out again, and continued till John took Conftantinople in 1355. A few days after, Cantacuzenus, unwilling to continue the effufion of blood, abdicated his fhare of the empire, and, retiring to a monaftery, took the habit of a monk, and the name of *Joafaphas*. His wife alfo retired to a nunnery, and changed her name of *Irene* for that of *Eugenia*. In this retirement he lived till the year 1411, when he was upwards of 100 years of age. Here he wrote a hiftory of his own times, a Latin tranflation of which, from the Greek manufcript, was publifhed by Pontanus at Ingolftadt, in 1603: and a fplendid edition was printed at Paris in 1645, in three volumes folio, of the original Greek, and Pontanus's Latin verfion. He alfo wrote an apology for the Chriftian religion againft that of Mahomet, under the name of *Chriftodulus*.

CANTALIVERS, in architecture, pieces of wood framed into the front or fides of a houfe, to fufpend the mouldings and eyes over it.

CANTAR, or Cantaro, an eaftern weight, of different value in different places, equal at Acra in Turkey to 603 pounds, at Tunis and Tripoli to 114 pounds.

Cantar is alfo an Egyptian weight, which is denominated a *quintal*, and confifts of an hundred or of an hundred and fifty rotolos, according to the goods they are to weigh.

Cantaro is alſo an Egyptian weight, which at Naples is equivalent to 25 pounds, at Genoa to 150 pounds. At Leghorn there are three kinds of *cantaros*, one weighing 150 pounds, another 151, and a third 160 pounds.

Cantaro is alſo a Spaniſh liquid meaſure, in uſe eſpecially at Alicant, containing three gallons.

Cantaro is alſo a meaſure of capacity, uſed at Cochin, containing four rubis, the rubi 32 rotolos.

CANTARINI (Simon), a famous painter, called the *Peſareſe*, from his being born at Peſaro, was the diſciple of Guido; and copied the manner of his maſter ſo happily, that it is often difficult to diſtinguiſh between their works. He died at Verona in the year 1648.

CANTATA, in muſic, a ſong or compoſition, intermixed with recitatives, airs, and different movements, chiefly intended for a ſingle voice, with a thorough baſs, though ſometimes for other inſtruments. The cantata, when performed with judgment, has ſomething in it very agreeable; the variety of the movement not clogging the ear, like other compoſitions. It was firſt uſed in Italy, then in France, whence it paſſed to us.

CANTAZARO, an epiſcopal city of Italy, in the kingdom of Naples, and in the territory of Calabria Ulterior. It is the reſidence of the governor of the province, and is ſeated near the ſea, in E. long. 17. 0. N. lat. 28. 59.

CANTECROIX, a ſmall territory of the Netherlands, in Brabant, and in the quarter of Antwerp, with the title of a principality; there is a ſmall town of the ſame name, but Lire is the capital.

CANTEMIR (Demetrius), ſon of a prince of Moldavia. Diſappointed by not ſucceeding his father in that dignity, held under the Ottoman Porte, he went over with his army to the Czar Peter the Great, againſt whom he had been ſent by the Grand Signior: he ſignalized himſelf in the Czar's ſervice; and in the republic of letters, by a Latin hiſtory of the origin and decline of the Ottoman empire, &c. He died in the year 1723.

Cantemir (Antiochus), eſteemed the founder of the Ruſſian poetry, was the youngeſt ſon of the preceding. Under the moſt ingenious profeſſors, whom the czar had invited to Peterſburg, he learned mathematics, phyſic, hiſtory, moral philoſophy, and polite literature; without neglecting the ſtudy of the Holy Scriptures, to which he had a great inclination. Scarce had he finiſhed his academic courſe, when he printed a Concordance to the Pſalms in the Ruſſian language, and was elected member of the academy. The affairs of ſtate in which he ſoon after engaged, did not make him neglect his literary purſuits. In order to make himſelf uſeful to his fellow-citizens, he compoſed his ſatires, to ridicule certain prejudices which had got footing among them. When but 23 years of age, he was nominated miniſter at the court of Great Britain; and his dexterity in the management of public affairs was as much admired as his taſte for the ſciences. He had the ſame reputation in France, whither he went in 1758, in quality of miniſter plenipotentiary, and ſoon after was inveſted with the character of ambaſſador extraordinary. The wiſe and prudent manner in which he conducted himſelf during the different revolutions which happened in Ruſſia during his abſence, gained him the confidence and eſteem of three ſucceſſive princes. He died of a dropſy, at Paris, in 1744, aged 44. Beſides the pieces already mentioned, he wrote, 1. Some fables and odes. 2. A tranſlation of Horace's epiſtles into Ruſſian verſe. 3. A proſe tranſlation of Fontenelle's plurality of worlds; and, 4. Algarotti's dialogues on ſight. The abbé Guaſco has written his life in French, and tranſlated his ſatires into that language.

CANTERBURY, the capital of the county of Kent, with an archbiſhop's ſee, the metropolitan of all England. The cathedral, a large ſtructure, was once famous for the ſhrine of Thomas à Becket, viſited by pilgrims from all parts of Europe. This turbulent prieſt having been murdered here in 1170, was afterward made a ſaint; miracles were pretended to be performed at his tomb; and 100,000 pilgrims, viſiters to this tomb, have been regiſtered at one time in Canterbury, where the devotion to him had quite effaced the adoration of God, and even of the Virgin. At the altar of God, for inſtance, there were offered, in one year 3l. 2s. 6d.; at the Virgin's 63l. 5s. 6d.; at St. Thomas's 832l. 12s. 3d. The next year the diſproportion was ſtill greater: there was not a penny on God's altar; the Virgin gained only 4l. 1s. 8d. but St. Thomas had got 954l. 6s. 3d. Lewis VII. of France made a pilgrimage to this tomb, and beſtowed on the ſhrine a jewel eſteemed the richeſt in Chriſtendom. But Henry VIII. in 1538, not only pillaged this rich ſhrine, but cauſed the ſaint to be cited in court, tried and condemned as a traitor; ordering his name to be ſtruck out of the calendar, his bones to be burnt, and his aſhes thrown in the air. In this cathedral are interred Henry IV. and Edward the Black Prince. Here are likewiſe 14 pariſh churches; the remains of many Roman antiquities; an ancient caſtle, with walls and a deep ditch. Canterbury is an ancient and meanly-built city, in a declining ſtate, notwithſtanding it poſſeſſes a ſhare of the ſilk manufactories introduced by the French refugees, who have a church under the cathedral. This city is noted for its brawn, and the adjacent country produces abundance of hops. It has two markets, on Wedneſday and Saturday, ſends two members to parliament, and is ſeated on the river Stour, 26 miles S. E. by E. of Rocheſter, and 56 from London. Long. 1. 4. E. Lat. 51. 19. N.

Canterbury-*Bell*, in botany; the Engliſh name of a ſpecies of Campanula.

CANTERUS (William), an eminent linguiſt and philologer, was born at Utrecht in 1542. He ſtudied at Louvain and Paris; and gave ſurpriſing proofs of his progreſs in Greek and Latin literature. He afterwards viſited the ſeveral univerſities of Germany and Italy; and died at Louvain, in 1575, aged 33. He underſtood ſix languages, beſides that of his native country; and, notwithſtanding his dying ſo young, wrote ſeveral philological and critical works, among which are, *Notæ Scholia, Emendationes, et Explicationes, in Euripidem, Sophoclem, Æſchylum, Ciceronem, Propertium, Auſonium*, &c. and many tranſlations of Greek authors.

CANTHARIDES. See Canthares and Meloe.

CANTHARIS, in zoology, a genus of inſects belonging to the order of inſects coleoptera. See Pl. 58. The feelers of this genus are ſetaceous; the breaſt is marginated, and ſhorter than the head; the elytra, or wing-caſes, are flexile; and the ſides of the belly are plated and papillous. Linnæus enumerates 27 ſpecies of the cantharis, moſt of them to be found in different parts of Europe. The cantharis uſed in making bliſtering plaiſters, is ranked under a different genus, viz. the Meloe.

CANTHI, in anatomy, cavities at the extremities of the eye-lids, commonly called the *corners of the eye*: the greater of them, or the greater canthus, is next the noſe; the leſſer of them, or the little canthus, lies towards the temple.

CANTICLES, a canonical book of the Old Teſtament, otherwiſe called the *Song of Solomon*; by the Jews the *Song of Songs, Canticum Canticorum*. The book of Canticles is uſually ſuppoſed to be an epithalamium compoſed by Solomon, on occaſion of his marriage with the king of Egypt's daughter. But thoſe who penetrate farther in the myſtery, find in it the marriage of Jeſus Chriſt with human nature, the church and good men. On this principle the Canticles is held to be a continued allegory, wherein, under the terms of a common wedding, a divine and ſpiritual marriage is expreſſed.

CANTIMARONS, or Catimarons, a kind of floats or

rafts, ufed by the inhabitants of the coaft of Coromandel to go a-fifhing in, and to trade along the coaft. They are made of three or four fmall canoes, or trunks of trees dug hollow, and tied together with cacao ropes, with a triangular fall in the middle, made of mats. The perfons who manage them are almoft half in the water, there being only a place in the middle a little raifed to hold their merchandize: which laft particular is only to be underftood of the trading cantimarons, and not of thofe who go fifhing.

CANTIN (Cape), a promontory of the coaft of Morocco in Africa, fituated in W. long. 10. 2. N. lat. 33. 9.

CANTING, a fea-phrafe, which denotes the act of turning any thing about.

Canting *Language* or *dialect*, is a myfterious fort of jargon ufed by gipfies, thieves, and ftrolling beggars, to exprefs their fentiments to each other, without being underftood by the reft of mankind. The late Mr. Grofe publifhed what he humoroufly called "A Dictionary of the Vulgar Tongue," which comprehended all the terms ufed by the high-bred inhabitants of St. Giles's.

CANTO denotes a part or divifion of a poem, anfwering to what is otherwife called a *book*. The word is Italian, where it properly fignifies *fong*. Taffo, Ariofto, and feveral other Italians, have divided their longer or heroic poems into cantos. In imitation of them, Scarron has alfo divided his *Gigantomachia*, and Boileau his *Lutrin*, into chants or fongs. The like ufage has been adopted by fome Englifh writers, as Butler, who divides his Hudibras, and Dr. Garth his Difpenfary, into cantos. A late tranflator of part of Virgil's Æneid has even fubdivided a book of Virgil into feveral cantos.

Canto, in the Italian mufic, fignifies a *fong*: hence *canto fimplice* is where all the notes or figures are equal, and called alfo *canto fermo*: *canto figurato* is that where the figures are unequal, and exprefs different motions.

Canto alfo fignifies the treble part of a fong: hence *canto concertante*, the treble of the little chorus; *canto ripieno*, the treble of the grand chorus, or that which fings only now and then in particular places. *Canto* fignifies the firft treble, unlefs fome other word be added to it, as *fecondo*; in which cafe it denotes the fecond treble.

CANTON, in geography, denotes a fmall diftrict or country conftituting a diftinct government: fuch are the cantons of Switzerland.

Canton, *Quang-tong*, or *Koanton*, one of the fouthern provinces of China; bounded on the north-eaft by Fokein, on the north by Kiang-fi, on the weft by Quang-fi and the kingdom of Tonking, and every where elfe by the fea. The country is diverfified with hills and plains, and the foil in general fo fertile that it produces two crops annually. Befides many of the fruits of Europe, and thofe common in the other parts of the Indies, the province of Canton produces fome peculiar to itfelf. Abundance of valuable aromatic woods are alfo to be met with in this province, as well as eagle-wood, ebony, &c. and in the mineral kingdom the province furnifhes gold, precious ftones, tin, quickfilver, and copper. Silk and fugar are alfo cultivated here, and pearls are fifhed up on the coafts; fo that every thing which can contribute to the pleafure or convenience of life is to be met with in Canton. "One begins, fays Premare, to have an idea of China, on entering the river Canton. Both fides of it prefent large fields of rice which refemble green meadows, and extend beyond the reach of fight. They are interfected by an infinite number of fmall canals, in fuch a manner that the barks which pafs and repafs in them feem at a diftance, while the water which carries them is concealed, to glide along the grafs. Farther inland the country appears covered with trees and cultivated along the valleys; and the whole fcene is interfperfed with villages, rural feats, and a variety of moft delightful profpects.

The coafts of this province abound with fifh, and furnifh vaft numbers of crabs, oyfters, and tortoifes of an immenfe fize. The inhabitants keep a prodigious number of tame ducks, which they hatch in ovens or dunghills, though it does not appear that they borrowed this cuftom from the Egyptians. The docility of thefe creatures exceeds what we fhould be apt at firft to imagine. The inhabitants load a number of fmall barks with them, and carry them in flocks to feed on the feafhore, where they find fhrimps and other animals proper for their nourifhment. But though the ducks from the different barks are thus unavoidably mixed together in the day-time, they are eafily collected by only beating on a bafon, on which they immediately collect themfelves into different flocks, and each returns to its proper bark.

In this province the Chinefe have alfo a method of preferving not only the flefh of their ducks in fuch a manner that it lofes nothing of its original flavour, but their eggs alfo. The latter operation is performed by covering the eggs with a coat of clay mixed with falt. When mixed in this manner, it feems that the falt has the property of penetrating through the pores of the fhell, and thus impregnating the fubftance in the egg, which it could not do by fimple folution of water.

Canton, though it fuffered much in the Chinefe wars, is at prefent one of the moft flourifhing provinces of the empire; and being at a great diftance from court, its government is one of the moft important. A great number of fortreffes, many of which are cities provided with numerous garrifons, have been built along the coafts for the fuppreffion of pirates and robbers; for which purpofe alfo a certain number of troops are kept properly pofted in different parts of the province. It is divided into ten diftricts, which contain as many cities of the firft clafs, and 84 of the fecond and third. The air in general is warm but healthy, and the people are very induftrious. They poffefs, in an eminent degree, the talent of imitation; fo that if they are only fhewn any European work they can execute others like it with furprifing exactnefs. The moft remarkable cities in the province befides Canton the capital are, 1. Chao-tcheou-fou, chiefly noted for a monaftery of the bonzes in its neighbourhood, to which the adjacent country belongs, and the origin of which is traced back for 8 or 900 years. It has under its jurifdiction fix cities of the third clafs; near one of thefe grows a reed of which feveral inftruments are made, which cannot be diftinguifhed from real ebony. The air of Chao-tcheou-fou, however, is unhealthy; and great numbers of the inhabitants are carried off annually by contagious diftempers, which prevail from the middle of October to the beginning of December. 2. Kao-tcheou-fou, fituated in a delightful and plentiful country. In the neighbourhood is found a fingular kind of ftone much refembling marble, on which are natural reprefentations of rivers, mountains, landfcapes, and trees. Thefe ftones are cut into flabs, and made into tables, &c. Crabs are alfo caught on the coafts here, which very much refemble thofe of Europe; but, fays M. Grofier, they have this fingularity, that when taken out of the water, they become petrified without lofing any thing of their natural figure. 3. Kiun-tcheou-fou, the capital of the ifland of Hai-nan. See Hai-nan.

Canton, a large, populous, and wealthy city of China, capital of the province of that name, ftands on the banks of the river Taa, or great river, which, near the city, is wide and fpacious. The wall of the city is pretty high, and about fix or feven miles in circumference, though not more than one-third of the ground is occupied by buildings, the other parts being appropriated to pleafure grounds, or to fifh-ponds. The

country is extremely pleafant, and towards the eaft hilly, fo as to command a beautiful profpect of the city and fuburbs, the compafs of which, together, is about ten miles. The buildings of Canton are in general low, confifting of one ftory and a ground floor, which is covered with earth or red tiles in order to keep it cool; but the houfes of the moft refpectable merchants and mandarins are comparatively lofty and well built. In different parts of the city and fuburbs are jofs houfes or temples, in which are placed the images worfhipped by the Chinefe: before whom are placed, at particular feafons, a vaft variety of fweetmeats, oranges, great plenty of food ready dreffed, and alfo incenfe, which is kept perpetually burning.

The ftreets of Canton are long and narrow, paved with flat ftones, adorned at intervals with triumphal arches, which have a pleafing effect, and are much crowded with people. On both fides are fhops as in London, appropriated to the fale of different commodities; and a kind of awning is extended from houfe to houfe, which prevents the fun's rays from incommoding either inhabitants or paffengers. At the end of every ftreet is a barrier, which, with the gates of the city, are fhut every evening. In China-ftreet, which is pretty long, and confiderably wider than the reft, refide merchants; whofe trade, fo far as refpects lackered ware, China, fans, &c. is wholly confined to Europeans. Moft of them fpeak the foreign languages tolerably well, or at leaft fufficiently to tranfact bufinefs. Befides thefe merchants, there is a company of twelve or thirteen, called the *Cohong*; who have an exclufive right to purchafe the cargoes from the different fhips, and alfo to fupply teas, raw filks, &c. in return. The eftablifhment of the Cohong, though injurious to private trade, is admirably well adapted for the fecurity of the different companies with which they traffic; becaufe each individual becomes a guarantee for the whole; fo that if one fail, the others are refponfible. In Canton there are no carriages; all burdens are carried by porters acrofs their fhoulders on bamboos; as are alfo the principal people in palanquins or fedan chairs, and the ladies always. The ftreets of Canton may be traverfed from morning till evening without feeing a woman, thofe excepted who are Tartars, and even thefe but very feldom.

On the wharf of the river, which is commodious and pleafant, ftand the factories of the different European nations, viz. the Dutch, French, Swedes, Danes, Englifh, &c. In thofe refide the fupercargoes belonging to their refpective companies, who are appointed to difpofe of the cargoes brought to market; to fupply the fhips with others from Europe in return; and, during their abfence, to contract with the merchants for fuch articles as may be judged neceffary for the next fleet. Between the refidents of the factories the moft perfect cordiality fubfifts: in each a common and fplendid table is kept at the company's expence, and vifits are reciprocally exchanged; fo that nothing is wanting to make refidence at Canton agreeable to an European, but the fociety of the ladies.

The fide of the river which is next the city is covered with boats, that form a kind of town, in which live the poorer fort of the Chinefe, or rather the defcendants of the Tartars. Some of the men come on fhore in the morning to their refpective employments, and in thofe fampans, or boats which are not ftationary, the women and alfo the men carry paffengers from place to place in the fame manner as is done by wherries on the Thames. On this river live many thoufand fouls who never are permitted to come on fhore; whofe only habitation is their boat; in which they eat, drink, fleep, carry on many occupations, keep ducks, &c. and occafionally a hog. The manufactures of Canton are principally carried on in the fuburbs; though it has been frequently fuppofed that they were confined to the city; and this, by fome writers, has been given as a reafon why Europeans are not permitted to enter within the gates. But this is a miftake; and perhaps the true reafon for this very fingular reftraint is, that the houfes in which they keep their women are chiefly within the city.

At Wampoa, a large commodious place for anchorage, and which is about 12 or 14 miles from Canton, the European veffels lie and unload their cargoes, which are tranfmitted by lighters to the factories; and by the fame conveyance receive their refpective freights. Between this place and the city are three hoppo or cuftom-houfes, at which the boats paffing and repaffing are obliged to ftop, and undergo, with their paffengers, an examination, in order to prevent fmuggling. The lighters juft mentioned, and alfo the captain's pinnace, are, however, excepted; the former having proper officers on board for the purpofe, and the latter being narrowly watched and examined at the landing.

The weather at Canton is, in fummer, extremely hot; and in the months of December, January, and February, cold: the country is neverthelefs pleafant and healthful, abounding with all the neceffaries and delicacies of life, which may be procured on terms much cheaper than in Europe. The number of inhabitants has been eftimated at one million; but later calculations have made the number confiderably lefs. N. lat. 23. 30. E. long. 113. 20.

Canton (John), an ingenious natural philofopher, was born at Stroud, in Gloucefterfhire, in 1718; and was placed, when young, under the care of a Mr. Davis, of the fame place, a very able mathematician, with whom, before he had attained the age of nine years, he had gone through both vulgar and decimal arithmetic. He then proceeded to the mathematics, and particularly to algebra and aftronomy, wherein he had made a confiderable progrefs, when his father took him from fchool, and put him to learn his own bufinefs, which was that of a broad-cloth weaver. This circumftance was not able to damp his zeal for the acquifition of knowledge. All his leifure time was devoted to the affiduous cultivation of aftronomical fcience; and, by the help of the Caroline tables, annexed to "Wing's Aftronomy," he computed eclipfes of the moon and other phænomena. His acquaintance with that fcience he applied likewife to the conftructing of feveral kinds of dials. But the ftudies of our young philofopher being frequently purfued to very late hours, his father, fearing that they would injure his health, forbad him the ufe of a candle in his chamber any longer than for the purpofe of going to bed, and would himfelf often fee that his injunction was obeyed. The fon's thirft after knowledge was, however, fo great, that it made him attempt to evade the prohibition, and to find means of fecreting his light till the family had retired to reft, when he rofe to profecute undifturbed his favourite purfuits. It was during this prohibition, and at thefe hours, that he computed, and cut upon a ftone, with no better an inftrument than a common knife, the lines of a large upright fun-dial, on which, befides the hour of the day, was fhown the rifing of the fun, his place in the ecliptic, and fome other particulars. When this was finifhed, and made known to his father, he permitted it to be placed againft the front of his houfe, where it excited the admiration of feveral gentlemen in the neighbourhood, and introduced young Mr. Canton to their acquaintance, which was followed by the offer of the ufe of their libraries. In the library of one of thefe gentlemen, he found "Martin's Philofophical Grammar," which was the firft book that gave him a tafte for natural philofophy. In the poffeffion of another gentleman, a few miles from Stroud, he firft faw a pair of globes—an object that afforded him uncommon pleafure, from the great eafe with which he could folve thofe problems he had hitherto been accuftomed to compute. The dial was beautified a few

years ago at the expence of the gentlemen at Stroud, several of whom had been his school-fellows, and who continued still to regard it as a very distinguished performance. Among other persons with whom he became acquainted in early life, was the late reverend and ingenious Dr. Henry Miles of Tooting, a learned and respectable member of the Royal Society, and of approved eminence in natural knowledge. This gentleman, perceiving that Mr. Canton possessed abilities too promising to be confined within the narrow limits of a country town, prevailed on his father to permit him to come to London. Accordingly he arrived at the metropolis March 4, 1737, and resided with Dr. Miles at Tooting till the 6th of May following; when he articled himself for the term of five years, as a clerk to Mr. Samuel Watkins, master of the academy in Spital-square. In this situation, his ingenuity, diligence, and good conduct, were so well displayed, that on the expiration of his clerkship in May 1742, he was taken into partnership with Mr. Watkins for three years; which gentleman he afterwards succeeded in Spital-square, and there continued during his whole life. In 1744, he married Penelope, the eldest daughter of Mr. Thomas Colbrooke, and niece to James Colbrooke, Esq. banker in London.

Towards the end of 1745, electricity, which seems early to have engaged Mr. Canton's notice, received a very capital improvement by the discovery of the famous Leyden Phial. This event turned the thoughts of most of the philosophers of Europe to that branch of natural philosophy; and our author, who was one of the first to repeat and to pursue the experiment, found his assiduity and attention rewarded by many capital discoveries. Towards the end of 1749, he was concerned with his friend, the late Mr. Benjamin Robins, in making experiments in order to determine what height rockets may be made to ascend, and at what distance their light may be seen. In 1750 was read at the Royal Society Mr. Canton's "Method of making artificial magnets, without the use of, and yet far superior to, any natural ones." This paper procured him the honour of being elected a member of the Society, and the present of their gold medal. The same year he was complimented with the degree of M. A. by the university of Aberdeen; and, in 1751, was chosen one of the council of the Royal Society.

In 1752, our philosopher was so fortunate as to be the first person in England, who, by attracting the electric fire from the clouds during a thunder-storm, verified Dr. Franklin's hypothesis of the similarity of lightning and electricity. Next year, his paper intitled, "Electrical Experiments, with an attempt to account for their several Phænomena," was read at the Royal Society. In the same paper Mr. Canton mentioned his having discovered, by a great number of experiments, that some clouds were in a positive, and some in a negative state of electricity. Dr. Franklin, much about the same time, made the like discovery in America. This circumstance, together with our author's constant defence of the doctor's hypothesis, induced that excellent philosopher, immediately on his arrival in England, to pay Mr. Canton a visit, and gave rise to a friendship which ever after continued without interruption or diminution.

Mr. Canton's labours in the pursuit of natural knowledge are recognised in a great variety of instances in different volumes of the Transactions of the Royal Society; but, besides these, he wrote a number of papers both in earlier and in later life, which appeared in several different publications, and particularly in the Gentleman's Magazine.

The close and sedentary life of Mr. Canton, arising from an unremitted attention to the duties of his profession, and to the prosecution of his philosophical enquiries and experiments, probably contributed to shorten his days. The disorder into which he fell, and which carried him off, was a dropsy; his death happening March 22d, 1772, in the 54th year of his age.

CANTONING, in the military art, is the allotting distinct and separate quarters to each regiment; the town wherein they are quartered being divided into as many cantons as there are regiments.

CANTRED, or CANTREF, signifies an hundred villages. It is a British word compounded of the adjective *cant*, i. e. hundred; and *tref*, a town or village. In Wales some of the counties are divided into cantreds, as in England into hundreds.

CANTYRE, (from *Cantierre*, signifying a "head-land;") the southern division of the shire of Argyle in Scotland. It is a peninsula, stretching 37 miles from north to south, and even seven miles in breadth. It gives the title of *marquis* to the duke of Argyle, and is by Lochfyn divided from Argyle Proper. This loch is an inlet from the sea, about 60 miles in length and four in breadth, affording heretofore an excellent herring fishery.

Mull of CANTYRE, the south cape or promontory of the above peninsula. Here is a light-house 235 feet above the sea at high water, situated on the rocks called the *Merchants*, lat. 55. 22. long. 5. 42. W. of London.

CANTZ, a town of Silesia in Germany. E. long. 16. 36. N. lat. 51. 6.

CANVAS, in commerce, a very clear unbleached cloth of hemp, or flax, wove regularly in little squares. It is used for working tapestry with the needle, by passing the threads of gold, silver, silk, or wool, through the intervals or squares.

CANVAS is also a coarse cloth of hemp, unbleached, somewhat clear, which serves to cover women's stays, also to stiffen men's clothes, and to make some other of their wearing apparel, &c.

CANVAS is also used among the French for the model or first words whereon an air or piece of music is composed, and given to a poet to regulate and finish. The canvas of a song contains certain notes of the composer, which show the poet the measure of the verses he is to make. Thus Du Lot says, he has canvas for ten sonnets against the muses.

CANVAS is also the name of a cloth made of hemp, and used for ship-sails.

CANVAS, among painters, is the cloth on which they usually draw their pictures; the canvas being smoothed over with a slick-stone, then sized, and afterwards whited over, makes what the painters call their *primed cloth*, on which they draw their first sketches with coal or chalk, and afterwards finish with colours.

CANUTE, the first Danish king of England after Ironside. He married Emma widow of king Ethelred; and put to death several persons of quality who stood in his way to the crown. Having thus settled his power in England, he made a voyage to his other kingdom of Denmark, in order to resist the attacks of the king of Sweden; and he carried along with him a great body of the English under the command of the earl of Godwin. This nobleman by his valour and good conduct performed a service by which he both reconciled the king's mind to the English nation, and gained to himself the friendship of his sovereign. Canute, who was the greatest and most powerful prince of his time, sovereign of Denmark and Norway as well as of England, could not fail to meet with adulation from his courtiers; a tribute which is liberally paid even to the meanest and weakest of princes. Some of his flatterers breaking out one day in admiration of his grandeur, exclaimed, that every thing was possible for him: upon which the monarch, it is said, ordered a chair to be set on the sea shore while the tide was making; and as the waters approached, he commanded them to retire, and to obey the voice of him who was lord of the ocean. He feigned to sit some time in expectation of their submission; but when the sea still advanced towards him, and began to wash him with its billows, he turned to his courtiers, and remarked to them, That every creature in the universe was feeble and impotent, and that power resided with one Being

alone, in whose hands were all the elements of nature, who could say to the ocean, " Thus far shalt thou go, and no farther," and who could level with his nod the most towering piles of human pride and ambition. From that time, it is said, he never would wear a crown. He died in the 20th year of his reign; and was interred at Winchester, in the old monastery.

CANZONE, in music, signifies, in general, a song, where some little fugues are introduced: but it is sometimes used for a sort of Italian poem, usually pretty long, to which music may be composed in the style of a cantata. If this term be added to a piece of instrumental music, it signifies much the same as cantata: if placed in any part of a sonata, it has the same meaning as *allegro*, and only denotes that the part to which it is prefixed is to be played or sung in a brisk and lively manner.

CANZONETTA, a diminutive of canzone, denoting a little short song. The canzonette Neapolitine has two strains, each of which is sung twice over, as the vaudevilles of the French: The canzonette siciliane is a species of jig, the measure whereof is usually twelve eighths, and six eighths, and sometimes rondeaus.

CAORLO, a small island in the gulf of Venice, on the coast of Friuli, 20 miles south-west of Aquileia, subject to Venice. It has a town of the same name, with a bishop's see.

CAOUTCHOUC, Elastic Resin, or *India rubber*, a substance produced from the syringe-tree of Cayenne and other parts of South America, and possessed of the most singular properties. No substance is yet known which is so pliable, and at the same time so elastic; and it is farther a matter of curiosity, as being capable of resisting the action of very powerful menstrua. From the account of M. de la Condamine, we learn that this substance oozes out, under the form of a vegetable milk, from incisions made in the tree; and that it is gathered chiefly in time of rain, because, though it may be collected at all times, it flows then most abundantly. The means employed to inspissate and indurate it, M. de la Borde says, are kept a profound secret. M. Bomere and others affirm, that it thickens and hardens gradually by being exposed to the air; and as soon as it acquires a solid consistence it manifests a very extraordinary degree of flexibility and elasticity. Accordingly the Indians make boots of it, which water cannot penetrate, and which, when smoked, have the appearance of real leather. Bottles are also made of it, to the necks of which are fastened hollow reeds, so that the liquor contained in them may be squirted through the reeds or pipes by pressure. One of these filled with water is always presented to each of the guests at their entertainments, who never fail to make use of it before eating. This whimsical custom led the Portuguese in that country to call the tree that produces this resin *pao de xirringa*, and hence the name of *seringat* is given both to the tree and to its resinous production. Flambeaux, an inch and an half in diameter, and two feet long, are likewise made of this resin, which give a beautiful light, have no bad smell, and burn twelve hours. A kind of cloth is also prepared from it, which the inhabitants of Quito apply to the same purpose as our oil-cloth and sail-cloth. It is formed, in fine, by means of moulds, into a variety of figures for use and ornament; and the process is said to be thus: The juice, which is obtained by incision, is spread over pieces of clay formed into the desired shape; and as fast as one layer is dry, another is added, till the vessel be of the proper thickness: the whole is then held over a strong smoke of vegetables on fire, whereby it hardens into the texture and appearance of leather; and before the finishing, while yet soft, is capable of having any impression made on the outside, which remains ever after. When the whole is done, the inside mould is picked out.

Ever since this resin has been known in Europe, its chemical qualities and other extraordinary properties have been very diligently investigated. In particular, it has been endeavoured to discover some method of dissolving it in such a manner that it would assume different figures with equal ease as when in its original state of milk. In the memoirs of the Academy of Sciences for 1768, we have an account of several attempts for this purpose, and how it may be effected: and Mr. Macquer, after a variety of fruitless trials, found that the caoutchouc, if cut into little bits, and put into a proper vessel with as much ether as was sufficient to cover it, would perfectly dissolve with the heat of the atmosphere. He observes, however, that two pints of the best ether, obtained by rectifying eight or ten pints of the common ether by a gentle heat, must be used, in order to the success of the operation. The distinguishing properties of this substance, viz. its solidity, flexibility, and elasticity, and its quality of resisting the action of aqueous, spirituous, saline, oily, and other common solvents, render it extremely fit for the construction of tubes, catheters, and other instruments, in which these properties are wanted. In order to form this resin into small tubes, Mr. Macquer prepared a solid cylindrical mould of wax, of the desired size and shape; and then dipping a pencil into the ethereal solution of the resin, daubed the mould over with it, till he had covered it with a coat of resin of a sufficient thickness. The whole piece is then thrown into boiling water; by the heat of which the wax is soon melted, and rises to the surface, leaving the resinous tube completely formed behind.

A resin similar to this was some years ago discovered by M. Poivre, in the isle of France; and there are various milky juices extracted from trees in America and elsewhere, which by previous mixtures and preparations are formed into an elastic resin, but of an inferior quality to that of Cayenne: such, for instance, are the juices obtained from the *Cecropia peltata*, the *Ficus religiosa*, and *indica*, &c. Of the genuine trees, those growing along the banks of the river of the Amazons are described by Mr. Condamine as attaining a very great height, being at the same time perfectly straight, and having no branches except at the top, which is but small, covering no more than a circumference of ten feet. Its leaves bear some resemblance to those of the *manioc*: they are green on the upper part, and white beneath. The seeds are three in number, and contained in a pod consisting of three cells, not unlike those of the *ricinus* or *palma Christi*; and in each of them there is a kernel, which being stripped and boiled in water produces a thick oil or fat, answering the purposes of butter in the cookery of that country.

This elastic gum, however, may be dissolved without ether, and answer the purposes of a varnish, if managed in the following way: Take one pound of the spirit of turpentine, and a pound of the gum cut into very small pieces; pour the turpentine into a long-necked matrass, which must be placed in a sand-bath; throw in the gum, not all at once, but by little and little according as it is perceived to dissolve. When it is entirely dissolved, pour into the matrass a pint of nut or linseed oil, or oil of poppies, rendered desiccative in the usual manner with litharge. Then let the whole boil for a quarter of an hour, and the preparation is finished. This would make an excellent varnish for air-balloons, were it not so expensive on account of the price of the gum. Another method, invented by Mr. Baldwin, is as follows: Take any quantity of the caoutchouc, as two ounces avoirdupois: cut it into small bits with a pair of scissars. Put a strong iron ladle (such as plumbers or glaziers melt their lead in) over a common pit-coal or other fire. The fire must be gentle, glowing, and without smoke. When the ladle is hot, much below a red heat, put a single bit into the ladle. If black smoke issues, it will presently flame and disappear; or it will evaporate without flame: the ladle is then too hot. When the ladle is less hot, put in a second bit, which

will produce a white ſmoke. This white ſmoke will continue during the operation, and evaporate the caoutchouc: therefore no time is to be loſt; but little bits are to be put in, a few at a time, till the whole are melted. It ſhould be continually and gently ſtirred with an iron or braſs ſpoon. Two pounds, or one quart, of the beſt drying oil (or of raw linſeed oil, which, together with a few drops of neats-foot oil, has ſtood a month, or not ſo long, on a lump of quick-lime, to make it more or leſs drying) is to be put into the melted caoutchouc, and ſtirred till hot: and the whole poured into a glazed veſſel, through a coarſe gauze, or fine ſieve. When ſettled and clear, which will be in a few minutes, it is fit for uſe, either in a hot or cold ſtate.

The Abbé Clavigero informs us, that the elaſtic gum is called by the Mexicans *olin* or *olli*, and by the Spaniards of that kingdom *ule*: That it diſtils from the *olquahuitl*, which is a tree of moderate ſize; the trunk of which is ſmooth and yellowiſh, the leaves pretty large, the flowers white, and the fruit yellow and rather round, but angular; within which there are kernels as large as filberds, and white, but covered with a yellowiſh pellicle: that the kernel has a bitter taſte, and the fruit always grows attached to the bark of the tree: that when the trunk is cut, the ule which diſtils from it is white, liquid, and viſcous; afterwards it becomes yellow; and laſtly of a leaden colour, though rather blacker, which it always retains. The tree, he adds, is very common in the kingdom of Guatimala.

As to the genus of this tree, it does not ſeem to be yet aſcertained. Aublet, in his *Hiſtoire des Plantes de la Guienne*, deſcribes the tree, the fruit, and manner of collecting the juice; but never ſaw the flower: he calls it, however, *Hevea Guianenſis*. In Jacquin's America, it is called *Echites corymboſa*. The younger Linnæus, in his *Supplementum Plantarum* (p. 422), names it *Jatropha elaſtica*; but acknowledges that he only gives it this name from the ſtructure of the fruit having moſt reſemblance to that genus, his dry ſpecies wanting the flowers.

With us, the caoutchouc is uſed for various purpoſes. Surgeons have bougies and catheters made of it, and bag ſyringes for injecting liquids. By painters it is uſed for rubbing out black-lead pencil marks, &c.

CAP, a part of dreſs adapted to and made to cover the head. The uſe of caps and hats is referred to the year 1449, the firſt ſeen in theſe parts of the world being at the entry of Charles VII. into Rouen: from that time they began to take place of the hoods, or chaperoons, that had been uſed till then. When the cap was of velvet, they called it *mortier*; when of wool, ſimply *bonnet*. None but kings, princes, and knights, were allowed the uſe of the mortier. The cap was the head dreſs of the clergy and graduates. Paſquier ſays, that it was anciently a part of the hood worn by the people of the robe; the ſkirts whereof being cut off as an incumbrance, left the round cap an eaſy commodious cover for the head; which round cap being afterwards aſſumed by the people, thoſe of the gown changed it for a ſquare one, firſt invented by a Frenchman, called Patrouillet: he adds, that the giving of the cap to the ſtudents in the univerſities, was to denote that they had acquired full liberty, and were no longer ſubject to the rod of their ſuperiors; in imitation of the ancient Romans, who gave a *pileus*, or cap, to their ſlaves, in the ceremony of making them free: whence the proverb, *Vocare ſervos ad pileum*. Hence, alſo, on medals, the cap is the ſymbol of liberty, whom they repreſent holding a cap in her right hand, by the point.

The Romans were many ages without any regular covering for the head: for when either the rain or the ſun was troubleſome, the lappet of the gown was thrown over the head; and hence it is that all the ancient ſtatues appear bareheaded, excepting ſometimes a wreath or the like. And the ſame uſage obtained among the Greeks, where, at leaſt during the heroic age, no caps were known. The ſort of caps or covers of the head in uſe among the Romans, were the *pitra*, *pileus*, *cucullus*, *galerus*, and *palliolum*; the differences between which are often confounded by ancient as well as modern writers.

The French clergy before the revolution wore a ſhallow kind of cap called *calotte*, which only covered the top of the head, made of leather, ſatin, or worſted. The red cap was a mark of dignity allowed only to thoſe who are raiſed to the cardinalate. The ſecular clergy in popiſh countries are diſtinguiſhed by black leathern caps, the regulars by knit and worſted ones. Churchmen, and the members of univerſities, ſtudents in law, phyſic, &c. as well as graduates, wear ſquare caps. In moſt univerſities doctors are diſtinguiſhed by peculiar caps, given them on aſſuming the doctorate. Wickliff calls the canons of his time *bifurcati*, from their caps. Paſquier obſerves, that, in his time, the caps worn by the churchmen, &c. were called ſquare caps; though, in effect, they were round yellow caps.

The Chineſe have not the uſe of the hat like us; but wear a cap of a peculiar ſtructure, which the laws of civility will not allow them to put off: it is different for the different ſeaſons of the year: that uſed in ſummer is in form of a cone, ending at top in a point. It is made of a very beautiful kind of mat, much valued in that country, and lined with ſatin: to this is added, at top, a large lock of red ſilk, which falls all round as low as the bottom; ſo that, in walking, the ſilk fluctuating regularly on all ſides, makes a graceful appearance: ſometimes, inſtead of ſilk, they uſe a kind of bright red hair, the luſtre whereof no weather effaces. In winter they wear a pluſh cap, bordered with marlet's or fox's ſkin; as to the reſt, like thoſe for the ſummer. Theſe caps are frequently ſold for eight or ten crowns; but they are ſo ſhort, that the ears are expoſed.

But the cap is ſometimes uſed as a mark of infamy; in Italy the Jews are diſtinguiſhed by a yellow cap; at Lucca by an orange one. In France thoſe who had been bankrupts were obliged ever after to wear a green cap, to prevent people from being impoſed on in any future commerce. By ſeveral arrets in 1584, 1622, 1628, 1688, it was decreed, that if they were at any time found without their green caps, their protection ſhould be null, and their creditors empowered to caſt them into priſon: but the ſentence is not now enforced.

Cap *of Maintenance*, one of the regalia, or ornaments of ſtate belonging to the kings of England, before whom it was carried at the coronation and other great ſolemnities. Caps of maintenance are alſo carried before the mayors of the ſeveral cities in England.

Cap, in ſhip-building, a ſtrong, thick, block of wood, uſed to confine two maſts together, when one is erected at the head of the other in order to lengthen it. It is for this purpoſe furniſhed with two holes perpendicular to its length and breadth, and parallel to its thickneſs: one of theſe is ſquare, and the other round; the former being ſolidly fixed upon the upper end of the lower maſt, whilſt the latter receives the maſt employed to lengthen it, and ſecures it in this poſition.

CAPACIO, an epiſcopal town of Italy, in the kingdom of Naples, and in the hither principato. E. long. 15. 18. N. lat. 40. 40.

CAPACITY, in a general ſenſe, an aptitude or diſpoſition to hold or retain any thing.

Capacity, in geometry, the ſolid contents of any body. Our hollow meaſures for wine, beer, corn, ſalt, &c. are called *meaſures of capacity*.

Capacity, in law, the ability of a man, or body politic, to give or take lands or other things, or ſue actions. Our law allows the king two capacities; a natural, and a political: in the firſt, he may purchaſe lands to him and his heirs; in the ſecond, to him and his ſucceſſors. The clergy of the church of England have the like.

CAPARASON, or CAPARISON, the covering or clothing laid over an horfe; efpecially a fumpter horfe, or horfe of ftate. The word is Spanifh, being an augmentative of *capa*, *caput*, *head*. Anciently the caparafons were a kind of iron armour wherewith horfes were covered in battle.

CAPE, in geography, an high land running out with a point into the fea, as Cape Nord, Cape Horn, the Cape of Good Hope, &c.

CAPE-*Elk*. See CERVUS.

CAPE-*Breton*. See BRETON.

CAPE-*Coaft Caftle*. See COAST.

CAPE *of Good Hope*. See GOOD HOPE.

CAPE-*Verd*. See VERD.

CAPELL (Edward), a gentleman well known by his indefatigable attention to the works of Shakefpeare, was a native of the county of Suffolk, and received his education at the fchool of St. Edmund's Bury. The duke of Grafton beftowed on him the office of deputy infpector of the plays, with a falary of 200l. a year. So early as the year 1745, Mr. Capell firft projected an edition of Shakefpeare, of the ftricteft accuracy, and proceeded to collect and compare the oldeft and fcarceft copies for that purpofe: noting the original excellencies and defects of the rareft quartos, and diftinguifhing the improvements or variations of the firft, fecond, and third folios: and, after many years labour, produced a very beautiful fmall octavo, in 10 volumes, with *an Introduction*, which was reckoned by the critics of that time a moft fingular compofition. In ftyle and manner, it is more obfolete and antique than the age of which it treats. It is Lord Herbert of Cherbury, walking the new pavement in all the trappings of romance; but, like Lord Herbert, it difplays many valuable qualities accompanying this air of extravagance, much found fenfe, and appropriate erudition. In the title-page of "Mr. William Shakefpeare his Comedies, Hiftories, and Tragedies," it was alfo announced and promulgated, "Whereunto will be added, in fome other volumes, notes critical and explanatory, and a body of various readings entire." "The Introduction" likewife declared, that thefe "notes and various readings" would be accompanied with another work, difclofing the fources from which Shakefpeare "drew the greater part of his knowledge in mythological and claffical matters, his fable, his hiftory, and even the feeming peculiarities of his language; to which," fays Mr. Capell, "we have given for title, The School of Shakefpeare." Nothing furely could be more properly conceived than fuch defigns, nor have we ever met with any thing better grounded on the fubject of "the learning of Shakefpeare" than what may be found in the long note to this part of Mr. Capell's Introduction. It is more folid than even the popular "Effay" on this topic. Certain quaintneffes of ftyle, and peculiarities of printing and punctuation, attended the whole of this publication. The outline, however, was correct; and the critic, with unremitting toil, proceeded in his undertaking. But while he was diving into the claffics of Caxton (to continue the Reviewers account), and working his way underground, like the river-mole, in order to emerge with all his glories; while he was looking forward to his triumphs; certain other active fpirits went to work upon his plan, and, digging out the promifed treafures, laid them prematurely before the public, defeating the effect of our critic's difcoveries by anticipation. Steevens, Malone, Farmer, Percy, Reed, and a whole hoft of literary ferrets, burrowed into every hole and corner of the warren of modern antiquity, and over-ran all the country whofe map had been delineated by Edward Capell. Such a contingency nearly ftaggered the fteady and unfhaken perfeverance of our critic, at the very eve of the completion of his labours, and, as his editor informs us—for, alas! at the end of near 40 years, the publication was pofthumous, and the critic himfelf no more!—he was almoft determined to lay the work wholly afide. He perfevered, however, by the encouragement of fome noble and worthy perfons: and to fuch their encouragement, and his perfeverance, the public was, in 1783, indebted for three large volumes in 4to, under the title of "Notes and various readings of Shakefpeare; together with the School of Shakefpeare, or Extracts from divers Englifh Books, that were in print in the Author's time; evidently fhowing from whence his feveral Fables were taken, and fome parcel of his Dialogue. Alfo farther Extracts, which contribute to a due underftanding of his Writings, or give a light to the Hiftory of his Life, or to the Dramatic Hiftory of his Time. By Edw. Capell." Befides the works already mentioned, Mr. Capell was the editor of a volume of ancient poems called "Prolufions;" and the alteration of "Anthony and Cleopatra," as acted at Drury Lane in 1758. He died January 24, 1781.

CAPELLA, in aftronomy, a bright fixed ftar in the left fhoulder of the conftellation Auriga.

CAPELLE, a town of France, in the department of Aifne and late province of Picardy, and in the Tierache, eight miles N. E. of Guife. It was taken by the Spaniards in 1636; but retaken the year after. E. long. 3. 59. N. lat. 49. 58.

CAPELLUS (Lewis), an eminent French Proteftant divine, born at Sedan in Champagne about the year 1579. He was author of fome learned works: but is chiefly known from the controverfy he engaged in with the younger Buxtorf concerning the antiquity of Hebrew points, which Capellus undertook to difprove. His *Critica Sacra* was alfo an elaborate work, and excited fome difputes. He died in 1658, having given an abridgment of his life in his work *De gente Capellori*.

CAPER, in botany. See CAPPARIS.

CAPER alfo denotes a veffel ufed by the Dutch for cruifing and taking prizes from the enemy; in which fenfe, caper amounts to the fame with privateer. Capers are commonly double-officered, and crowded with hands even beyond the rates of fhips of war, becaufe the thing chiefly in view is boarding the enemy's veffel.

CAPERNAUM, a city celebrated in the gofpels, being the calplace where Jefus ufually refided during the time of his miniftry. This city is no where mentioned in the Old Teftament under this or any other name like it; and therefore it is not improbable that it was one of thofe towns which the Jews built after their return from the Babylonifh captivity.

CAPEROLANS, a congregation of religious in Italy, fo called from Peter Caperole their founder, in the 15th century. The Milanefe and Venetians being at war, the enmity occafioned thereby fpread itfelf to the very cloifters. The fuperiors of the province of Milan, of minor brothers, which extended itfelf as far as the territories of the republic of Venice, carried it fo haughtily over the Venetians, that thofe of the convent of Brefcia refolved to fhake off a yoke which was grown infupportable to them. The fuperiors, informed of this, expelled out of the province thofe whom they confidered as the authors of this defign; the principal of whom were Peter Caperole, Matthew de Tharvillo, and Bonaventure of Brefcia. Peter Caperole, a man of an enterprifing genius, found means to feparate the convents of Brefcia, Bergamo, and Cremona, from the province of Milan, and fubject them to the conventuals. This occafioned a law-fuit between the vicar-general and thefe convents, which was determined in favour of the latter; and thefe convents, in 1475, by the authority of Pope Sixtus IV. were erected into a diftinct vicariate, under the title of that of *Brefcia*. This not fatisfying the ambition of Caperole, he obtained, by the interpofition of the Doge of Venice, that this vicariate might be erected into a congregation, which was called from him *Caperolans*. This congregation ftill fubfifts in Italy, and is compofed of 24 convents, fituated in Brefcia, Bergamo, and Cremona.

CAPERQUIN, a town of Ireland, in the county of Water-

ford, and province of Munſter, ſituated on the river Blackwater. W. long. 7. 50. N. lat. 52. 5.

CAPESTAN, a town of France, in the department of Aude, and late province of Languedoc, near the river Aude and ci-devant royal canal. E. long. 3. 5. N. lat. 43. 35.

CAPH, a Jewiſh meaſure of capacity for things eſtimated by Kimchi at the 30th part of the log, by Arbuthnot at the 16th part of the hin or 32d of the ſeah, amounting to five-eighths of an Engliſh pint. The caph does not occur in Scripture as the name of any meaſure.

CAPHAR, a duty which the Turks raiſe on the Chriſtians who carry or ſend merchandiſes from Aleppo to Jeruſalem and other places in Syria. This duty of caphar was firſt impoſed by the Chriſtians themſelves, when they were in poſſeſſion of the Holy Land, for the maintenance of the troops which were planted in difficult paſſes, to obſerve the Arabs and prevent their incurſions. It is ſtill continued, and much increaſed by the Turks, under pretence of defending the Chriſtians againſt the Arabs; with whom, nevertheleſs, they keep a ſecret intelligence, favouring their depredations.

CAPI-AGA, or CAPI-*Agaſſi*, a Turkiſh officer who is governor of the gates of the ſeraglio, or grand maſter of the ſeraglio. The capi-aga is the firſt dignity among the white eunuchs: he is always near the perſon of the grand ſignior: he introduces ambaſſadors to their audience: nobody enters or goes out of the grand ſignior's apartment but by his means. His office gives him the privilege of wearing the turban in the ſeraglio, and of going every where on horſeback. He accompanies the grand ſignior to the apartment of the Sultanas, but ſtops at the door without entering. His appointment is very moderate; the grand ſignior bears the expence of his table, and allows him at the rate of about ſixty French livres per day: but his office brings him in abundance of preſents; no affair of conſequence coming to the emperor's knowledge without paſſing through his hand. The capi-aga cannot be baſhaw when he quits his poſt.

CAPIAS, in law, a writ of two ſorts; one before judgment in an action, and the other after. That before judgment is called *capias ad reſpondendum*, where an original is iſſued out, to take the defendant, and make him anſwer the plaintiff. That after judgment is of divers kinds; as

CAPIAS *ad Satisfaciendum*, a writ of execution that iſſues on a judgment obtained, and lies where any perſon recovers in a perſonal action, as for debt, damages, &c. in which caſes this writ iſſues to the ſheriff, commanding him to take the body of him againſt whom the debt is recovered, who is to be kept in priſon till he make ſatisfaction.

CAPIAS *pro Fine* is a writ lying where a perſon is fined to the king, for ſome offence committed againſt a ſtatute, and he does not diſcharge the fine according to the judgment; therefore his body ſhall be taken by this writ, and committed to gaol till the fine is paid.

CAPIAS *Utlegatum*, a writ which lies againſt any one outlawed, upon any action perſonal or criminal, by which the ſheriff is ordered to apprehend the party outlawed, for not appearing on the exigent, and keep him in ſafe cuſtody till the day of return, when he is ordered to preſent him to the court, to be there farther ordered for his contempt.

CAPIAS *in Withernam*, a writ that lies for cattle *in withernam*: that is, where a diſtreſs taken is driven out of the county, ſo that the ſheriff cannot make deliverance upon a replevin; then this writ iſſues, commanding the ſheriff to take as many beaſts of the diſtrainer, &c.

CAPIGI, a porter or door-keeper of the Turkiſh ſeraglio. There are about five hundred *capigis* or porters in the ſeraglio, divided into two companies; one conſiſting of three hundred, under a chief called *Capigi-Baſſa*, who has a ſtipend of three ducats per day; the other conſiſts of two hundred, diſtinguiſhed by the name of *Cuccicapigi*, and their chief *Cuccicapigi-Baſſa*, who has two ducats. The capigis have from ſeven to fifteen aſpers per day; ſome more, others leſs. Their buſineſs is to aſſiſt the janizaries in the guard of the firſt and ſecond gates of the ſeraglio; ſometimes all together; as when the Turk holds a general council, receives an ambaſſador, or goes to the moſque; and ſometimes only in part; being ranged on either ſide to prevent people entering with arms, any tumults being made, &c. The word, in its original ſenſe, ſignifies *gate*.

CAPILLAMENT, in a general ſenſe, ſignifies a hair; whence the word is applied to ſeveral things, which on account of their length or their fineneſs reſemble hairs: as, *Capillaments of the Nerves*, in anatomy, which are the fine fibres or filaments whereof the nerves are compoſed.

CAPILLARY, in a general ſenſe, an appellation given to things on account of their extreme fineneſs or reſembling hair.

CAPILLARY *Tubes*, in phyſics, are ſmall pipes of glaſs, whoſe canals are extremely narrow, their diameter being only a half, a third, or a fourth of a line. The aſcent of water, &c. in capillary tubes is a phenomenon that has long embarraſſed the philoſophers: for let one end of a glaſs tube open at both extremities be immerged in water, the liquor within the tube will riſe to a conſiderable height above the external ſurface: or if two or more tubes are immerged in the ſame fluid, one a capillary tube, and the other of a larger bore, the fluid will aſcend higher in the former than in the latter; and this will be in a reciprocal ratio of the diameters of the tubes.

In order to account for this phenomenon, it will be neceſſary firſt to premiſe, that the attraction between the particles of glaſs and water is greater than the attraction between the particles of water itſelf; for if a glaſs tube be placed in a poſition parallel to the horizon, and a drop of water be applied to the under ſide of the tube, it will adhere to it; nor will it fall from the glaſs till its bulk and gravity are ſo far increaſed, as to overcome the attraction of the glaſs. Hence it is eaſy to conceive how ſenſibly ſuch a power muſt act on the ſurface of a fluid, not viſcid, as water, contained within the ſmall cavity or bore of a glaſs tube; as alſo that it will be proportionably ſtronger as the diameter of the bore is ſmaller; for it will be evident that the efficacy of the power is in the inverſe proportion of the diameter, when it is conſidered, that ſuch particles only as are in contact with the fluid, and thoſe immediately above the ſurface, can effect it.

Now theſe particles form a periphery contiguous to the ſurface, the upper part of which attracts and raiſes the ſurface, while the lower part, which is in contact with it, ſupports it: ſo that neither the thickneſs nor length of the tube is of any conſequence here; the periphery of particles only, which is always proportionable to the diameter of the bore, is the only acting power. The quantity of the fluid raiſed will therefore be as the ſurface of the bore which it fills, that is, as the diameter; for otherwiſe the effect would not be proportional to the cauſe, ſince the quantities are always as the ratio of the diameters; the heights therefore to which the fluids will riſe, in different tubes, will be inverſely as the diameters.

Some doubt whether the law holds throughout, of the aſcent of the fluid being always higher as the tube is ſmaller; Dr. Hook's experiments, with tubes almoſt as fine as cobwebs, ſeem to ſhow the contrary. The water in theſe, he obſerves, did not riſe ſo high as one would have expected. The higheſt he ever found it, was at 21 inches above the level of the water in the baſon; which is much ſhort of what it ought to have been by the law above mentioned. See COHESION.

CAPILLARY *Veſſels*, the minuteſt veſſels of animal bodies. Many of theſe have been diſcovered by the modern invention

of injecting the veffels of animals with a coloured fluid, prepared with fize and vermilion. Though moft anatomifts know the manner of filling the large trunks, the art of filling the capillaries is much more difficult. Dr. Monro, in the Medical Effays, has given what after many trials he has found moft fuccefsful. See INJECTION.

CAPILLUS VENERIS. See ADIANTHUM.

CAPILUPI, or CAPILUPUS (Camillus), a native of Mantua in the 16th century. He wrote a book, entitled, *The Stratagem*; in which he relates not only what was perpetrated at Paris during the maffacre on St. Bartholomew's day, but alfo the artful preparations which preceded that horrid maffacre. It is, however, blended with a great number of falfities.

CAPILUPI (Lælius), an Italian poet, brother to the former, made himfelf famous by fome Cantos of Virgil. The manner in which he applied Virgil's expreffions to reprefent things which the poet never dreamt of, is admired. His Canto againft women is very ingenious, but too fatirical. The poems of Capilupi are inferted in the *Deliciæ Poetarum Italorum*.

CAPISCOLUS, or CAPISCHOLUS, in ecclefiaftical writers, denotes a dignitary in certain cathedrals, who has the fuperintendence of the choir, or band of mufic, anfwering to what in other churches is called *chanter* or *precentor*. The word is alfo written *cabifcolus* and *caputfcholæ*, q. d. the head of the fchool, or band of mufic. The capifcolus is alfo called *fcolafticus*, as having the inftruction of the young clerks and chorifters, how to perform their duty.

CAPITA (diftribution by), in law, fignifies the appointing to every man an equal fhare of a perfonal eftate; when all the claimants claim in their own rights, as in equal degrees of kindred, and not *jure reprefentationis*.

CAPITA (fucceffion by), where the claimants are next in degree to the anceftor, in their own right, and not by right of reprefentation.

CAPITAL, of the Latin *caput* "the head," is ufed on various occafions, to exprefs the relation of head, chief, or principal: thus,

CAPITAL *City*, in geography, denotes the principal city of a kingdom, ftate, or province.

CAPITAL *Stock*, among merchants, bankers, and traders, fignifies the fum of money which individuals bring to make up the common ftock of a partnerfhip when it is firft formed. It is alfo faid of the ftock which a merchant at firft puts into trade for his account. It likewife fignifies the fund of a trading company or corporation, in which fenfe the word ftock is generally added to it. Thus we fay, the capital ftock of the bank, &c. The word capital is oppofed to that of profit or gain, though the profit often increafes the capital, and becomes of itfelf part of the capital, when joined with the former.

CAPITAL *Crime*, fuch a one as fubjects the criminal to capital punifhment, that is, to lofs of life. See CRIME.

CAPITAL *Picture*, in painting, denotes one of the fineft and moft excellent pieces of any celebrated mafter.

CAPITAL *Letters*, in printing, large or initial letters, wherein titles, &c. are compofed; with which all periods, verfes, &c. commence; and wherewith alfo all proper names of men, kingdoms, nations, &c. begin. The practice which, for fome time, obtained among our printers, of beginning every fubftantive with a capital, is now juftly fallen into difrepute; being a manifeft perverfion of the defign of capitals, as well as an offence againft beauty and diftinctnefs.

CAPITAL, in architecture, the uppermoft part of a column or pilafter, ferving as the head or crowning, and placed immediately over the fhaft, and under the entablature. See ARCHITECTURE.

CAPITANA, or CAPTAIN *Galley*, the chief or principal galley of a ftate, not dignified with the title of a kingdom. The capitana was anciently the denomination of the chief galley of France, which the commander went on board of. But after the fuppreffion of the office of captain general of the gallies in 1669, they had no capitana, but the firft galley was called *reale*, and the fecond *parone*.

CAPITANATA, one of the 12 provinces of the kingdom of Naples, in Italy, bounded on the north by the Gulph of Venice, on the eaft by the Terra di Barri, on the fouth by the Bafilicata and the Farther Principato, and on the weft by the county di Molife and a fmall part of Hither Abruzzo. It is a level country without trees; the foil fandy, the air hot: the land however near the rivers is fertile in paftures. The capital town is Manfredonia.

CAPITANEATE, in a general fenfe, the fame with capitania. Capitaneates, in Pruffia, are a kind of noble feuds, or eftates, which, befides their revenue, raife their owners to the rank of nobility. They are otherwife called *ftaroftics*.

CAPITANEI, or CATANEI, in Italy, was a denomination given to all the dukes, marquiffes, and counts, who were called *capitanei regis*. The fame appellation was alfo given to perfons of inferior rank who were invefted with fees, formerly diftinguifhed by the appellation *valvafores majores*.

CAPITANEUS, in ancient law-writers, denotes a tenant in capite, or chief.

CAPITANEUS *Ecclefiæ*, the fame with ADVOCATE.

CAPITANIA, in geography, an appellation given to the 12 governments eftablifhed by the Portuguefe in the Brafils.

CAPITATION, a tax or impofition raifed on each perfon, in proportion to his labour, induftry, office, rank, &c. It is a very ancient kind of tribute. The Latins call it *tributum*, by which taxes on perfons are diftinguifhed from taxes on merchandife, which were called *vectigalia*. Capitations are never practifed among us but in exigencies of ftate. In France the capitation was introduced by Louis XIV. in 1695; and was a tax very different from the *taille*, being levied from all perfons, whether fubject to the taille or not. The clergy paid no capitation, but the princes of the blood were not exempt from it.

CAPITE, in law, (from *capute*, i. e. *rex*; whence *tenere in capite*, is to hold of the *king*, the *head* or lord paramount of all the lands in the kingdom) an ancient tenure of land, held immediately of the king, as of his crown, either by knight's fervice, or by foccage. It is now abolifhed. See TENURE.

CAPITE *Cenfi*, in antiquity, the loweft rank of Roman citizens, who in public taxes were rated the leaft of all, being fuch as never were worth above 365 affes. They were fuppofed to have been thus called, becaufe they were rather counted and marfhalled by their heads than by their eftates. The *capite cenfi* made part of the fixth clafs of citizens, being below the *proletarii*, who formed the other moiety of that clafs. They were not enrolled in the army, as being judged not able to fupport the expence of war; for in thofe days the foldiers maintained themfelves. It does not appear, that before Caius Marius any of the Roman generals lifted the *capite cenfi* in their armies.

CAPITOL, CAPITOLIUM, in antiquity, a famous fort or caftle, on the Mons Capitolinus at Rome, wherein was a temple dedicated to Jupiter, thence alfo denominated *Capitolinus*, in which the fenate anciently affembled; and which ftill ferves as the city-hall, or town-houfe, for the meeting of the confervators of the Roman people. It had its name *capitol*, from *caput*, a man's head, faid to have been found frefh, and yet bleeding, upon digging the foundation of the temple built in honour of Jupiter. Arnobius adds, that the man's name was *Tolus*, whence *caput-tolium*.—The firft foundations of the

capitol were laid by Tarquin the Elder, in the year of Rome 139. His fucceffor Servius raifed the walls; and Tarquin the Proud finifhed it in the year 221. But it was not confecrated till the third year after the expulfion of the kings, and eftablifhment of the confulate. The ceremony of the dedication of the temple was performed by the conful Horatius in 246.

The capitol confifted of three parts; a nave facred to Jupiter; and two wings, the one confecrated to Juno, the other to Minerva: it was afcended to by ftairs; the frontifpiece and fides were furrounded with galleries, in which thofe who were honoured with triumphs entertained the fenate at a magnificent banquet, after the facrifices had been offered to the gods. Both the infide and outfide were enriched with an infinity of ornaments, the moft diftinguifhed of which was the ftatue of Jupiter, with his golden thunderbolt, his fceptre, and crown. In the capitol alfo were a temple to Jupiter the guardian, and another to Juno, with the mint; and on the defcent of the hill was the temple of Concord. This beautiful edifice contained the moft facred depofits of religion, fuch as the ancylia, the books of the Sibyls, &c. The capitol was burnt under Vefpafian. It was burnt a fecond time by lightning under Titus, and reftored by Domitian.

Anciently the name *capitol* was likewife applied to all the principal temples in moft of the colonies throughout the Roman empire; as at Conftantinople, Jerufalem, Carthage, Ravenna, Capua, &c. That of Tholoufe has given the name of *capitouls* to its echevins or fheriffs.

CAPITOLINE GAMES, annual games inftituted by Camillus, in honour of Jupiter Capitolinus, and in commemoration of the capitol's not being taken by the Gauls. Plutarch tells us that a part of the ceremony confifted in the public criers putting up the Hetrurians to fale by auction: they alfo took an old man, and, tying a golden bulla about his neck, expofed him to the public derifion. Feftus fays they alfo dreffed him in a pretexta. There was another kind of Capitoline games, inftituted by Domitian, wherein there were rewards and crowns beftowed on the poets, champions, orators, hiftorians, and muficians. Thefe laft Capitoline games were celebrated every five years, and became fo famous, that, inftead of calculating time by luftra, they began to count by Capitoline games, as the Greeks did by Olympiads. It appears, however, that this cuftom was not of long continuance.

CAPITOLINUS (Julius), an hiftorian in the beginning of the fourth age under Dioclefian, to whom he infcribed the Lives of Verus, Antoninus Pius, Clodius Balbinus, Macrinus, the Maximins, and the Gordians. He wrote other lives, which are moft of them loft.

CAPITOUL, or CAPITOL, an appellation given, before the French revolution, to the chief magiftrates of Tholoufe, who had the adminiftration of juftice and policy, both civil and mercantile, in the city. The capitouls at Tholoufe were much the fame with the echevins at Paris, and with the confuls, bailiffs, burgher-mafters, mayors, and aldermen, &c. in other cities. In ancient acts they were called *confules capitularii*, or *capitolini*, and their body *capitulum*. From this laft come the words *capitularii* and *capitouls*. The appellative *capitolini* arofe hence, that they had the charge and cuftody of the town-houfe, which was anciently called *capitol*. The office only lafted one year, ennobled the bearers, and entitled them to the *jus imaginum*; that is, when the year of their adminiftration was expired, their pictures were hung up in the town-houfe; a cuftom which they have retained from the ancient Romans, as may be feen in Sigonius.

CAPITOULATE, an appellation formerly given to the feveral quarters or diftricts of the city of Tholoufe, each of which were under the direction of a capitoul; as the wards of London are under our aldermen. Tholoufe was divided into eight *capitoulates*, which were fubdivided into *moulans*, each having its tithing-man, whofe bufinefs was to inform the capitoul of what paffed in his tithing, and to inform the inhabitants of the tithing of the orders of the capitoul.

CAPITULAR, or CAPITULARY, denotes an act paffed in a chapter, either of knights, canons, or religious. The capitularia, or capitulars of Charlemagne, Charles the Bald, &c. are the laws, both ecclefiaftical and civil, made by thofe emperors in the general councils or affemblies of the people; which was the way in which the conftitutions of moft of the ancient princes were made: each perfon prefent, though a plebeian, fetting his hand to them. Some diftinguifh thefe from laws; and fay, they were only fupplements to laws. They had their name, *capitulars*, becaufe divided into capitula, chapters or fections. In thefe capitulars did the whole French jurifprudence anciently confift. In procefs of time, the name was changed for that of ordonnances. Some diftinguifh three kinds of capitulars, according to the difference of their fubject matter: thofe on ecclefiaftical affairs are really canons, extracted from councils; thofe on fecular affairs, real laws; thofe relating to particular perfons, or occafions, private regulations.

CAPITULATION, in military affairs, a treaty made between the inhabitants or garrifon of a place befieged and the befiegers, for the delivering up the place on certain conditions. The moft honourable and ordinary terms of capitulation are, to march out at the breach with arms and baggage, drums beating, colours flying, a match lighted at both ends, and fome pieces of cannon, waggons and convoys for their baggage, and for their fick and wounded.

CAPITULATION, in the German polity, a contract which the emperor makes with the electors, in the name of all the princes and ftates in the empire, before he is declared emperor, and which he ratifies before he is raifed to that fovereign dignity. The principal points which the emperor undertakes to obferve are, 1. To defend the church and empire. 2. To obferve the fundamental laws of the empire. And, 3. To maintain and preferve the rights, privileges, and immunities of the electors, princes, and the other ftates of the empire, fpecified in the capitulation. Thefe articles and capitulations are prefented to the emperor by the electors only, without the concurrence of the other ftates, who have complained from time to time of fuch proceedings; and in the time of the Weftphalian treaty, in 1648, it was propofed to deliberate in the following diet, upon a way of making a perpetual capitulation; but the electors have always found means of eluding the execution of this article. In order, however, to give fome fatisfaction to their adverfaries, they have inferted in the capitulations of the emperors, and in that of Francis I. in particular, a promife to ufe all their influence to bring the affair of a perpetual capitulation to a conclufion. Some German authors own, that this capitulation limits the emperor's power; but maintain that it does not weaken his fovereignty: though moft writers maintain that he is not abfolute, becaufe he receives the empire under conditions, which fet bounds to an abfolute authority.

CAPITULUM, in the ancient military art, was a tranfverfe beam, wherein were holes through which paffed the ftrings whereby the arms of huge engines, as balifte, catapultæ, and fcorpions, were played or worked.

CAPITULUM, in ecclefiaftical writers, denoted part of a chapter of the bible read and explained. In this fenfe they faid, *ire ad capitulum*, to go to fuch a lecture. Afterwards the place or apartment where fuch theological exercifes were performed was denominated *domus capituli*.

CAPNICON, in antiquity, chimney money, or a tax which

the Roman emperors levied for ſmoke, and which, of conſequence, was due from all, even the pooreſt, who kept a fire. This was firſt invented by Nicephorus.

CAPNOMANCY, a kind of divination by means of ſmoke, uſed by the ancients in their ſacrifices. The word comes from καπνος *ſmoke*, and μαντεια *divination*. The general rule was, when the ſmoke was thin, and light, and roſe ſtraight up, it was a good omen: if the contrary, it was an ill one. There was alſo another ſpecies of capnomacy, conſiſting in the obſervation of the ſmoke riſing from poppy and jeſſamin-ſeed, caſt upon lighted coals.

CAPO FINO, a large barren rock in the territory of the Genoeſe, which has a caſtle on its eaſtern peak. Near it is a ſmall harbour of the ſame name, 13 miles eaſt by ſouth of Genoa.

CAPO *d'Iſtria*, a conſiderable town of Italy, in Iſtria on the gulph of Trieſte, with a biſhop's ſee, and ſubject to the Venetians. The air is wholeſome and temperate; its principal revenue conſiſts in wine and ſalt. E. long. 14. 0. N. lat. 45. 48.

CAPON, a cock-chicken, gelded as ſoon as left by the dam, or as ſoon as he begins to crow. They are of uſe either to lead chickens, ducklings, pheaſants, &c. and defend them from the kites and buzzards; or to feed for the table, they being reckoned more delicate than either a cock or a hen.

CAPONIERE, or CAPPONIERE, in fortification, a covered lodgment ſunk four or five feet into the ground, encompaſſed with a little parapet about two feet high, ſerving to ſupport ſeveral planks covered with earth. The caponiere is large enough to contain 15 or 20 ſoldiers; and is uſually placed in the glacis on the extremity of the counterſcarp, and in dry moats; having little embraſures for the ſoldiers to fire through.

CAPPADOCIA, an ancient kingdom of Aſia, comprehending all that country which lies between mount Taurus and the Euxine ſea. It was divided by the Perſians into two kingdoms, the one called *Cappadocia ad Taurum*; the other, *Cappadocia ad Pontum*, and commonly *Pontus*; for an account of which laſt, ſee the article PONTUS.

CAPPADOCIA *Magna*, or *Cappadocia* properly ſo called, lies between the 38th and 41ſt degrees of north latitude. It was bounded by Pontus on the north, Lycaonia and part of Armenia Major on the ſouth, Galatia on the weſt, and by Euphrates and part of Armenia Minor on the eaſt. In the time of the Romans, the inhabitants of Cappadocia bore ſo bad a character, and were reported ſo vicious and lewd, that, among the neighbouring nations, a wicked man was emphatically called a *Cappadocian*. In after ages, however, they were ſo corrected by the pure doctrines of Chriſtianity, that no country whatever has produced men, or given to the church prelates, of more unblemiſhed characters.—We have now no ſyſtem of the Cappadocian laws, and ſcarce wherewithal to form any particular idea of them. As to their commerce, they carried on a conſiderable trade in horſes, great numbers of which were produced in their country; and we read of them in ſcripture as frequenting the fairs of Tyre with this commodity. As Cappadocia abounded with mines of ſilver, braſs, iron, and alum, and afforded great ſtore of alabaſter, cryſtal, and jaſper, it is probable that they might ſupply the neighbouring countries with theſe articles. The religion of the ancient Cappadocians was much the ſame with that of the Perſians.

CAPPANUS, a name given by ſome authors to a worm that adheres to and pierces the bottoms of ſhips; to which it is extremely pernicious, eſpecially in the Eaſt and Weſt Indies. To prevent this, our ſhips were ſheathed with copper; and the practice now obtains univerſally in the navy.

CAPPARIS, in botany; a genus of the monogynia order, belonging to the polyandria claſs of plants; and in the natural method ranking under the 25th order, *Putamineæ*. The calyx is tetraphyllous and coriaceous; their petals are four; the ſtamina are long: the fruit is a berry, carnous, unilocular, and pedunculated, or furniſhed with a foot-ſtalk.—There are ſeven ſpecies. The ſpinoſa, or common caper, is a low ſhrub, generally growing out of the joints of old walls, the fiſſures of rocks, and amongſt rubbiſh, in moſt of the warm parts of Europe: it hath woody ſtalks, which ſend out many lateral ſlender branches; under each of theſe are placed two ſhort crooked ſpines, between which and the branches come out the footſtalks of the leaves, which are ſingle, ſhort, and ſuſtain a round ſmooth entire leaf. At the intermediate joints, between the branches, come out the flowers on long footſtalks; before theſe expand, the bud with the empalement is gathered for pickling. Thoſe which are laſt, expand in form of a ſingle roſe, having five large white petals, which are roundiſh and concave; in the middle are placed a great number of long ſtamina, ſurrounding a ſtyle which riſes above them, and crowned with an oval germen, which afterwards becomes a capſule filled with kidney-ſhaped ſeeds.—This plant is with great difficulty preſerved in Britain. It delights in crevices of rocks, old walls, &c. and always thrives beſt in an horizontal poſture; ſo that, when planted either in pots or in the full ground, they ſeldom thrive, though they may be kept alive for ſome years. They are propagated by ſeeds in the warm parts of Europe, but very ſeldom in Britain. The buds of this plant, pickled with vinegar, are brought to Britain annually from Italy and the Mediterranean, and are much uſed in cookery.

CAPRA, or GOAT, a genus of quadrupeds belonging to the order of pecora. See Plates 67 and 68. The horns are hollow, turned upwards, erect, and ſcabrous. There are eight fore-teeth in the under jaw, and none in the upper; and they have no dog-teeth. This genus conſiſts of 14 ſpecies, *viz.*

I. The HIRCUS, or *common goat*, with arched carinated horns, and a long beard; a native of the eaſtern mountains. The goat is an animal of more ſagacity than the ſheep. Inſtead of having an antipathy to mankind, goats voluntarily mingle with them, and are eaſily tamed. Even in uninhabited countries, they betray no ſavage diſpoſitions. In the year 1698, an Engliſh veſſel having put in to the iſland of Bonaviſta, two negroes came on board, and offered gratis to the captain as many goats as he pleaſed. The captain expreſſed his aſtoniſhment at this offer; but the negroes replied, that there were only 12 perſons in the iſland; that the goats had multiplied to ſuch a degree, that they were become extremely troubleſome; and that, inſtead of having any difficulty in catching them, they followed the men wherever they went, and were ſo obſtinately officious, that they became a nuiſance.

Theſe animals are ſenſible of careſſes, and capable of a conſiderable degree of friendſhip. They are ſtronger, more agile, and leſs timid, than ſheep. They have a lively, capacious, and wandering diſpoſition; are fond of high and ſolitary places, and frequently ſleep upon the very points of rocks. They are more eaſily ſupported than any other animal of the ſame ſize; for there is hardly an herb, or the bark of a tree, which they will not eat. Neither are they liable to ſo many diſeaſes as ſheep: they can bear heat and cold with leſs inconvenience. The actions and movements of animals depend more upon the force and variety of their ſenſations than the ſtructure of their bodies: the natural inconſiſtency or fancifulneſs of goats is accordingly expreſſed by the irregularity of their actions: they walk, ſtop ſhort, run, jump, ſhow and hide themſelves, as it were by mere caprice, and without any other cauſe than what ariſes from the natural vivacity of their temper.

The buck will copulate when he is a year old, and the female

when ſhe is ſeven months. But as this is rather premature, they are generally reſtrained till after 18 months or two years. The buck is bold, beautiful, and vigorous; and one is ſufficient to ſerve 150 females. The females are generally in ſeaſon from September to the end of November. At that time the males drive whole flocks of the females continually from place to place, and fill the whole atmoſphere around them with their ſtrong diſagreeable odour; to which, as reſembling aſafœtida, good effects are attributed, in the prevention of nervous and hyſterical affections. Horſes are alſo ſuppoſed to be much refreſhed by it; on which account many people keep a he-goat in their ſtables.

Goats go with young four months and an half, and bring forth from the latter end of February to the latter end of April. Having only two teats, they generally bring forth but one or two young; ſometimes three; and in good warm paſtures there have been inſtances, though rare, of their bringing forth four at a time. They continue fruitful till they are ſeven years of age; but a buck goat is ſeldom kept after he is five. Both young and old are affected by the weather; a rainy ſeaſon makes them thin, a dry ſunny one makes them fat and blithe. Their exceſſive venery prevents their longevity; for in our climate they ſeldom live above 11 or 12 years.

Though the food of this animal coſts next to nothing, as it can ſupport itſelf even upon the moſt barren mountains, their produce is valuable. The whiteſt wigs are made of their hair, their uſual colour being white: thoſe indeed of France, and the Alps, are ſhort-haired, reddiſh, and the horns ſmall. Bolſters made from the hair of a goat were in uſe in the days of Saul. The ſpecies very probably was the Angora goat, found only in the Eaſt; and whoſe hair is ſoft and ſilky.

The ſuet of the goat is alſo in great eſteem, and many of the inhabitants of Caernarvonſhire kill them merely for the ſake of their fat, which makes candles of a ſuperior quality to the common. Of their horns excellent handles are made for tucks and pen-knives. The ſkin is peculiarly well adapted for the glove manufactory, eſpecially that of the kid; as it takes a dye better than any other ſkin. The fleſh is of great uſe, and affords a cheap and plentiful proviſion in the winter months, when the kids are brought to market. The haunches of the goat are frequently ſalted and dried, and ſupply all the uſes of bacon: this by the Welſh is called *coch yr wden*, or hung veniſon.

The milk of the goat is ſweet and nouriſhing, and an excellent ſuccedaneum for aſs's milk. Some of this, with a tea-ſpoonful of hartſhorn drunk warm in bed in the morning, and at four in the afternoon, and repeated for ſome time, is ſaid to have cured ſome phthiſical people before they were gone too far. The cheeſe which is made of goat's milk, though much valued in ſome of the mountainous countries, has, however, a peculiar taſte and flavour, not very generally approved of. α. The Angora goat is a variety that is found only in the tract that ſurrounds Angora and Beibazar, towns in Aſiatic Turky, for the diſtance of three or four days journey. Strabo ſeems to have been acquainted with this kind; for, ſpeaking of the river Halys, he ſays, that there are goats found near it that are not known in any other parts. In the form of their body they differ from the common goat, being ſhorter; their legs too are ſhorter, their ſides broader and flatter, and their horns ſtraighter; but the moſt valuable characteriſtic is their hair, which is ſoft as ſilk, of a gloſſy ſilvery whiteneſs, and curled in locks of eight or nine inches in length. This hair is the baſis of our fine camlets, and imported to England in form of thread; for the Turks will not permit it to be exported raw, for a reaſon that does them honour; becauſe it ſupports a multitude of poor, who live by ſpinning it. The goat-herds of Angora and Beibazar are extremely careful of their flocks, frequently combing and waſhing them. It is obſerved that, if they change their climate and paſture, they loſe their beauty; we therefore ſuſpect that the deſign of Baron Alſtroemer, a patriotic Swede, turned out fruitleſs, who imported ſome into his own country, to propagate the breed for the ſake of their hair. β. The *Capricorn* of Buffon is another variety, having ſhort horns, the ends turned forwards, their ſides annulated, and the rings more prominent before than behind.

II. The IBEX, or *wild goat*, is the ſtock from whence the tame ſpecies ſprung. It has large knotty horns reclined upon its back, is of a yellowiſh colour, and its beard is black. The females are leſs, and have ſmaller horns, more like thoſe of a common ſhe-goat, and with few knobs on the upper ſurface: they bring one young one, ſeldom two, at a birth. They inhabit the higheſt Alps of the Griſons country and the Valais; are alſo found in Crete. They are very wild, and difficult to be ſhot, as they always keep on the higheſt points. Their chace is exceedingly dangerous: being very ſtrong, they often tumble the incautious huntſman down the precipices, except he has time to lie down, and let the animals paſs over him. They are ſaid not to be long-lived.

III. The MAMBRINA, or *Syrian goat*, with reclined horns, pendent ears, and a beard. It is a native of the Eaſt. Their ears are of a vaſt length; from one to two feet; and ſometimes ſo troubleſome, that the owners cut off one to enable the animal to feed with more eaſe. Theſe animals ſupply Aleppo with milk.

IV. The RUPICAPRA, or *chamois goat*, has erect and hooked horns. The body is of a duſky red colour; but the front, top of the head, gullet, and inſide of the ears are white; the under part of the tail is blackiſh; and the upper lip is a little divided. It inhabits the Alps of Dauphiné, Switzerland, and Italy; the Pyrenean mountains; Greece, and Crete; does not dwell ſo high in the hills as the ibex, and is found in greater numbers. The chamois is of the ſize of a domeſtic goat, and his hair is as ſhort as that of a hind. His vivacity is delightful, and his agility truly admirable. Theſe animals are very ſocial among themſelves: we find them going in pairs, or in little flocks of from three to twenty; and ſometimes we ſee from 60 to 100 of them diſperſed in different flocks along the declivity of the ſame mountain. The large males keep at a diſtance from the reſt, except in the rutting ſeaſon, when they join the females and beat off all the young. At this period their ardour is ſtill ſtronger than that of the wild bucks. They bleat often, and run from one mountain to another. Their ſeaſon of love is in the months of October and November, and they bring forth in March and April. A young female takes the male at the age of 18 months. The females bring forth one, but rarely two, at a time. The young follow their mothers till October, if not diſperſed by the hunters or the wolves. We are aſſured that they live between 20 and 30 years. Their fleſh is very good. A fat chamois goat will yield from 10 to 12 pounds of ſuet, which is harder and better than that of the goat. The voice of the chamois is a very low bleating, reſembling that of a hoarſe domeſtic goat. It is by this bleating that they collect together, particularly the mothers and their young. But, when alarmed, they advertiſe one another by a kind of whiſtling noiſe. The ſight, ſmelling, and hearing of the chamois are very acute. When he ſees a man diſtinctly, he ſtops for ſome time, and flies off when he makes a nearer approach. When he ſmells or hears any thing which he cannot ſee, he whiſtles or blows with ſuch force, that the rocks and foreſts re-echo the ſound. If there are many of them near, they all take the alarm. He is very fond of ſome aromatic herbs, particularly of the carline thiſtle and genipay, which are the hotteſt plants that grow on the Alps. When he eats green herbs, he

drinks very little. He is very fond of the leaves and tender buds of ſhrubs, and ruminates like the common goat. This animal is admired for his large round eyes, whoſe ſize correſponds with the vivacity of his diſpoſition. His head is adorned with two ſmall horns, from half a foot to nine inches in length. Their colour is a fine black, and they are placed on the front nearly between his eyes; and, inſtead of being reflected backward, like thoſe of other animals, they advance forward above the eyes, and bend backward at the points, which are extremely ſharp. He adjuſts his ears moſt beautifully to the points of his horns. Two tufts of black hair deſcend from his horns to the ſides of his face. The reſt of the head is of a yellowiſh white colour, which never changes. The horns of the female are ſmaller, and leſs crooked. The ſkin of the chamois, when dreſſed, is very ſtrong, though ſupple, and makes excellent breeches, gloves, &c. Garments of this kind laſt long, and are of great uſe to manufacturers. The chamois goats are ſo impatient of heat, that, in ſummer, they are only to be found under the ſhades of caverns in the rocks, among maſſes of ſnow and ice, or in elevated foreſts on the northern declivities of the moſt ſcabrous mountains, where the rays of the ſun ſeldom penetrate. It has been alleged, but without foundation, that the chamois, in climbing and deſcending rocks, ſupports himſelf by his horns; but it is by the ſtrength and agility of his limbs only that he is enabled to climb and deſcend rocks. His legs are very free and tall; thoſe behind are ſomewhat longer, and always crooked, which favours their ſpringing to a great diſtance. The hunting of the chamois is very difficult and laborious. The mode moſt in uſe is to kill them by ſurpriſe. The hunters conceal themſelves behind rocks or large ſtones, taking care that the wind blows oppoſite to them, and, when a favourable opportunity occurs, ſhoot them with muſkets. They are likewiſe hunted in the ſame manner as ſtags and other animals, by poſting ſome of the hunters in narrow paſſages, while others beat about to raiſe the game. Men are preferable for this purpoſe to dogs; for dogs too quickly diſperſe the animals, who fly off ſuddenly to the diſtance of four or five leagues.

V. The Depressa is an African goat, with ſmall depreſſed horns, bent forwards, lying on the head. It is about the ſize of a kid; and the hair is long and pendulous.

VI. The Reversa is likewiſe an African goat, with erect horns, and curved a little forwards. It is about the ſize of a kid of a year old. It inhabits Juda or Whidaw in Africa.

VII. The Gazella has long, erect, cylindrical horns, annulated near the baſe. It inhabits Egypt, the Cape, Arabia, the Levant, and India, dwelling in the plains.

VIII. The Cervicapra, with plated cylindrical horns, inhabits Barbary. The hair near the horns is longer than in any other part of the body. The females want horns. Mr. Haſſelquiſt gives the following account of this ſpecies: "The cervicapra is larger, ſwifter, and wilder, than the common rock-goat, and can ſcarcely be taken without a falcon. It is met with near Aleppo. I have ſeen a variety of this which is common in the Eaſt, and the horns appear different; perhaps it is a diſtinct ſpecies. This animal loves the ſmoke of tobacco; and, when caught alive, will approach the pipe of the huntſman, though otherwiſe more timid than any animal. This is perhaps the only creature, beſides man, that delights in the ſmell of a poiſonous and ſtinking plant. The Arabians hunt it with a falcon (*falco gentilis*, Lin.) I had an excellent opportunity of ſeeing this ſport near Nazareth in Galilee. An Arab, mounted on a ſwift courſer, held the falcon in his hand, as huntſmen commonly do: when he eſpied the rock-goat on the top of a mountain, he let looſe the falcon, which flew in a direct line like an arrow, and attacked the animal, fixing his talons into his throat, which was afterwards cut by the huntſman."

O

IX. The Bezoartica, or *bezoar goat*, is bearded, and has cylindrical, arched, and wholly annulated horns. It is a native of Perſia. The bezoar is found in one of its ſtomachs, called *abomaſus*. See Bezoar and Abomasus.

X. The Tartarica, or *ſaiga* of Buffon, has cylindrical, ſtraight, annulated horns; the points inclining inward, the ends ſmooth; the other part ſurrounded with very prominent annuli; of a pale yellow colour, and the greateſt part ſemipellucid; the cutting teeth are placed ſo looſe in their ſockets, as to move with the leaſt touch. The male is covered with rough hair like the he-goat, and has a very ſtrong ſmell; the female is ſmoother. The hair on the bottom of the ſides and throat is long, and reſembles wool; that on the ſides of the neck and head is hoary; the back and ſides of a dirty white; the breaſt, belly, and inſide of the thighs, of a ſhining white. The females are deſtitute of horns. Theſe animals inhabit all the deſerts from the Danube and Dnieper to the river Irtiſh, but not beyond; nor are they ever ſeen to the north of 54 or 55 degrees of latitude. Feeding on the ſalt and aromatic plants of thoſe countries, they grow in the ſummer very fat: but their fleſh is ſcarcely eatable. The females go with young the whole winter; and have but one at a time; which is ſingular, as the numbers of theſe animals are prodigious. The young are covered with a ſoft fleece, like new-dropt lambs, curled and waved. They are regularly migratory. In autumn, the rutting-ſeaſon, they retire in large flocks to the ſouthern deſerts. In the ſpring they divide into little flocks, and return northward at the ſame time as the wandering Tartars change their quarters.

Whenever they feed, ſome are always keeping watch; a precaution very neceſſary to preſerve themſelves from the attack of wolves, and from the ſurpriſe of the huntſmen. They are exceſſively ſwift, and will outrun the fleeteſt horſe or greyhound; yet partly through their timidity, and partly by the ſhortneſs of their breath, they are very ſoon taken. If they are but bit by a dog, they inſtantly fall down, nor will they even offer to riſe. In a wild ſtate they ſeem to have no voice. When brought up tame, the young emit a ſhort ſort of bleating, like ſheep.

The males are moſt libidinous animals. When taken young, they may eaſily be made tame; but, if caught when at full age, are ſo wild and ſo obſtinate as to refuſe any food. They are hunted for the ſake of their fleſh, horns, and ſkins, which are excellent for gloves, belts, &c.

XI. The Ammon, has ſemicircular, plain, white horns, and no beard. It is about the ſize of a ram, and is a native of Siberia.

XII. The Ægagrus of Pallas, or *Caucaſan goat*, has ſmooth black horns, ſharply ridged on their upper parts, and hollowed on their outward ſides. No veſtiges of knots or rings, but on the upper ſurface are ſome wavy riſings; bend much back, and are much hooked at the end, approaching a little at the points. On the chin is a great beard, duſky, mixed with cheſnut. The fore part of the head is black, the ſides mixed with brown; the reſt of the animal grey, or grey mixed with ruſt colour. Along the middle of the back, from the neck to the tail, is a black liſt; and the tail is black. The female is either deſtitute of horns, or has very ſhort ones. In ſize it is ſuperior to the largeſt he-goats, but in form and agility reſembles a ſtag: yet Monardus compares it to the he-goat, and ſays that it has the feet of the goat. They inhabit the lower mountains of Caucaſus and Taurus, all Aſia Minor, and perhaps the mountains of India. They abound on the inhoſpitable hills of Laar and Khorazan in Perſia; and, according to Monardus, are alſo found in Africa. It is an animal of vaſt agility. Monardus was witneſs to the manner of its ſaving itſelf from injury

by falling on its horns; for he ſaw that which he deſcribes leap from a high tower, precipitating itſelf on its horns, then ſpringing on its legs, and leaping about, without receiving the leaſt harm. This is one of the animals which yields that once-valued but now juſtly exploded alexipharmic, the Bezoar-ſtone: which is a concretion formed of many coats, incruſting a nucleus of ſmall pebbles, ſtones of fruits, bits of ſtraw, or buds of trees.

XIII. The Gnou, with ſcabrous horns, and thick at the baſe, bending forward cloſe to the head, then ſuddenly reverting upwards. The mouth is ſquare; the noſtrils covered with broad flaps. From the noſe, half way up the front, is a thick oblong ſquare bruſh of long ſtiff black hairs reflected upwards, on each ſide of which the other hairs are long, and point cloſely down the cheeks. Round the eyes are diſpoſed in a radiated form ſeveral ſtrong hairs. The neck is ſhort, and a little arched. On the top a ſtrong and upright mane, reaching from the horns beyond the ſhoulders. On the chin is a long white beard; and on the gullet a very long pendulous bunch of hair. On the breaſt, and between the fore legs, the hairs are very long and black. The tail reaches to the firſt joint of the legs, and is full of hair like thoſe of the horſe, and quite white. The body is thick; and covered with ſmooth ſhort hair of a ruſt brown colour tipt with white. The legs are long, elegant, and ſlender, like thoſe of a ſtag. On each foot is only a ſpurious or hind hoof. It is a ſtrange compound of animals: having a vaſt head like that of an ox; body and tail, like a horſe; legs like a ſtag; and the *ſinus lachrymalis* of an antelope. The ordinary ſize of it is about that of a common galloway; the length of it being ſomewhat above five, and height of it rather more than four feet. Theſe animals inhabit in great numbers the fine plains of the great Namacquas, far north of the Cape of Good Hope, extending from S. lat. 25. to 28. 42. where Africa ſeems at once to open its vaſt treaſures of hoofed quadrupeds. It is an exceedingly fierce animal: on the ſight of any body it uſually drops its head, and puts itſelf into an attitude of offence; and will dart with its horns againſt the pales of the incloſure towards the perſons on the outſide; yet it will afterwards take the bread which is offered. It will often go upon its knees, run ſwiftly in that ſingular poſture, and furrow the ground with its horns and legs. The Hottentots call it *Gnou* from its voice. It has two notes, one reſembling the bellowing of an ox, the other more clear. It is called an ox by the Europeans.

XIV. The Dorcas, or *antelope*, has cylindrical annulated horns, bent backwards, contorted, and ariſing from the front between the eyes. It is a native of Africa and Mexico. Theſe animals are of a moſt elegant and active make; of a reſtleſs and timid diſpoſition; extremely watchful; of great vivacity; remarkably ſwift; exceedingly agile; and moſt of their boundings ſo light, ſo elaſtic, as to ſtrike the ſpectators with aſtoniſhment. What is very ſingular, they will ſtop in the middle of their courſe, for a moment gaze at their purſuers, and then reſume their flight.

As the chace of theſe animals is a favourite diverſion with the eaſtern nations, from that may be collected proofs of the rapid ſpeed of the antelope tribe. The grey-hound, the fleeteſt of dogs, is unequal in the courſe; and the ſportſman is obliged to call in the aid of a falcon trained to the work, to ſeize on the animal and impede its motions, ſo that the dogs may overtake it. In India and Perſia a ſort of leopard is made uſe of in the chace: this is an animal that takes its prey, not by ſwiftneſs of foot, but by the greatneſs of its ſprings, by motion ſimilar to that of the antelope; but ſhould the leopard fail in its firſt eſſay, the game eſcapes. The fleetneſs of this animal was proverbial in the country it inhabited, even in the earlieſt times. The ſpeed of Aſahel is beautifully compared to that of the tzebi; and the Gadites were ſaid to be as ſwift as the roes upon the mountains. The ſacred writers took their ſimiles from ſuch objects as were before the eyes of the people they addreſſed themſelves to. There is another inſtance drawn from the ſame ſubject: the diſciple raiſed to life at Joppa was ſuppoſed to have been called *Tabitha*, i. e. *Dorcas*, or the *Antelope*, from the beauty of her eyes; and this is ſtill a common compariſon in the eaſt: *Aine el Czazel*, or, "You have eyes of an Antelope," is the greateſt compliment that can be paid to a fine woman.

Some ſpecies of the antelope form herds of 2000 or 3000, while others keep in ſmall troops of five or ſix. They generally reſide in hilly countries; though ſome inhabit plains: they often browſe like the goat, and feed on the tender ſhoots of trees, which give their fleſh an excellent flavour. This is to be underſtood of thoſe that are taken in the chace; for thoſe that are fattened in houſes are leſs delicious. The fleſh of ſome ſpecies is ſaid to taſte of muſk, which perhaps depends on the qualities of the plants they feed on.

Mr. Pennant makes the antelope a diſtinct genus of animals, forming a link between the goat and the deer. With the firſt of theſe they agree in the texture of the horns, which have a core in them, and they never caſt them; with the laſt, in the elegance of their form, and great ſwiftneſs. He diſtinguiſhes ſeveral ſpecies, among which he ranks the *gazella*, the *cervicapra*, the *bezoartica*, and the *tartarica* of Linnæus, deſcribed above, VII. VIII. IX. X. with the *moſchus grimmia* of the ſame author. The other ſpecies of antelopes diſtinguiſhed by zoologiſts are:

1. The *Kevella* of Pallas, or flat-horned antelope, has horns twelve inches long, flattened on their ſides, inclining firſt backwards, bending in the middle, and then reverting forwards at their ends, and annulated with from fourteen to eighteen rings: the upper ſide of the body is reddiſh brown; lower part and buttocks are white: the ſize equal to a ſmall roe-buck. They inhabit Senegal; where they live in great flocks, are eaſily tamed, and are excellent meat.

2. The *corine antelope*, with very ſlender horns, ſix inches long, ſurrounded with circular *rugæ*: on each ſide of the face is a white line; beneath that is one of black: the neck, body, and flanks are tawny; belly and inſide of the thighs white: on the knees is a tuft of hair. It is leſs than a roe-buck, and inhabits Senegal.

3. The *nager*, or red antelope, with horns $5\frac{1}{2}$ inches long; one or two ſlight rings at the baſe: ears much longer than the horns: hair ſtiff and bright; in all parts of a reddiſh colour, paleſt on the cheſt: tail very ſhort, inhabits Senegal and the Cape; where it is very frequent, and is a common food.

4. The *dama* or ſwift antelope, *le Nanguer*, (Buff.) with round horns, eight inches long, reverting at their ends. The general colour is tawny; but this ſpecies varies in that particular. It inhabits Senegal, and is eaſily tamed. It is ſo very ſwift, that Ælian compares its flight to the rapidity of a whirlwind.

5. The *elk-antelope* of Sparman (Indian antelope of Pennant), has thick ſtraight horns, marked with two prominent ſpiral ribs near two thirds of their length, ſmooth towards their end; ſome above two feet long. The head is of a reddiſh colour, bounded on the cheeks by a duſky line. The forehead is broad; the noſe pointed. On the forehead is a ſtripe of long looſe hairs; and on the lower part of the dewlap, a large tuft of black hair. Along the neck and back, from head to tail, is a black ſhort mane: the reſt of the body is of a bluiſh grey, tinged with red. The tail does not reach to the firſt joint of the leg; is covered with ſhort cinereous hairs; and the end tufted with long black hairs. The hoofs are ſhort, ſurrounded at their junction with the legs by a circle of black hairs. The height

to the ſhoulders is five feet. It is thick bodied and ſtrongly made; but the legs are ſlender. It wants the *ſinus lacbrymalis*. The females are horned like the males. The Caffres call this ſpecies *impoſos* and *poſſo*. The Dutch of the Cape call it the *eland* or *elk*. M. de Buffon, by miſtake, calls this the *condous*, which he ought to have beſtowed on his *condoma*. It inhabits India, Congo, and the ſouthern parts of Africa. They live in herds; but the old males are often ſolitary. They grow very fat, eſpecially about the breaſt and heart; ſo that they are eaſily caught; and, when purſued, will ſometimes fall dead in the chace. They are ſlow runners; when rouſed, always go againſt the wind, nor can the hunters (even if they front the herd) divert them from their courſe. The fleſh is fine-grained, very delicious, and juicy. The hide is tough: the Hottentots make tobacco pipes of the horns.

6. The *cervine antelope*, or *antelope bubalis* of Pallas, with horns bending outward and backward, almoſt cloſe at their baſe, and diſtant at their points; twiſted and annulated; very ſtrong and black: the head is large, and like that of an ox: the eyes are placed very high, and near to the horns: the form of the body is a mixture of the ſtag and heifer; the height to the top of the ſhoulders four feet: the tail is rather more than a foot long, aſinine, and terminated with a tuft of hair: the colour a reddiſh brown; white about the rump, the inner ſide of the thighs, and lower part of the belly: a dark ſpace occupies the top of the back, the front of the upper part of the fore legs, and hinder part of the thighs. It inhabits Barbary, and probably other parts of Africa, being alſo found towards the Cape of Good Hope. It is the *bekker el waſh* of the Arabs, according to Dr. Shaw; who ſays, that its young quickly grow tame, and herd with other cattle. Mr. Forſkal mentions it among the Arabian animals of an uncertain genus, by the name of *bakar uaſch*. This is the bubalus of the ancients; not the buffalo, as other writers have ſuppoſed. The Dutch of the Cape call this ſpecies *bartebeeſt*. They go in large herds; a few only are ſolitary. They gallop ſeemingly with a heavy pace, yet go ſwiftly. They drop on their knees to fight like the white-footed antelope or nil-ghau, and the boſch-bok hereafter deſcribed. The fleſh is fine-grained, but dry. In this animal there is a pore, one line in diameter, an inch or an inch and a half below and before the internal angle of the eye. The uſe of this, which is alſo found in the deer, is for affording a freer reſpiration, a circumſtance ſo eſſential to beaſts of chace.

7. The *ſpringer*, with ſlender horns, annulated half way, and twice contorted. The ears very long and duſky. The face, cheeks, noſe, chin, and throat, are white. The whole upper ſide of the neck, part of the lower, the back, ſides, and outſide of the limbs, are of a pale yellowiſh brown. The cheſt, belly, and inſide of the limbs, are white; the ſides and belly divided by a broad band of cheſnut, which runs down part of the ſhoulders. The tail reaches to the firſt joint of the leg; the upper part white; the lower black, and furniſhed with long hair. The buttocks are white; and from the tail half way up the back is a ſtripe of white, expanſible at pleaſure. This elegant ſpecies weighs about fifty pounds, and is rather leſs than a roe-buck. It inhabits the Cape of Good Hope, where it is called the *ſpring-bok*, from the prodigious leaps it takes on the ſight of any body. When alarmed, it has the power of expanding the white ſpace about the tail into the form of a circle, which returns to its linear form when the animal is tranquil. Theſe animals migrate annually from the interior parts in ſmall herds, and continue in the neighbourhood of the Cape for two or three months; then join companies and go off in troops conſiſting of many thouſands, covering the great plains for ſeveral hours in their paſſage. They are attended in their migrations by numbers of lions, hyænas, and other wild beaſts, which make great deſtruction among them. They are excellent eating, and with other antelopes are the veniſon of the Cape.

8. The *ſtriped antelope*, has ſmooth horns, twiſted ſpirally, and compreſſed ſideways, with a ridge on one ſide following the wreaths: they conſiſt of three bends; and are ſometimes four feet and a half long, meaſured in a ſtraight line. They are naturally of a duſky colour, and wrinkled; but are generally brought over highly poliſhed. The females are deſtitute of horns. In the upper jaw is a hard horny ſubſtance, diſpoſed in ridges. The length of the animal is nine feet; the legs are ſlender: the general colour is of a reddiſh caſt, mixed with grey; and from the tail, along the top of the back, to the ſhoulders, is a white ſtripe; from which are ſeven others, four pointing towards the thighs, and three towards the belly; but they vary in number of ſtripes. On the upper part of the neck is a ſhort mane: beneath the neck, from the throat to the breaſt, are ſome long hairs hanging down. It inhabits the Cape of Good Hope, where it is called *coedoes*, and is ſaid to leap to a moſt aſtoniſhing height. This ſpecies wants the *ſinus lacbrymalis*.

9. The *boſch-bok*, or wood-goat of the Cape, a ſpecies of antelope, according to Mr. Sparman, unknown to all the cultivators of natural hiſtory, whether ancient or modern, till he deſcribed it in the year 1780, by the name of *antilope ſylvatica*. This animal has obtained the name it goes by, in conſequence of its being the only one among the gazels in Africa, which may be properly ſaid to live in the woods and groves. In ſize, the boſch-bok is ſomewhat above two feet and a half high. The horns are ten inches and a half long: the ears half the length of the horns, or five inches. The horns are black, in ſome meaſure triangular, and at the ſame time wreathed, ſo that both the ſides and angles have ſomewhat of a ſpiral turn. At bottom they are rather rough, in conſequence of a ſet of almoſt innumerable wavy rings; which, however, are not elevated much above the ſurface. At top they are conical and ſharp-pointed, and in that part as ſmooth as though they had been poliſhed. The teeth of this animal are like thoſe of other antelopes. It has no fore teeth or *inciſores* except in the lower jaw, where it has eight. There is no *porus ceriferus* in this, as there is in ſome other antelopes. The hairs on the head are very ſhort and fine; afterwards they become more rough and rugged, reſembling goats hair more than that of gazels or harts. Forwards on the neck, breaſt, ſides and belly, they are an inch and a half or two inches long. On the ridge of the neck, and ſo on all along that of the back, they are three or four inches in length, ſo as to form a kind of mane there, terminating in a tail about a finger's breadth long. On the hind part of the thighs and buttocks likewiſe the hairs are eight inches long; the legs and feet are ſlender, and covered with ſhort hairs; the fetlock joints are ſmall; the noſe and upper lip are decorated with black whiſkers about an inch long. The predominant colour in this animal is dark brown, which occupies the principal part of the ſides, the back, the upper part of the tail, the upper part of the cheſt and fore ribs, and the fore part of the belly. A ſtill darker brown, bordering upon black, is diſcoverable on the outſide of the ſhoulders, and ſome part of the fore ribs. The fore part of the noſe, from the eyes to the muzzle, is of a ſoot colour. The ears are likewiſe as black as ſoot on the outſide, but on the inſide grey; and both outwards and inwards covered with hairs ſtill ſhorter than thoſe on the head; excepting half the fore part of the lower edge, where the hairs are white and half an inch long. Small white ſpots, from nine to twelve in all, are ſeen on each of the haunches and on the ſides near them. A narrow line of long white hairs extends from the neck all along the back and tail, in the midſt of the brown hairs already deſcribed. From the chine of the back to the ſides run five white parallel

CAMELUS.


Bactrian Camel.
African Camel or Dromedary.
CAPRA
Chamois Goat.
African Goat.
Female.
Male.
Wild Goat.
Buck of Juda.
Male.
Female.
Male.
Syrian Goat.
Female.
Angora Goat.
Male.
Female.
The Capricorn.


The Swift Antilope
Hart Beast
Red Antilope
Antilope
Elk Antilope
Hat-horned Antilope
Harnefsed Antilope
White-footed Antilope
Spring Bok
Corine Antilope
The Gnou
Cervicapra
Wood Antilope
Barlow sculp.

ſtreaks, which, however, are only diſcoverable by a cloſe inſpection.

This creature does much miſchief to the vineyards and kitchen-gardens of the Cape coloniſts; and it ſhows a great deal of craft in avoiding the traps ſet for it. As the *boſch-bok* runs but ſlowly, it ſometimes happens that he is caught by dogs. When he ſees there is no other reſource, he puts himſelf in a poſture of defence; and when he is going to butt, kneels down, like the white-footed antelope and the hartbeeſt. The coloniſts are not very fond of hunting him in this manner, as the beaſt on this occaſion generally ſells his life at a very dear rate, by goring and killing ſome of their beſt and moſt ſpirited hounds. This creature's horns, which are its chief defence, ſometimes alſo prove its bane, by being entangled in the buſhes and ſmall branches of trees, which thus ſtop the beaſt in its flight. This ſpecies of antelope is monogamous, or keeps in pairs. The female, which is without horns, and on that account runs about in the foreſt more free and unimpeded, does not ſuffer herſelf ſo eaſily to be hunted out of the woods, having there, as well as on the plains, a more certain defence againſt the dogs in her legs, than the male has in his horns, eſpecially as ſhe is not ſo bulky and heavy as the male. Her breaſt is ſaid to be very plump and fleſhy, but the fleſh in general is not very tender.

10. The *leucoryx* with the noſe thick and broad, like that of a cow; the ears ſomewhat ſlouching; body clumſy and thick: the horns long, very ſlightly incurvated, ſlender, annulated part of the way; black, pointed. The tail reaching to the firſt joint of the legs, and tufted. The colour is in all parts a ſnowy white, except the middle of the face, ſides of the cheeks, and limbs, which are tinged with red. This ſpecies is about the ſize of a Welch runt; and inhabits Gow Bahrein, an iſle in the gulph of Baſſora.

11. The *picta*, white-footed antelope, or nyl-ghau, with ſhort horns, bending a little forward; ears large, marked with two black ſtripes; a ſmall black mane on the neck, and half way down the back; a tuft of long black hairs on the fore-part of the neck; above that, a large ſpot of white; another between the fore-legs on the cheſt: one white ſpot on each fore-foot; two on each hind-foot: the tail is long, tufted with black hairs. The colour of the male is a dark grey. The female is of a pale brown colour; with a mane tuft, and ſtriped ears, like the male; on each foot, three tranſverſe bands of black, and two of white: it is deſtitute of horns. The height to the top of the ſhoulders is four feet and an inch; the length from the bottom of the neck to the anus, four feet. The head is like that of a ſtag; the legs are delicate. Theſe animals inhabit the diſtant and interior parts of India, remote from our ſettlements. They are brought down as curioſities to the Europeans, and have of late years been frequently imported into England. In the days of Aurenge Zebe, they abounded between Delhi and Lahor, on the way to Cachemire. They were called *nyl-ghau*, or *blue* or *grey bulls*; and were one of the objects of chace, with that mighty prince, during his journey. They were incloſed by his army of hunters within nets, which being drawn cloſer and cloſer, at length formed a ſmall precinct: into this the king, his omrahs, and hunters entered, and killed the beaſts with arrows, ſpears, or muſkets; and ſometimes in ſuch numbers, that Aurenge Zebe uſed to ſend quarters as preſents to all his great people. They are uſually very gentle and tame, will feed readily, and lick the hands which give them food. In confinement they will eat oats, but prefer graſs and hay; are very fond of wheaten bread; and when thirſty, they will drink two gallons at a time. They are ſaid to be at times very vicious and fierce. When the males fight, they drop on their knees at a diſtance from one another, make their approaches in that attitude, and when they come near, ſpring and dart at each other. They will often, in a ſtate of confinement, fall into that poſture without doing any harm. They will, notwithſtanding, attack mankind unprovoked, and are ſometimes dangerous. They have been bred in England, and are ſuppoſed to go nine months with young, producing ſometimes two at a birth.

12. The *ſcripta*, or harneſſed antelope (*le guib* Buff.), has ſtraight horns nine inches long, pointing backwards, with two ſpiral ribs. The general colour is a deep tawny; but the ſides are moſt ſingularly marked with two tranſverſe bands of white, croſſed by two others from the back to the belly; the rump with three white lines pointing downwards on each ſide; and the thighs are ſpotted with white. The tail is ten inches long, covered with long rough hairs. It inhabits the plains and woods of Senegal, living in large herds. It is frequent at the Cape, where it is called the *bonte bok*, or *ſpotted goat*.

CAPRA-*Saltans*, in meteorology, a fiery meteor or exhalation ſometimes ſeen in the atmoſphere. It forms an inflected line, reſembling in ſome meaſure the caperings of a goat; whence it has its name.

CAPRALA, an iſle of Italy, in the Tuſcan ſea, to the north-eaſt of Corſica, on which it depends. It is pretty populous, and has a ſtrong caſtle for its defence. It is about 15 miles in circumference. E. long. 11. 5. N. lat. 43. 15.

CAPRARIA, in botany; a genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 40th order, *Perſonatæ*. The calyx is quinquepartite; the corolla campanulated, quinquefid, with acute ſegments; the capſule bivalved, bilocular, and polyſpermous. There is but one ſpecies, the biflora, which is a native of the warm parts of America. Being a troubleſome weed, and without beauty, it is never cultivated, except in botanic gardens for the ſake of variety.

CAPRAROLA, one of the moſt magnificent palaces in Italy, ſeated on a hill, in Ronciglione, whoſe foot is watered by the river Tireia. It was built by cardinal Farneſe; and has five fronts, in the middle of which is a round court, though all the rooms are ſquare, and well proportioned. It is 27 miles north-weſt of Rome.

CAPREÆ. See CAPRI.

CAPREOLUS (Elias), an excellent civilian, and learned hiſtorian, born in Breſcia in Italy, wrote an hiſtory of Breſcia, and other works: died in 1519.

CAPRI, anciently *Capreæ*, a city and iſland at the entrance of the gulph of Naples, E. long. 14. 50. N. lat. 40. 45. The iſland is only four miles long and one broad: the city is a biſhop's ſee, ſituated on a high rock at the weſt end of the iſland. Capreæ was anciently famous for the retreat of the emperor Tiberius for ſeven years, during which he indulged himſelf in the moſt ſcandalous debaucheries.

CAPRIATA (Peter John), a civilian and hiſtorian, was born at Genoa. He wrote, in Italian, the hiſtory of the wars of Italy; an Engliſh tranſlation of which was printed in London in 1663.

CAPRICORN, in aſtronomy, one of the 12 ſigns of the zodiac. See ASTRONOMY. The ancients accounted Capricorn the tenth ſign; and when the ſun arrived there, it made the winter ſolſtice with regard to our hemiſphere: but the ſtars having advanced a whole ſign towards the eaſt, Capricorn is now rather the 11th ſign; and it is at the ſun's entry into Sagittary that the ſolſtice happens, though the ancient manner of ſpeaking is ſtill retained. This ſign is repreſented on ancient monuments, &c. as having the fore part of a goat and the hind part of a fiſh, which is the form of Ægipan; ſometimes ſimply under the form of a goat.

Tropic of CAPRICORN, a leſſer circle of the ſphere, which is parallel to the equinoctial, and at 23° 30′ diſtance from it ſouthwards; paſſing through the beginning of Capricorn.

CAPRIFICATION, a method uſed in the Levant, for ripening the fruit of the domeſtic fig-tree, by means of inſects bred in that of the wild fig-tree. The moſt ample and ſatisfactory accounts of this curious operation in gardening are thoſe of Tournefort and Pontedera; the former, in his Voyage to the Levant, and in a Memoir delivered to the academy of ſciences at Paris in 1705; the latter, in his *Anthologia*. The ſubſtance of Tournefort's account is this: "Of the thirty ſpecies or varieties of the domeſtic fig-tree which are cultivated in France, Spain, and Italy, there are but two cultivated in the Archipelago. The firſt ſpecies is called *ornos*, from the old Greek *erinos*, which anſwers to *caprificus* in Latin, and ſignifies a wild fig-tree. The ſecond is the domeſtic or garden fig-tree. The former bears ſucceſſively, in the ſame year, three ſorts of fruit called *fornites*, *cratitires*, and *orni*; which, though not good to eat, are found abſolutely neceſſary towards ripening thoſe of the garden fig. Theſe fruits have a ſleek even ſkin; are of a deep green colour; and contain in their dry and mealy inſide, ſeveral male and female flowers placed upon diſtinct foot-ſtalks, the former above the latter. The *fornites* appear in Auguſt, and continue to November without ripening: in theſe are bred ſmall worms, which turn to a ſort of gnats no where to be ſeen but about theſe trees. In October and November, theſe gnats of themſelves make a puncture into the ſecond fruit, which is called *cratitires*. Theſe do not ſhow themſelves till towards the end of September. The *fornites* gradually fall away after the gnats are gone; the *cratitires*, on the contrary, remain on the tree till May, and incloſe the eggs depoſited by the gnats when they pricked them. In May, the third ſort of fruit, called *orni*, begins to be produced by the wild fig-trees. This is much bigger than the other two; and when it grows to a certain ſize, and its bud begins to open, it is pricked in that part by the gnats of the *cratitires*, which are ſtrong enough to go from one fruit to another to depoſit their eggs. It ſometimes happens that the gnats of the *cratitires* are ſlow to come forth in certain parts, while the *orni* in thoſe very parts are diſpoſed to receive them. In this caſe, the huſbandman is obliged to look for the *cratitires* in another part, and fix them at the ends of the branches of thoſe fig-trees whoſe *orni* are in a fit diſpoſition to be pricked by the gnats. If they miſs the opportunity, the *orni* fall, and the gnats of the *cratitires* fly away. None but thoſe that are well acquainted with the culture know the critical moment of doing this; and in order to know it, their eye is perpetually fixed on the bud of the fig; for that part not only indicates the time that the prickers are to iſſue forth, but alſo when the fig is to be ſucceſsfully pricked: if the bud is too hard and compact, the gnat cannot lay its eggs; and the fig drops when the bud is too open.

"The uſe of all theſe three ſorts of fruit is to ripen the fruit of the garden fig-tree, in the following manner: During the months of June and July, the peaſants take the *orni*, at the time their gnats are ready to break out, and carry them to the garden fig-trees: if they do not nick the moment, the *orni* fall; and the fruit of the domeſtic fig-tree, not ripening, will in a very little time fall in like manner. The peaſants are ſo well acquainted with theſe precious moments, that, every morning in making their inſpection, they only transfer to their garden fig-trees ſuch *orni* as are well conditioned, otherwiſe they loſe their crop. In this caſe, however, they have one remedy, though an indifferent one; which is to ſtrew over the garden fig-tree another plant in whoſe fruit there is alſo a ſpecies of gnats, which anſwers the purpoſe in ſome meaſure."

The caprification of the ancient Greeks and Romans, deſcribed by Theophraſtus, Plutarch, Pliny, and other authors of antiquity, correſponds in every circumſtance with what is practiſed at this day in the Archipelago and in Italy. Theſe all agree in declaring, that the wild fig-tree, *caprificus*, never ripened its fruit; but was abſolutely neceſſary for ripening that of the garden or domeſtic fig, over which the huſbandmen ſuſpend its branches. The reaſon of this ſucceſs has been ſuppoſed to be, that by the punctures of theſe inſects the veſſels of the fruit are lacerated, and thereby a greater quantity of nutritious juice derived thither. Perhaps, too, in depoſiting their eggs, the gnats leave behind them ſome ſort of liquor proper to ferment gently with the milk of the figs, and to make their fleſh tender. The figs in Provence, and even at Paris, ripen much ſooner for having their buds pricked with a ſtraw dipped in olive-oil. Plums and pears likewiſe pricked by ſome inſects, ripen much the faſter for it; and the fleſh round ſuch puncture is better taſted than the reſt. It is not to be diſputed, that conſiderable changes happen to the contexture of fruits ſo pricked, juſt the ſame as to parts of animals pierced with any ſharp inſtrument. Others have ſuppoſed that theſe inſects penetrated the fruit of the tree to which they were brought, and gave a more free admiſſion to the air, and to the ſun. Linnæus explained the operation by ſuppoſing that the inſects brought the farina from the wild fig, which contained male flowers only, to the domeſtic fig, which contained the female ones. Haſſelquiſt, from what he ſaw in Paleſtine, ſeemed to doubt of this mode of fructification. M. Bernard, in the memoirs of the Society of Agriculture, oppoſes it more decidedly. He could never find the inſect in the cultivated fig; and, in reality, it appeared to leave the wild fig, after the ſtamina were mature, and their pollen diſſipated: beſides, he adds, what they may have brought on their wings muſt be rubbed away in the little aperture which they would form for themſelves. At Malta, where there are ſeven or eight varieties of the domeſtic fig, this operation is only performed on thoſe which ripen lateſt: the former are of a proper ſize, fine flavour, and in great abundance, without it; ſo that he thinks the caprification only haſtens the ripening. He examined the parts of fructification of the fig; and he obſerves, if this examination be made previous to the ripening, that round the eye of the fig, and in the ſubſtance of its covering, may be ſeen triangular dentated leaves, preſſed one againſt another; and under theſe leaves are the ſtamina, whoſe pollen is deſtined for the impregnation of the grains, which fill the reſt of the fruit. Theſe male organs are much more numerous in the wild fig than in the domeſtic; and the ſtamina are found to contain a yellow duſt, which may be collected when it is ripe. The wild figs, when ripe, are not ſucculent, and have no taſte, though the grains are diſpoſed in the ſame manner as in the other kind. The pith of the grain of the wild fruit ſerves as food to a ſpecies of the cynips, whoſe larva is white, till the moment of its transformation; and it is by an opening, in the direction of the piſtil, that the inſect penetrates the grain. From this account it is thought probable that the inſect is only communicated by accident to the domeſtic fig, and that the flowers of this genus are ſometimes hermaphrodites. But the number of hermaphrodite flowers being fewer on the cultivated than on the wild fig, the ſeeds are fecundated more certainly and quickly by the caprification; and every botaniſt knows, that when the impregnation is completed, the flower ſoon withers; while, if by any accident it is delayed, it continues in bloom much longer. This view of the ſubject, therefore, explains very completely the reaſon why, in Malta, the caprification is practiſed on the late kind of fig, becauſe it haſtens the formation and maturity of the fruit.

CAPRIMULGUS, Goat-sucker, or *Fern-owl*, in ornithology, a genus of birds belonging to the order of passeres. See Plate 58. The beak is incurvated, small, tapering, and depressed at the base; the mouth opens very wide. 1. The *Europæus*, with the tubes of the nostrils hardly visible. It feeds on moths, gnats, dorrs, or chaffers; from which Charleton calls it a *dorr-hawk*, its food being entirely of that species of beetle during the month of July, the period of that insect's flight in this country. This bird migrates. It makes but a short stay with us; appears the latter end of May; disappears, in the northern parts of our island, the latter end of August; but, in the southern, stays above a month later. It inhabits all parts of Britain from Cornwall to the county of Ross. Mr. Scopoli seems to credit the report of their sucking the teats of goats, an error delivered down from the days of Aristotle. Its notes are most singular. The loudest so much resemble that of a large spinning-wheel, that the Welsh call this bird *aderyn y droell*, or the wheel-bird. It begins its song most punctually on the close of day, sitting usually on a bare bough, with the head lower than the tail, the lower jaw quivering with the efforts. The noise is so very violent, as to give a sensible vibration to any little building it chances to alight on and emit this species of a note. The other is a sharp squeak, which it repeats often; this seems a note of love, as it is observed to reiterate it when in pursuit of the female among the trees. It lays its eggs on the bare ground; usually two: they are of a long form, of a whitish hue, prettily marbled with reddish brown. The length of this bird is $10\frac{1}{2}$ inches; extent 22; plumage, a beautiful mixture of white, black, ash-colour, and ferruginous, disposed in lines, bars, and spots. The male is distinguished from the female by a great oval white spot near the end of the three first quill feathers, and another on the utmost feathers of the tail. This is the only one of the genus which is found in Europe. A variety less in size, being only eight inches in length, inhabits Virginia, in summer; arrives there towards the middle of April; and frequents the mountainous parts, but will frequently approach the houses in the evening, where it settles on a rail or post, and cries for several times together very loud, somewhat like the word *whiperiwhip*, or *whip-poor-will*, the first and last syllables pronounced the loudest. After continuing in one place for some time, it flies to another, and does the same; sometimes four or five cry altogether: this noise it begins just after sun-set, and continues at intervals till just before sun-rise. It does not catch insects always on the wing; for it frequently sits upon a convenient place, and leaps up after them as they fly by, and returns to the same spot again. It makes no nest, but lays the eggs, which are two in number, and of a dull green, with dusky spots and streaks, on the bare ground in the open fields. Kalm says that the flesh is good to eat. Another variety, larger, inhabits Virginia and Carolina; where it is called the *rain-bird*, because it never appears in the day-time, except when the sky, being obscured with clouds, betokens rain. It is said to lay its eggs on the ground, and that they are not unlike those of the Lapwing. 2. The *Americanus*, has the tubes of the nostrils very conspicuous. It is a night-bird, and is found in America. There are several other species or varieties inhabiting different countries, and differently marked, but all nearly similar in their manners.

CAPRIOLES, in the manege, leaps that a horse makes in the same place without advancing, in such a manner that when he is at the height of the leap he jerks out with his hinder legs even and near. It is the most difficult of all the high manege. It differs from a croupade, in this, that, in a croupade, a horse does not show his shoes; and from a ballotade, because in this he does not jerk out. To make a horse work well at caprioles, he must be put between two pillars, and taught to raise first his fore-quarters, and then his hind quarters while his fore-ones are yet in the air; for which end you must give him the whip and the poinson.

CAPSARIUS, from *capsa*, a satchel, in antiquity, a servant who attended the Roman youth to school, carrying a satchel with their books in it, sometimes also called librarius.

Capsarius was also an attendant at the baths, to whom persons committed the keeping of their clothes.

Capsarius, from *capsa*, "a chest," among the Roman bankers, was he who had the care of the money-chest or coffer.

CAPSICUM, or Guinea-pepper; a genus of the monogynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 28th order, *Luridæ*. The corolla is verticillated, and the fruit a sapless berry.

The species are, 1. The *annuum*, with oblong fruit, is the common long-podded capsicum commonly cultivated in the gardens. Of this there is one kind with red, and another with yellow fruit: and of these there are several varieties, differing only in the size and figure of their fruit. 2. The *tetragonum*, commonly called *bell-pepper*. The fruit of this is red, and is the only kind proper for pickling, the skin being tender; whereas those of the other sorts are thin and tough. The pods are from an inch to an inch and an half or two inches long; are very large, swelling, and wrinkled, flatted at the top, where they are angular, and sometimes stand erect, at others grow downward. 3. The *cerasiforme*, with a round smooth fruit, doth not grow so tall as the other sorts, but spreads near the ground; the leaves come out in clusters, are of a shining green, and stand on long footstalks. The fruit is of a beautiful red, and of the size of a cherry. 4. The *pyramidale*, is a native of Egypt, and hath much narrower leaves than the other sorts. The pods always grow erect, and are produced in great plenty, so that the plants make a good appearance for three months in the winter. 5. The *minimum*, commonly called *bird-pepper*, rises with a shrubby stalk four or five feet high; the leaves are of a lucid green; the fruit grows at the division of the branches, standing erect: these are small, oval, and of a bright red: they are much more sharp and biting than those of the other sorts. Besides these species, botanists describe as many more; viz. the cordiforme, with heart-shaped fruit; the angulosum, with angular heart-shaped fruit; the olivaforme, with oval fruit; the conoide, commonly called *hen-pepper*, with a conical red fruit growing erect; and the frutescens, with small pyramidal fruit growing erect; commonly called *Barbary-pepper*. These, however, have no remarkable properties different from the others.

The three first species are annual plants, and must be propagated by seeds sown on a hot-bed in the spring, and treated in the same manner with other exotics; they will however bear the open air, after being inured to it by degrees. The plants of the second sort, whose fruit is used for pickling, should be taken from the hot-bed, and planted in a rich spot of ground, in a warm situation, about a foot and an half asunder. They must be shaded till they have taken root, and afterwards duly watered in dry weather, which will greatly promote their growth, and cause them to be more fruitful, and likewise enlarge the size of the fruit. By this management, three or four crops of fruit for pickling may be obtained the same year. The other sorts are more tender; and therefore must be planted in pots plunged in a moderate hot-bed, and sheltered under a frame.

With regard to their uses, the second sort, as already observed, produces fruit fit for pickling; for which purpose they must be gathered before they arrive at their full size, whilst their rind is tender. They must be slit down on one side to get out the seeds, after which they should be soaked two or three days in salt and water; when they are taken out of this and drained, boiling vinegar must be poured on them, in a sufficient quantity to

cover them, and closely stopped down for two months; then they should be boiled in the vinegar to make them green; but they want no addition of any spice, and are reckoned an excellent pickle. The tenth species is used for making what is called *cayan-butter*, or *pepper-pots*, by the inhabitants of America, and which they esteem the best of all the spices.

CAPSQUARES, strong plates of iron which come over the trunnions of a gun, and keep it in the carriage. They are fastened by a hinge to the prize plate, that they may lift up and down, and form a part of an arch in the middle to receive a third part of the thickness of the trunnions: for two-thirds are let into the carriage, and the other end is fastened by two iron wedges called the *fore-locks* and *keys*.

CAPSTAN, a large massy column, shaped like a truncated cone, and placed perpendicularly on the deck of a ship, and turned by levers, or bars, which pass through holes pierced in its upper extremity; serving, by means of a cable which winds round the barrel, to draw up burdens fastened to the end of the cable. See Plate 63. The word is also written *capstand*, *capstern*, and even *capstow*. It is formed from the French *cabestan*, which signifies the same. The power of the *capstan* is reducible to that of the axis in *peritrochio*. De Camus considers the *capstan* as a perpetual lever. By it vessels are drawn ashore, and hoisted up to be refitted; anchors are weighed, and sails hoisted, &c.

There are commonly two capstans in a ship of war; the *main-capstan* placed behind the main-mast, standing on the first deck, and reaching four or five feet above the second: this is also called *double-capstan*, because it has two drum-heads, and serves two decks for drawing of anchors; and because its force may be doubled by applying hands on each deck. It has bars, whelps, &c. for turning and stopping it: see fig. 3. And the *jeer-capstan*, or *little-capstan*: this stands on the second deck, between the main-mast and the mizen: its use is, chiefly, to heave upon the jeer-rope, or to heave upon the viol, to hold off by, when the anchor is weighed; and on other occasions where a less force is required than to weigh the anchors, &c. See fig. 2. The French call that an *English capstan* where there are only half-bars used; and which, for that reason, is only half perforated: this is thicker than the others. There is also a *flying capstan*, which may be moved from place to place.

The parts of a capstan are, the foot *d*, fig. 2. which is the lowest part; the spindle *f*, the smallest part of which turns round in an iron socket, called the saucer: the whelps, *b*, a sort of brackets set into the body of the capstan close under the bars, and reaching downwards from the lower part of the drum-head to the deck: the barrel A, the main body of the whole: the *drum-head c*, which is a broad cylindric piece of wood fixed above the barrel and whelps, in which are the holes for the bars to be put into: the bars, which are small pieces of timber by which the men heave: the pins, as *e*, which are little bolts of iron, thrust perpendicularly through the holes of the drum-head, and through a corresponding hole in the end of the bar, made to receive them when the bars are fixed: the *pawls*, which are pieces of iron bolted to one end of the beams of the deck, close to the body of the capstan, but so as that it has liberty to turn about every way, and against them do the whelps of the capstan bear; so as that by them the capstan may be stopped from turning back. There are also hanging pawls, as *g*, *g*, fig. 3, which reach from the deck above the drum-head immediately beneath it; and lastly, the swifter, which is a rope passed horizontally through holes in the outer ends of the bars and drawn tight, designed to keep the men steady whilst they work, and to afford room for a greater number to work at once.

Formerly the bars of the capstern went entirely through the head of it, and consequently were more than double the length of the present ones; the holes were therefore formed at different heights, as represented at fig. 1. But this machine had several inconveniences, and has long been entirely disused in the navy. Some of this sort of capsterns, however, are still retained in merchant-ships, and are usually denominated *crabs*. The situation of the bars in a crab, as ready for heaving, is represented at fig. 4.

The terms belonging to the use of the capstan are, *rig the capstan*, i. e. fix the bars in their respective holes; *heave the capstan*, i. e. go round with it, heaving on the bars; *surge the capstan*; and *come up capstan*, that is, slacken the cable which you heave by; in a like sense they also say *launch the capstan*: *pawl out the capstan*, signifies, stop it from going back.

CAPSULE, in a general sense, denotes a receptacle or cover in form of a bag. Among botanists, it denotes a dry hollow seed-vessel or pericarpium, that cleaves or splits in some determinate manner. See PERICARPIUM. This species of seed-vessel is frequently fleshy and succulent, like a berry, before it has attained maturity; but, in ripening, becomes dry, and often so elastic as to dart the seeds from their departments with considerable velocity. This elasticity is remarkably conspicuous in wood-sorrel; balsam, *impatiens*; African spiræa, *diosma*; *fraxinella*; *justicia*; *ruellia*; *barleria*; *lathræa*; and many others. Capsules, in splitting, are divided, externally, into one or more pieces, called by Linnæus *valves*. The internal divisions of the capsules are called *cells*, *loculamenta*: these, in point of number, are exceedingly diversified; some having only one cell, as the primrose; and others many, as the water-lily. Hence a capsule is termed *unilocular*, *bilocular*, &c. according as it has one, two, or more cells or cavities.

CAPSULÆ *Atrabiliariæ*, called also *glandulæ renales*, and *renes succenturiati*. See ANATOMY, page 208.

CAPTAIN, a military officer, whereof there are several kinds, according to the nature of their appointments.

CAPTAIN *of a Troop or Company*, an inferior officer who commands a troop of horse or a company of foot, under a colonel. The duty of this officer is to be careful to keep his company full of able-bodied soldiers; to visit their tents and lodgings; to see what is wanting; to pay them well; to cause them to keep themselves neat and clean, and their arms bright. He has the power in his own company of appointing non-commissioned officers. In the horse and foot guards, the captains have the rank of lieutenant-colonels.

CAPTAIN-*General*, is he who commands in chief.

CAPTAIN-*Lieutenant*, he who with the rank of captain, but the pay of lieutenant, commands a troop or company in the name and place of some other person who is dispensed with on account of his quality from performing the functions of his post. Thus the colonel being usually captain of the first company of his regiment, that company is commanded by his deputy under the title of *Captain-lieutenant*.

CAPTAIN-*Reformed*, one who, upon the reduction of the forces, has his commission and company suppressed; yet is continued captain, either as second to another, or without any post or command at all.

CAPTAIN *of a Ship of War*, the officer who commands a ship of the line of battle, or a frigate carrying 20 or more guns. The charge of a captain in his majesty's navy is very comprehensive, in as much as he is not only answerable for any bad conduct in the military government, navigation, and equipment of the ship he commands, but also for any neglect of duty or ill management in his inferior officers, whose several charges he is appointed to superintend and regulate. Whenever a ship of war is lost, whether in consequence of bad weather, the superior force of an enemy, or from any other cause, whether obvious or not, the captain is always tried by a court-martial. This is done in order that every fact relative to the loss of the ship may be fully ascertained, and the conduct of the commander scrutinized.

Captain *of a Merchant Ship*, he who has the direction of the ship, her crew, and lading, &c. In small ships and short voyages, he is more ordinarily called the *master*. In the Mediterranean, he is called the *patroon*. The proprietor of the vessel appoints the captain or master; and he is to form the crew, and choose and hire the pilots, mates, and seamen; though, when the proprietor and master reside on the same spot, they generally act in concert.

Captain *Bashaw*, or *Capondan Bashaw*, in the polity of the Turks, signifies the Turkish high-admiral. He possesses the third office of the empire, and is invested with the same power at sea that the vizier has on shore. Soliman II. instituted this office in favour of the famous Barbarossa, with absolute authority over the officers of the marine and arsenal, whom he may punish, cashier, or put to death, as soon as he is without the Dardanelles. He commands in chief in all the maritime countries, cities, castles, &c. and, at Constantinople, is the first magistrate of police in the villages on the side of the Porte, and the canal of the Black-Sea. The mark of his authority is a large Indian cane, which he carries in his hand, both in the arsenal and with the army. The captain-bashaw enjoys two sorts of revenues; the one fixed, the other casual. The first arise from a capitation of the islands in the Archipelago, and certain governments in Natolia and Galipoli. The latter consist in the pay of the men who die during a campaign; in a fifth of all prizes made by the begs; in the profits accruing from the labour of the slaves, whom he hires as rowers to the grand signior; and in the contributions he exacts in all places where he passes.

CAPTIVE, a slave, or a person taken from the enemy. Formerly captives in war became the slaves of those who took them; and though slavery, such as obtained among the ancients, is now abolished, some shadow of it still remains in respect of prisoners of war, who are accounted the property of their captors, and have no right to liberty but by concession from them. The Romans used their captives with great severity; their necks were exposed to the soldiers to be trampled on, and their persons afterwards sold by public auction. Captives were frequently burnt in the funeral piles of the ancient warriors, as a sacrifice to the infernal gods. Those of royal or noble blood had their heads shaven, and their hair sent to Rome to serve as decorations for female toys, &c. They were led in triumph loaded with chains through Rome, in the emperor's train, at least as far as the foot of the Capitoline mount, for they were not permitted to ascend the sacred hill, but carried thence to prison. Those of great quality were honoured with golden chains on their hands and feet, and golden collars on their necks. If they made their escape, or killed themselves, to avoid the ignominy of being carried in triumph, their images or effigies were frequently carried in their place.

CAPTIVITY, in a general sense, the state or condition of a captive. In sacred history, it denotes a punishment which God inflicted upon his people for their vices and infidelities. The first of these captivities is that of Egypt, from which Moses delivered them; after which, are reckoned six during the government of the judges; but the greatest and most remarkable were those of Judah and Israel, which happened under the kings of each of those kingdoms. Since the destruction of the temple by the Romans, the Hebrews boast that they have always had their heads or particular princes, whom they call *princes of the captivity*, in the east and west.

CAPTURE, a prize, or prey; particularly that of a ship taken at sea. Captures made at sea were formerly held to be the property of the captors after a possession of twenty-four hours; but the modern regulations require, that before the property can be changed, the goods must have been brought into port, and have continued a night *intra præsidia*, in a place of safe custody, so that all hope of recovering them was lost.

Capture also denotes an arrest or seizure of a criminal or debtor, on land; or of property, as in the case of smuggled goods, &c.

CAPUCHINS, religious of the order of St. Francis in its strictest observance; deriving their name from *capuce*, or *capuchon*, a stuff cap, or cowl, wherewith they cover their heads. They are clothed with brown or grey; always bare-footed; are never to go in a coach, nor ever shave their beard. The capuchins are a reform made from the order of minors, commonly called *cordeliers*, set on foot in the 16th century by Matthew Baschi, a religious observant of the monastery of Montefiascone; who, being at Rome, was advertised several times from heaven, to practise the rule of St. Francis to the letter. Upon this he made application to pope Clement in 1525, who gave him permission to retire into a solitude, with as many others as chose to embrace the strict observance. In 1528, they obtained the pope's bull. In 1529, the order was brought into complete form; Matthew was elected general, and the chapter made constitutions. In 1543, the right of preaching was taken from the capuchins by the pope: but in 1545 it was restored to them again with honour. In 1578, there were already 17 general chapters in the order of capuchins.

CAPUT, the head. See Head.

Caput *baroniæ*, the head of the barony, in ancient customs, denotes the ancient or chief seat or castle of a nobleman, where he made his usual residence, and held his court; sometimes also called *caput honoris*, or the head of the honour. The caput baroniæ could not be settled in dowry; nor could it be divided among the daughters, in case there were no son to inherit; but was to descend entire to the eldest daughter, *cæteris filiabus aliunde satisfactis*.

Caput *gallinaginis*, in anatomy, is a kind of septum, or spongious border, at the extremities or apertures of each of the *vesiculæ seminales*.

Caput *lupinum*. Anciently an outlawed felon was said to have *caput lupinum*, and might be knocked on the head like a *wolf* by any one that should meet him; because, having renounced all law, he was to be dealt with as in a state of nature, when every one that should find him might slay him: yet now, to avoid such inhumanity, it is held that no man is intitled to kill him wantonly; but in so doing he is guilty of murder, unless it is done in the endeavour to apprehend him.

Caput *Mortuum*, a Latin name given to the exhausted residues that remain in retorts after distillations. As these residues are very different, according to the substances distilled, and the degree of heat employed, they are by the more accurate modern chemists particularly specified by adding a term denoting their qualities; as *earthy residuum*, *charry residuum*, *saline residuum*, &c.

CARABINE, a sort of fire-arm shorter than a musket, carrying a ball of 24 in the pound, borne by the light horse, hanging at a belt over the left shoulder. The barrel is two feet and an half long; and is sometimes furrowed spirally within, which is said to add to the range of the piece.

CARABINEERS, regiments of light horse, carrying longer carabines than the rest, and sometimes used on foot.

CARABUS, in zoology, a genus of insects belonging to the order of coleoptera, or the beetle kind. See Pl. 51. The feelers are bristly; the breast is shaped like a heart, and marginated; and the elytra are likewise marginated. There are 34 species of this genus, mostly distinguished by their colour. The most remarkable is the crepitans, or bombardier, with the breast, head, and legs, ferruginous or iron-coloured, and the elytra black. It keeps itself concealed among stones, and

ſeems to make little uſe of its wings. When it moves, it is by a ſort of jump; and whenever it is touched, one is ſurpriſed to hear a noiſe reſembling the diſcharge of a muſket, in miniature, during which a blue ſmoke may be perceived to proceed from its anus. The inſect may be made at any time to play off its artillery, by ſcratching its back with a needle. If we may believe Rolander, who firſt made theſe obſervations, it can give 20 diſcharges ſucceſſively. A bladder placed near the anus is the arſenal whence it derives its ſtore, and this is its chief defence againſt an enemy, although the ſmoke emitted ſeems to be altogether inoffenſive, except it be by cauſing alarm, or concealing its courſe. Its chief enemy is another ſpecies of the ſame genus, but four times larger: when purſued and fatigued, the bombardier has recourſe to this ſtratagem, by lying down in the path of the large carabus, which advances with open mouth and claws to ſeize it; but, on this diſcharge of the artillery, ſuddenly draws back, and remains a while confuſed: during which the bombardier conceals himſelf in ſome neighbouring crevice; but if not happy enough to find one, the large carabus returns to the attack, takes the inſect by the head, and tears it off.

CARACALLA (M. Antonius Baſſianus), emperor after his father Severus in 211, put the phyſicians to death for not diſpatching his father as he would have had them. He killed his brother Geta; and put Papinianus to death, becauſe he would not defend nor excuſe his parricide. In ſhort, it is ſaid that 20,000 perſons were maſſacred by his order. He married Julia, his father's widow. Going to Alexandria, he ſlew the inhabitants, and applied to the magicians and aſtrologers. At laſt, going from Edeſſa to Meſopotamia, one of his captains ſlew him, by order of Macrinus, who ſucceeded him. He died after he had reigned ſomewhat more than ſix years.

Caracalla, in antiquity, a long garment, having a ſort of capuchin, or hood a-top, and reaching to the heels; worn equally among the Romans by the men and the women, in the city and the camp. Spartian and Xiphilian repreſent the emperor Caracalla as the inventor of this garment, and hence ſuppoſe the appellation *Caracalla* was firſt given it. Others, with more probability, make the caracalla originally a Gallic habit, and only brought to Rome by the emperor abovementioned, who firſt enjoined the ſoldiery to wear it. The people called it *antoninian*, from the ſame prince, who had borrowed the name of Antoninus. The caracalla was a ſort of caſſock, or ſurtout. Salmaſius, Scaliger, and after them Du-Cange, even take the name *caſaque* to have been formed from that of *caraque*, for *caracalla*.

CARACCAS, a diſtrict of Terra Firma in South America, belonging to the Spaniards. The chief town is likewiſe called *Caraccas*, and is ſituated in N. lat. 10. 10. The commerce of this town, to which the bay of Cuaira at two leagues diſtance ſerves for a harbour, was for a long time open to all the ſubjects of the Spaniſh monarchy, and is ſtill ſo to the Americans; but the Europeans are not ſo well treated.

CARACCI (Lewis, Auguſtine, and Hannibal), three celebrated painters of the Lombard ſchool, all of Bologna. Lewis was born in 1555; and was couſin-german to Auguſtin and Hannibal who were brothers, the ſons of a taylor, who was yet careful to give them a liberal education. They were both diſciples of their couſin Lewis. Auguſtin gained a knowledge of mathematics, natural philoſophy, muſic, poetry, and moſt of the liberal arts; but, though painting was his principal purſuit, he learned the art of engraving from Cornelius Cort, and ſurpaſſed all the maſters of his time. Hannibal, again, never deviated from his pencil. Theſe three painters, at length, having reaped all the advantages they could by contemplation and practice, formed a plan of aſſociation, continued always together, and laid the foundation of that celebrated ſchool which has ever ſince been known by the name of *Caracci's Academy*. Hither all the young ſtudents, who had a view of becoming maſters, reſorted to be inſtructed in the rudiments of painting; and here the Caracci taught freely, and without reſerve, all that came. Lewis's charge was to make a collection of antique ſtatues and bas-reliefs. They had deſigns of the beſt maſters, and a collection of curious books on all ſubjects relating to their art; and they had a ſkilful anatomiſt always ready to teach what belonged to the union and motions of the muſcles, &c. There were often diſputations in the academy; and not only painters, but men of learned profeſſions, propoſed queſtions, which were always decided by Lewis. Every body was well received; and though ſtated hours were allotted to treat of different matters, yet improvement might be obtained at all hours from the antiquities and deſigns which were to be ſeen.

The fame of the Caracci reaching Rome, the cardinal Farneſe ſent for Hannibal thither, to paint the gallery of his palace. Hannibal was the more willing to go, becauſe he had a great deſire to ſee Raphael's works, with the antique ſtatues and bas-reliefs. The guſto which he took there from the ancient ſculpture, made him change his Bolognian manner for one more learned, but leſs natural, in the deſign and in the colouring. Auguſtin followed Hannibal, to aſſiſt him in his undertaking of the Farneſe gallery; but the brothers not rightly agreeing, Farneſe ſent Auguſtin to the court of the duke of Parma, where he died in the year 1602, being only 45 years of age. His moſt celebrated piece of painting is that of the communion of St. Jerom, in Bologna.

In the mean while, Hannibal continued working in the Farneſe gallery at Rome; and, after inconceivable pains and care, finiſhed the paintings in the perfection in which they are now to be ſeen. He hoped that the cardinal would have rewarded him in ſome proportion to the excellence of his work, and the time it took him up, which was eight years; but he was diſappointed. The cardinal, influenced by an ignorant Spaniard his domeſtic, gave him but a little above 200l. though it is certain he deſerved more than twice as many thouſands. When the money was brought him, he was ſo ſurpriſed at the injuſtice done him, that he could not ſpeak a word to the perſon who brought it. This confirmed him in a melancholy to which his temper naturally inclined, and made him reſolve never more to touch his pencil; which reſolution he had undoubtedly kept if his neceſſities had not compelled him to break it. It is ſaid that his melancholy gained ſo much upon him, that at certain times it deprived him of the uſe of his ſenſes. It did not, however, put a ſtop to his amours; and his debauches at Naples, whither he had retired for the recovery of his health, brought a diſtemper upon him of which he died in 1609, when he was 49 years of age. His veneration for Raphael was ſo great, that it was his death-bed requeſt to be buried in the ſame tomb with him: which was accordingly done, in the pantheon or rotunda at Rome. There are extant ſeveral prints of the bleſſed Virgin, and ſome other ſubjects etched by the hand of this incomparable artiſt. He is ſaid to have been a friendly, plain, honeſt, and open-hearted man; very communicative to his ſcholars; and ſo extremely kind to them, that he generally kept his money in the ſame box with his colours, where they might have recourſe to either as they had occaſion.

While Hannibal Caracci worked at Rome, Lewis was courted from all parts of Lombardy, eſpecially by the clergy, to make pictures in their churches; and we may judge of his capacity and facility by the great number of pictures he drew, and by the preference that was given him to other painters. In the midſt of theſe employments Hannibal ſolicited him to come and aſſiſt him in the Farneſe gallery; and ſo earneſtly, that he

could not avoid complying with his requeft. He went to Rome; corrected feveral things in that gallery; painted a figure or two himfelf; and then returned to Bologna, where he died in 1619, aged 64.

CARACOL, in the manege, the half turn which an horfeman makes, either to the right or left. In the army, the horfe always makes a caracol after each difcharge, in order to pafs the rear of the fquadron.

Caracol, in architecture, denotes a ftair-cafe in a helix or fpiral form.

CARACOLI, a kind of metal of which the Caribbees, or natives of the Leffer Antilles, make a fort of ornament in the form of a crefcent, which they alfo call *caracoli*. This metal comes from the main land; and the common opinion is, that it is a compound of filver, copper, and gold, fomething like the Corinthian brafs among the ancients. Thefe metals are fo perfectly incorporated, that the compound which refults from them, it is faid, has a colour that never alters, how long foever it remains in the fea or under ground. It is fomewhat brittle; and they who work at it are obliged to mix a large proportion of gold with it, to give it malleability.

CARACT, or Carat, the name of that weight which expreffes the degree of finenefs that gold is of. The word is alfo written *carract*, *carrat*, *karract*, and *karrat*. Its origin is contefted: but the moft probable opinion is that of Kennet, who derives it from *carecta*, a term which anciently denoted any weight, and came not till of latter days to be appropriated to that which expreffes the finenefs of gold and the gravity of diamonds. Thefe carats are not real determinate weights, but only imaginary. The whole mafs, be the weight what it will, is conceived to be divided into 24 carats; and as many 24th parts as it contains of pure gold, it is called *gold of fo many carats*, or *fo many carats fine*. Thus, gold of 18 carats is a mixt, of which 18 parts are pure gold, and the other fix an inferior metal, &c. This is the common way of reckoning in Europe, and at the gold mines in the Spanifh Weft Indies, but with fome variation in the fubdivifion of the carat. Among us, it is divided into four grains; among the Germans into 12 parts; and by the French, according to Mr. Helot, into 32. The Chinefe reckon by a different divifion called *touches*, of which the higheft number, or that which denotes pure gold, is 100; fo that 100 touches correfpond to our 24 carats, &c.

Caract is alfo a certain weight which goldfmiths and jewellers ufe wherewith to weigh precious ftones and pearls. In this fenfe, the word is by fome fuppofed to be derived from the Greek κεράτιον, a fruit which the Latins call *filiqua*, and we *carob bean*; each of which may weigh about four grains of wheat, whence the Latin *filiqua* has been ufed for a weight of four grains. This caract weighs four grains, but they are fomething lighter than the grains of other weights. Each of thefe grains is fubdivided into $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, &c.

CARACTACUS, a renowned king of the ancient Britifh people called *Silures*, inhabiting South Wales. Having valiantly defended his country feven years againft the Romans, he was at length defeated; and flying to Cartifmunda, queen of the Brigantes (inhabitants of Yorkfhire), was by her treacheroufly delivered up to the Romans, and led in triumph to the emperor Claudius then at York; where his noble behaviour, and heroic but pathetic fpeech, obtained him not only his liberty, but the efteem of the emperor, A. D. 52.

CARAGROUTH, in commerce, a filver coin of the empire, weighing nine drachms. It goes at Conftantinople for 120 afpers. There are four forts of them, which are all equally current and of the fame value.

CARAITES, in the ecclefiaftical hiftory of the Jews, a religious fect among that people, whereof there are ftill fome fubfifting in Poland, Ruffia, Conftantinople, Cairo, and other places of the Levant; whofe diftinguifhing tenet and practice it is, to adhere clofely to the words and letter of the fcripture, exclufive of allegories, traditions, and the like.

CARAMANIA, a confiderable province of Turkey, in Afia, in the fouth part of Natolia. Bajazet united this province to his empire about the year 1488, and fince that time it has continued in the poffeffion of the Turks. Satalia was the capital city, but is now much decayed.

CARAMANTA, a town of South America, and capital of a province of the fame name in Terra Firma, and in the audience of Santo Fe. W. long. 72. 35. N. lat. 5. 18. The province of Caramanta is extended on both fides the river Cauca; and is bounded on the north by the diftrict of Carthagena, on the eaft by New Grenada, on the fouth by Popayan, and on the weft by Popayan and by the audience of Panama. It is a valley furrounded on every fide by very high mountains.

CARANGA, an inconfiderable ifland near Bombay in the Eaft Indies. It affords nothing but fome rice, fowls, and goats, for that market.

CARANNA, or Karanna, a very fcarce gum which comes from New Spain. It is faid to poffefs many extraordinary medical virtues, but the prefent practice takes no notice of it.

CARANUS, the firft king of Macedon, and the feventh of the race of the Heraclides.

CARARA, a weight at Leghorn, and in other parts of Italy, ufed in the fale of wool and cod-fifh, equivalent to 60 pounds of that country.

CARAT. See Caract.

CARAVAGGIO (Michael Angelo de). See Angelo.

CARAVAN, or Karavanne, in the eaft, fignifies a company or affembly of travellers and pilgrims, and more particularly of merchants, who, for their greater fecurity, and in order to affift each other, march in a body through the deferts, and other dangerous places, which are infefted with Arabs or robbers. There are four regular caravans which go yearly to Mecca; the firft from Damafcus, compofed of the pilgrims from Europe and Afia; the fecond from Cairo, for the Mahometans of Barbary; the third from Zibith, a place near the mouth of the Red Sea, where thofe of Arabia and India meet; the fourth from Babylon, where the Perfians affemble. Moft of the inland commerce of the Eaft is carried on by caravans. The late czar Peter the Great eftablifhed a trade between Ruffia and China by means of a caravan. Caravans of this kind are large convoys of armed men, merchants, and travellers, with various forts of animals for the carriage of their provifions. There are commonly four chief officers of a caravan, viz. the caravan bachi, or chief; the captain-guide; captain of reft; and captain of diftribution. The firft has abfolute command over all the reft: the fecond is abfolute in the march: the office of the third only commences when the caravan ftops and makes a ftay: to the fourth it belongs to difpofe of every part of the corps, in cafe of an attack or battle; he has alfo the infpection over the diftribution of provifions, which is made under him by feveral diftributors, who give fecurity to the mafter of the caravan, and have each of them a certain number of perfons, elephants, dromedaries, &c. to take care of at their own peril. The treafurer of the caravan makes a fifth officer, who has under him feveral agents and interpreters, who keep journals of all that paffes, for the fatisfaction of thofe concerned in fitting out the caravan. Any dealer is at liberty to form a company, in order to make a caravan. He in whofe name it is raifed, is confidered as the caravan bachi, or chief of the caravan, unlefs he appoint fome other in his place. If there are feveral merchants equally concerned, they elect a caravan bachi; after which they appoint officers to conduct the caravan and decide all controverfies that may arife during the journey. There are alfo fea caravans; eftablifhed on the fame footing, and for

the fame purpofes: fuch is the caravan of veffels from Conftantinople to Alexandria.

CARAVANSERA, or KARAVANSERA, a place appointed for receiving and loading the caravans. It is commonly a large fquare building, in the middle of which there is a very fpacious court; and under the arches or piazzas that furround it there runs a bank, raifed fome feet above the ground, where the merchants, and thofe who travel with them in any capacity, take up their lodgings as well as they can; the beafts of burden being tied to the foot of the bank. Over the gates that lead into the court, there are fometimes little rooms, which the keepers of the caravanferas let out at a very high price to fuch as have a mind to be private. The caravanferas in the Eaft are fomething of the nature of the inns in Europe; only that you meet with little accommodation either for man or beaft, but are obliged to carry almoft every thing with you: there is never a caravanfera without a well, or fpring of water. Thefe buildings are chiefly owing to the charity of the Mahometans; they are efteemed facred dwellings, where it is not permitted to infult any perfon, or to pillage any of the effects that are depofited there. There are alfo caravanferas where moft things may be had for money; and as the profits of thefe are confiderable, the magiftrates of the cities to whofe jurifdiction they belong, take care to ftore them well. There is an infpector, who, at the departure of each caravan, fixes the price of the night's lodging, from which there is no appeal.

CARAVANSERASKIER, the fteward or keeper of a CARAVANSERA. He keeps an account of all the merchandife fold upon truft, and demands payment of the fums due to the merchants for what has been fold in the caravanfera, on the feller's paying two per cent.

CARAVEL; thus they call a fmall veffel on the coaft of France, which goes to fifh for herrings on the banks. They are commonly from 25 to 30 tons burden. Thofe which are defigned for the fame fifhery in the Britifh channel are called by the French *trinquarts*: thefe are from 12 to 15 tons burden.

CARAWAY, in botany. See CARUM.

CARBONADE, or CARBONADO, in cookery; flefh, fowl, or the like, feafoned and broiled on the coals.

CARBUNCLE, in natural hiftory, a very elegant gem, whofe colour is deep red, with an admixture of fcarlet. This gem was known among the ancients by the name of *anthrax*. It is ufually found pure and faultlefs, and is of the fame degree of hardnefs with the fapphire: it is naturally of an angular figure; and is found adhering, by its bafe, to a heavy and ferruginous ftone of the emery kind: its ufual fize is near a quarter of an inch in length, and two thirds of that in diameter in its thickeft parts: when held up againft the fun, it lofes its deep tinge, and becomes exactly of the colour of burning charcoal, whence the propriety of the name which the ancients gave it. It bears the fire unaltered, not parting with its colour, nor becoming at all the paler by it. It is found only in the Eaft Indies, fo far as we yet know; and there but very rarely.

CARBUNCLE, or *Anthrax*, in furgery, an inflammation which arifes with a veficle or blifter almoft like that produced by burning. See SURGERY.

CARBUNCLE, in heraldry, a charge or bearing, confifting of eight radii, four whereof make a common crofs, and the other four a faltier. Some call thefe radii *buttons*, or ftaves, becaufe round, and enriched with buttons, or pearled like a pilgrim's ftaff, and frequently tipped or terminated with flower-de-luces: others blazon them, royal fceptres, placed in faltier, pale and feffe.

CARCASSE, or CARCUS, in the art of war, an iron cafe, or hollow ball, about the bignefs of a bomb, of an oval figure, made of ribs of iron, filled with combuftible matters, as meal-powder, &c. It has two or three apertures, out of which the fire is to blaze; and the defign of it is to be thrown out of a mortar, to fet houfes on fire, and do other execution. It has the name *carcaffe*, becaufe the circles which pafs from one ring or plate to the other feem to reprefent the ribs of a human carcafe.

CARCASSONE, an ancient and rich town of France, in the department of Aude and late province of Languedoc, with a bifhop's fee. It is divided into the Upper and Lower Town by the Aude, over which is a handfome ftone bridge. In the Upper Town are a ftrong caftle and a cathedral. The Lower Town is fquare, regularly built, and kept very neat, by means of an aqueduct, which brings the water of the Aude to different fountains. This part is modern; but the Upper Town, which is alfo called the *City*, is very ancient; and in the caftle are preferved fome old records written on the bark of trees. They have manufactures of all forts of cloth. It is 15 miles W. of Narbonne, and 400 S. of Paris. Long. 2. 25. E. Lat. 43. 14. N.

CARCERES, in the ancient Circenfian games, were inclofures in the circus, wherein the horfes were reftrained till the fignal was given for ftarting, when, by an admirable contrivance, they all at once flew open.

CARCINOMA, in furgery; the fame with CANCER.

CARD, among artificers, an inftrument confifting of a block of wood, befet with fharp teeth, ferving to arrange the hairs of wool, flax, hemp, and the like: there are different kinds of them, as hand-cards, ftock-cards, &c. They are made thus: A piece of thick leather, of the fize intended for the card, is ftrained in a frame for that purpofe; and then pricked full of holes, into which the teeth or pieces of iron wire are inferted. After which the leather is nailed by the edges to a flat piece of wood, in the form of an oblong fquare, about a foot in length and half a foot in breadth, with a handle placed in the middle of one of the longer fides. The teeth are made in the following manner: The wire being drawn of the fize intended, a fkain or number of wires are cut into proper lengths by means of a gauge, and then doubled in a tool contrived for that purpofe: after which they are bent into the proper direction by means of another tool; and then placed in the leather, as mentioned above.

CARDS, among gamefters, little pieces of fine thin pafteboard of an oblong figure, of feveral fizes, but moft commonly in Britain three inches and an half long and two and an half broad, on which are painted feveral points and figures. The moulds and blocks for making cards exactly like thofe that were ufed for the firft printed books. They lay a fheet of wet or moift paper on the block, which is firft flightly done over with a fort of ink made of lamp-black diluted in water, and mixed with fome ftarch to give it a body. They afterwards rub it off with a round lift. The court cards are coloured by means of feveral patterns, ftyled *ftane-files*. Thefe confift of papers cut through with a penknife; and in thefe apertures they apply feverally the various colours, as red, black, &c. Thefe patterns are painted with oil-colours, that the brufhes may not wear them out; and when the pattern is laid on the pafteboard, they flightly pafs over it a brufh-full of colour, which leaving it within the openings, forms the face or figure of the card.

Cards were invented about the year 1390, to divert Charles VI. of France, who had fallen into a melancholy difpofition. The inventor propofed, by the figures of the four fuits or colours, as the French call them, to reprefent the four claffes of men in the kingdom. By the *cœurs* (hearts) are meant the *gens de choeur*, choir-men, or ecclefiaftics; and therefore the Spaniards, who certainly received the ufe of cards from the French, have *copas*, or chalices, inftead of hearts. The nobility, or prime military part of the kingdom, are reprefented by the ends or points of lances or pikes; and our ignorance of the

meaning or resemblance of the figure induced us to call them *ſpades*. The Spaniards have *eſpadas*, ſwords, in lieu of pikes, which are of ſimilar import. By diamonds are deſigned the order of citizens, merchants, or tradeſmen, *carreaux* (ſquare ſtones, tiles, or the like). The Spaniards have a coin, *dineros*, which anſwers to it: and the Dutch call the French word *carreaux* "*ſteeneen*," ſtones and diamonds, from the form. *Trefle*, the trefoil-leaf, or clover-graſs (corruptly called *clubs*), alludes to the huſbandmen and peaſants. But how this ſuit came to be called *clubs* is not eaſily explained; unleſs borrowing the game from the Spaniards, who have *baſtos* (ſtaves or clubs) inſtead of the trefoil, we give the Spaniſh ſignification to the French figure.

The hiſtory of the four kings, which the French, in drollery, ſometimes call the *cards*, are David, Alexander, Cæſar, and Charles; which names were then on the French cards. Theſe reſpectable names repreſent the four celebrated monarchies of the Jews, Greeks, Romans, and Franks under Charlemagne. By the queens are intended Argine, Eſther, Judith, and Pallas (names retained in the French cards), typical of birth, piety, fortitude, and wiſdom, the qualifications reſiding in each perſon. *Argine* is an anagram for *regina* queen by deſcent. By the knaves were deſigned the ſervants to knights (for *knave* originally meant only *ſervant*); but French pages and valets were formerly only allowed to perſons of quality, eſquires (*eſcuiers*), ſhield or armour bearers. Others fancy that the knights themſelves were deſigned by thoſe cards; becauſe Hogier and Lahire, two names on the French cards, were famous knights at the time cards were ſuppoſed to have been invented.

Deceptions with CARDS. See LEGERDEMAIN.

CARDAMINE, in botany; a genus of the ſiliquoſa order, belonging to the tetradynamia claſs of plants; and in the natural method ranking under the 39th order, *Siliquoſæ*. The ſiliqua parts aſunder with a ſpring, and the valves roll ſpirally backward; the ſtigma is entire, and the calyx a little gaping. Of this there are 15 ſpecies; but the moſt remarkable is the pratenſis, with a large purpliſh flower. This grows naturally in many parts of Britain, and is alſo called *cuckow flower*. There are four varieties, viz. the ſingle, with purple and white flowers, which are frequently intermixed in the meadows; and the double, of both colours. The ſingle ſorts are not admitted into gardens; but the double deſerve a place, as making a pretty appearance during the time they are in flower. They will thrive in a moiſt ſhady border; and are propagated by parting their roots, which is beſt performed in autumn. They delight in a ſoft loamy ſoil, not too ſtiff. By ſome this plant is reckoned a good antiſcorbutic.

CARDAMOM, in the Materia Medica. See AMOMUM.

CARDAN (Jerom), one of the moſt extraordinary geniuſes of his age, was born at Pavia on the 24th of September 1501. As his mother was not married, ſhe tried every method to cauſe abortion, but without effect. She was three days in labour, and they were at laſt obliged to cut the child from her. He was born with his head covered with black curled hair. When he was four years old, he was carried to Milan; his father being an advocate in that city. At the age of 20, he went to ſtudy at the univerſity of that city; and two years afterwards he explained Euclid. In 1524, he went to Padua; and the ſame year he was admitted to the degree of maſter of arts: in the end of the following year, he took the degree of doctor of phyſic. He married about the year 1531, but for ten years before, acknowledged himſelf unfit for connubial enterpriſes. At the age of 32, he became profeſſor of mathematics at Milan. In 1539, he was admitted of the college of phyſicians at Milan: In 1543, he read public lectures of medicine in that city, and at Pavia the year following; but diſcontinued them becauſe he could not get his ſalary paid, and returned to Milan. In 1552, he went into Scotland, to preſcribe for the Archbiſhop of St. Andrew's, who had a periodical aſthma, for which he had in vain applied to the French king's phyſicians, and afterwards to thoſe of the emperor of Germany. Cardan took his leave at the end of ſix weeks, leaving him preſcriptions which in two years cured him entirely.

This journey to Scotland gave Cardan an opportunity of viſiting Germany, and the Low Countries, which took up about four months: after which, coming back to Milan, he continued there till the beginning of October 1552; and then went to Pavia, from whence he was invited to Bologna in 1562. He taught in this laſt city till the year 1570; at which time he was thrown into priſon; but ſome months after, he was ſent home to his own houſe. He left Bologna in 1571; and went to Rome, where he lived for ſome time without any public employment. He was, however, admitted a member of the college of phyſicians, and received a penſion from the pope. He died at Rome on the 21ſt of September 1575, according to Thuanus. This account might be ſufficient to ſhow the reader that Cardan was of a very fickle temper. He declared he was ſo irregular even in his manner of walking the ſtreets, as to induce all beholders to point at him as a fool. Sometimes he walked very ſlowly, like a man abſorbed in profound meditation; then all on a ſudden quickened his ſteps, accompanying them with very abſurd attitudes. In Bologna his delight was to be drawn about in a mean vehicle with three wheels. He was ſubject to ſuch immoderate and impetuous ſallies of the mind, that, in his greateſt agitations, he uſed to whip his legs with rods, and bite his left arm; ſaying it was a great relief to him to weep, but that very often he could not; that nothing gave him more pleaſure than to talk of things which made the whole company uneaſy; that he ſpoke on all ſubjects, in ſeaſon and out of ſeaſon; and he was ſo fond of games of chance, as to ſpend whole days in them, to the great prejudice of his family and reputation, for he even ſtaked his furniture and his wife's jewels. In a word Cardanus makes no ſcruple of owning that he was revengeful, envious, treacherous, a dealer in the black-art, a backbiter, a calumniator, and addicted to all the foul and deteſtable exceſſes that can be imagined. Yet, notwithſtanding what one would think ſo humble a declaration, there was never perhaps a vainer mortal, nor one that with leſs ceremony expreſſed the high opinion he had of himſelf.

The ſame capriciouſneſs obſervable in his outward conduct is to be obſerved in the compoſition of his works. We have a multitude of his treatiſes in which the reader is ſtopped almoſt every moment by the obſcurity of his text, or his digreſſions from the ſubject. The Lyons edition of his works, printed in 1663, conſiſts of ten volumes in folio. In fact, when we conſider the tranſcendent qualities of Cardan's mind, we cannot deny his having ſtored it with every ſpecies of knowledge, and his having made a greater progreſs in philoſophy, in the medical art, in aſtronomy, in mathematics, &c. than moſt of his cotemporaries who had applied themſelves excluſively to one of thoſe ſciences.

Scaliger affirms, that Cardan, having fixed the time of his death, abſtained from food, that his prediction might be fulfilled, and that his continuance to live might not diſcredit his art. Cardan's father, who was a doctor of medicine, and a profeſſor of civil and canon law, died in the ſame manner, in the year 1524, having abſtained from ſuſtenance for nine days His ſon tells us, that he had white eyes, and could ſee in the dark.

CARDASS, a ſort of card, proper for carding ſlocks of ſilk, to make cappadine of it. It is alſo the name which the French give to thoſe flocks of ſilk

Cardasses, is alfo the name which, in the cloth manufactories of Languedoc, they give to a fort of large card, which is ufed for carding the dyed wool, defigned for making cloth of mixed colours.

CARDERS, in the woollen manufactory, are perfons who prepare wool, &c. for fpinning, &c. Carders, fpinners, weavers, fullers, fheermen, and dyers, not performing their duty in their occupations, fhall yield to the party grieved double damages; to be committed until payment. One juftice to hear and determine complaints. Carders, combers, forters, fpinners, or weavers, conveying away, embezzling, or detaining any wool or yarn, delivered by the clothier, or any other perfon, fhall give the party grieved fuch fatisfaction, as two juftices, mayor, &c. fhall think fit: if not able or willing to make fatisfaction, for the firft offence to be whipped, or fet in the ftocks in fome market-town, or in any other town where the offence is committed: the fecond offence to incur the like or fuch further punifhment by whipping, &c. as juftices fhall think proper. Conviction muft be by one witnefs on oath, or on confeffion.

CARDI (Ludovico). See Civoli.

CARDIACS, are all fuch cordial medicines as, by warming and ftimulating the ftomach, feem to cheer and quicken the motions of the heart. The term comes from the Greek word καρδια, cor.

CARDIALGIA, in medicine, a violent fenfation of heat or acrimony felt towards the upper orifice of the ftomach, fometimes accompanied with palpitations of the heart, fainting, and a propenfity to vomit. This is better known by the name of *cardiac-paffion*, or *heart-burn*. See Medicine.

CARDIFF, a town of Glamorganfhire, in South Wales, feated on the river Teivy, in a rich and fruitful foil. It is a large, compact, well built town, having a caftle, a wall, and four gates, built by Robert Fitz-Hamon, a Norman, about the year 1100. W. long. 3. 20. N. lat. 51. 30. Cardiff gives the title of Britifh Baron to the family of Bute in Scotland.

CARDIGAN, the capital town of Cardiganfhire, in South Wales, is feated near the mouth of the river Teivy, on the Irifh channel. It is indifferently large and well built, containing three wards, one church, and the county goal. Here are the ruins of a caftle which was built by Gilbert de Clare, about the year 1160. Cardigan fends one member to parliament. W. long. 4. 38. N. lat. 52. 15.

CARDIGANSHIRE, a county of South Wales, bounded on the north by Merionethfhire and Montgomeryfhire, on the eaft by Radnorfhire and Brecknockfhire, on the weft by the Irifh Sea, and on the fouth by Caermarthenfhire. Its length from north-weft to fouth-eaft is about 44 miles, and its breadth near 20. The air, as in other parts of Wales, varies with the foil, which in the fouthern and weftern parts is more upon a level than this principality generally is, which renders the air mild and temperate. But as the northern and eaftern parts are mountainous, they are confequently more barren and bleak. However, there are cattle bred in all parts; but they have neither wood nor coals of their own for fuel; they have rich lead mines, and fifh in plenty, with fowls both tame and wild. The principal rivers are the Teivy, the Ridol, and the Iftwith. This county has five market-towns, viz. Cardigan, Aberiftwith, Llanbadarnvawn, Llanbedar, and Tregaron, with 77 parifhes; and was formerly computed to have upward of 3000 houfes, and 520,000 acres of land. It fends to parliament one county member.

CARDINAL, in a general fenfe, an appellation given to things on account of their pre-eminence. The word is formed of the Latin *cardo*, a hinge; it being on thefe fundamental points that all the reft of the fame kind are fuppofed to turn. Thus, juftice, prudence, temperance, and fortitude, are called the four *cardinal virtues*, as being the bafis of all the reft.

Cardinal *Flower*, in botany. See Lobelia.

Cardinal *Points*, in cofmography, are the four interfections of the horizon with the meridian, and the prime vertical circle. Of thefe, two, viz. the interfections of the horizon and meridian, are called *North* and *South*, with regard to the poles they are directed to. The other two, viz. the interfections of the horizon, and firft vertical, are called *Eaft* and *Weft*. The cardinal points, therefore, coincide with the four cardinal regions of the heavens; and are 90° diftant from each other. The intermediate points are called *collateral points*.

Cardinal *Points*, in aftrology, are the rifing and fetting of the fun, the zenith, and nadir. *Cardinal figns*, in aftronomy, are Aries, Libra, Cancer, and Capricorn. *Cardinal Winds* are thofe that blow from the cardinal points.

Cardinal *Numbers*, in grammar, are the numbers one, two, three, &c. which are indeclinable; in oppofition to the ordinal numbers, firft, fecond, third, fourth, &c.

Cardinal, an ecclefiaftical prince in the Romifh church, being one who has a voice in the conclave at the election of a pope. Some fay the cardinals were fo called from the Latin *incardinatio*, which fignifies the adoption made in any church of a prieft of a foreign church, driven thence by misfortune; and add, that the ufe of the word commenced at Rome and Ravenna; the revenues of the churches of which cities being very great, they became the common refuge of the unhappy priefts of all other churches.

The cardinals compofe the pope's council or fenate: in the Vatican is a conftitution of pope John, which regulates the rights and titles of the *cardinals*; and which declares that as the pope reprefents Mofes, fo the cardinals reprefent the feventy elders, who, under the pontifical authority, decide private and particular differences.

Cardinals, in their firft inftitution, were only the principal priefts, or incumbents of the parifhes of Rome; and the cardinals continued on this footing till the eleventh century: but as the grandeur and ftate of the pope became then exceedingly augmented, he would have his council of cardinals make a better figure than the ancient priefts had done. It is true, they preferved their ancient title; but the thing expreffed by it was no more. It was a good while, however, before they had the precedence over bifhops, or got the election of the pope into their hands: but when they were once poffeffed of thofe privileges, they foon had the red hat and purple; and growing ftill in authority, they became at length fuperior to the bifhops, by the fole quality of being cardinals.

Du Cange obferves, that originally there were three kinds of churches: the firft or genuine churches were properly called *parifhes*; the fecond, *deaconries*, which were chapels joined to hofpitals, and ferved by deacons; the third were fimple *oratories*, where private maffes were faid, and were difcharged by local and refident chaplains. He adds, that, to diftinguifh the principal or parifh churches from the chapels and oratories, the name *cardinales* was given to them. Accordingly, parifh churches gave titles to cardinal priefts, and fome chapels alfo at length gave the title of *cardinal deacons*. Others obferve, that the term *cardinal* was given not only to priefts, but alfo to bifhops and deacons who were attached to certain churches, to diftinguifh them from thofe who only ferved them *en paffant*, and by commiffion. Titular churches, or benefices, were a kind of parifhes, i. e. churches affigned each to a cardinal prieft; with fome ftated diftrict depending on it, and a font for adminiftering of baptifm, in cafes where the bifhop himfelf could not adminifter it. Thefe cardinals were fubordinate to the bifhops; and accordingly, in councils, particularly that held at Rome in 868, fubfcribed after them. It was not, however, only at Rome that priefts bore this name; for we find there were cardinal priefts in France: thus, the curate of the parifh

of St. John de Vignes is called in old charters the *cardinal prieſt* of that pariſh. The title of *cardinal* is alſo given to ſome biſhops, *quatenus* biſhops; e. g. to thoſe of Mentz and Milan: the archbiſhop of Bourges is alſo, in ancient writings, called *cardinal*; and the church of Bourges, a *cardinal church*. The abbot of Vendome calls himſelf *cardinalis natus*.

The cardinals are divided into three claſſes or orders; containing ſix biſhops, fifty prieſts, and fourteen deacons; making in all ſeventy; which conſtitute what they call the *ſacred college*. The cardinal biſhops, who are, as it were, the pope's vicars, bear the titles of the biſhopricks aſſigned to them; the reſt take ſuch titles as are given them: the number of cardinal biſhops has been fixed; but that of cardinal prieſts and deacons, and conſequently the ſacred college itſelf, is always fluctuating. Till the year 1125, the college only conſiſted of fifty-two or fifty-three: the council of Conſtance reduced them to twenty-four; but Sextus IV. without any regard to that reſtriction, raiſed them again to fifty-three, and Leo to ſixty-five. Thus, as the number of cardinal prieſts was anciently fixed to twenty-eight, new titles were to be eſtabliſhed, in proportion as new cardinals were created. As for the cardinal deacons, they were originally no more than ſeven for the fourteen quarters of Rome; but they were afterwards increaſed to nineteen, and after that were again diminiſhed.

According to Onuphrius, it was pope Pius IV. who firſt enacted, in 1562, that the pope ſhould be choſen only by the ſenate of cardinals; whereas, till that time, the election was by all the clergy of Rome. Some ſay, the election of the pope reſted in the cardinals, excluſive of the clergy, in the time of Alexander III. in 1160. Others go higher ſtill, and ſay, that Nicholas II. having been elected at Sienna, in 1058, by the cardinals alone, occaſioned the right of election to be taken from the clergy and people of Rome; only leaving them that of confirming him by their conſent; which was at length, however, taken from them.

At the creation of a new cardinal, the pope performs the ceremony of opening and ſhutting his mouth; which is done in a private conſiſtory. The ſhutting his mouth implies the depriving him of the liberty of giving his opinion in congregations; and the opening his mouth, which is performed 15 days after, ſignifies the taking off this reſtraint. However, if the pope happens to die during the time a cardinal's mouth is ſhut, he can neither give his voice in the election of a new pope, nor be himſelf advanced to that dignity.

The dreſs of a cardinal is a red ſoutanne, a rocket, a ſhort purple mantle, and a red hat. The cardinals began to wear the red hat at the council of Lyons, in 1243. The decree of pope Urban VIII. whereby it is appointed, that the cardinals be addreſſed under the title of *eminence*, is of the year 1630; till then, they were called *illuſtriſſimi*. When cardinals are ſent to the courts of princes, it is in quality of legates *à latere*; and when they are appointed governors of towns, their government is called by the name of *legation*.

Cardinal has alſo been applied to ſecular officers. Thus, the prime miniſters in the court of the emperor Theodoſius, are called *cardinales*. Caſſiodorus, lib. vii. formul. 31. makes mention of the cardinal prince of the city of Rome; and in the liſt of officers of the duke of Bretagne, in 1447, we meet with one Raoul de Thorel, cardinal of Quillart, chancellor, and ſervant of the viſcount de Rohan: which ſhews it to have been an inferior quality.

CARDIOID, in the higher geometry, an algebraical curve, ſo called from its reſemblance to an heart.

CARDIOSPERMUM, in botany; a genus of the trigynia order, belonging to the octandria claſs of plants; and in the natural method ranking under the 39th order, *Tribilatæ*. The calyx is tetraphyllous, the petals four, the nectarium tetraphyllous and unequal; the capſules three, grown together, and inflated. There are two ſpecies, both natives of the Eaſt and Weſt Indies; but have no great beauty, or any other remarkable property.

CARDIUM, or Cockle, in zoology; a genus of inſects belonging to the order of vermes teſtaceæ. The ſhell conſiſts of two equal valves, and the ſides are equal. There are 21 ſpecies of this genus; common on all ſandy coaſts, lodged a little beneath the ſand: their place is marked by a depreſſed ſpot. They are a wholeſome and delicious food.

CARDONA, a handſome town of Spain, in Catalonia, with a ſtrong caſtle, and the title of a duchy. Near it is an inexhauſtible mountain of ſalt of ſeveral colours, as red, white, carnation, and green: but, when waſhed, it becomes white. There are alſo vineyards which produce excellent wine, and very lofty pine-trees. It is ſeated on an eminence, near the river Cardenero. E. long. 1. 26. N. lat. 41. 42.

CARDUUS, in botany; a genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The calyx is ovate, imbricated with prickly ſcales, and the receptacle hairy. Of this genus there are 26 ſpecies, ten of which are natives of Britain, and being troubleſome weeds require no deſcription. Some few of the exotic kinds are propagated in gardens for the ſake of variety; but even theſe have neither beauty nor any other property to recommend them.

Carduus *Benedictus*. See Cnicus.

CAREENING, in the ſea-language, the bringing a ſhip to lie down on one ſide, in order to trim and caulk the other ſide. A ſhip is ſaid to be brought to the *careen*, when, the moſt of her lading being taken out, ſhe is hulled down on one ſide, by a ſmall veſſel, as low as neceſſary; and there kept by the weight of the ballaſt, ordnance, &c. as well as by ropes, leſt her maſts ſhould be ſtrained too much; in order that her ſides and bottom may be trimmed, ſeams caulked, or any thing that is faulty under water mended. Hence, when a ſhip lies on one ſide when ſhe ſails, ſhe is ſaid to ſail on the careen.

CAREER, in the manege, a place incloſed with a barrier, wherein they run the ring. The word is alſo uſed for the race or courſe of the horſe itſelf, provided it do not exceeed 200 paces. In the ancient circus, the career was the ſpace the bigæ, or quadrigæ, were to run at full ſpeed, to gain the prize. See Circus.

Career, in falconry, is a flight or tour of the bird, about 120 yards. If ſhe mount more it is called a *double career*; if leſs, a *ſemi-career*.

CARELIA, the eaſtern province of Finland; divided into Swediſh Carelia, and Muſcovite Carelia. The capital of the latter is Povenza, and of the former Weiburg.

CARELSCROON, a ſea-port town of Sweden, in Blekingia, or Bleking, on the Baltic Sea, with a very good harbour defended by two forts. It was built in 1679; and is very populous, with arſenals for the marine; the houſe of the director-general of the admiralty is in this town, and here the Swedes lay up their royal navy. E. long. 15. 5. N. lat. 56. 15.

CARENTAN, a town of France in the department of the Channel, and late province of Normandy, with an ancient caſtle. W. long. 1. 14. N. lat. 49. 20.

CARET, among grammarians, a character marked thus ‸, ſignifying that ſomething is added on the margin, or interlined, which ought to come in where the caret ſtands.

CAREW (George), born in Devonſhire in 1557, an eminent commander in Ireland, was made preſident of Munſter by queen Elizabeth; when, joining his forces with the earl of Thomond, he reduced the Iriſh inſurgents, and brought the

earl of Defmond to his trial. King James made him governor of Guernfey, and created him a baron. As he was a valiant commander, he was no lefs a polite fcholar; and wrote *Pacata Hibernia*, a hiftory of the late wars in Ireland, printed after his death, in 1633. He made feveral collections for a hiftory of Henry V. which are digefted into Speed's Hiftory of Great Britain. Befides thefe, he collected materials of Irifh hiftory in four large MS. volumes, now in the Bodleian library, Oxford.

Carew (Thomas), defcended from the family of Carew in Gloucefterfhire, was gentleman of the privy chamber to Charles I. who always efteemed him one of the moft celebrated wits of his court. He was much refpected by the poets of his time, particularly by Ben Jonfon and Sir William Davenant; and left behind him feveral poems, and a mafque called *Cœlum Britannicum*, performed at Whitehall on Shrove Tuefday night, 1633, by the king, and feveral of his nobles with their fons. Carew was affifted in the contrivance by Inigo Jones, and the mufic was fet by Mr. Henry Laws of the king's chapel. He died in the prime of life, about the year 1639.

Carew (Richard), author of the "Survey of Cornwall," was the eldeft fon of Thomas Carew of Eaft Anthony, and was born in 1555. When very young, he became a gentleman commoner of Chrift church college, Oxford; and at 14 years of age had the honour of difputing, extempore, with the afterwards famous Sir Philip Sidney, in the prefence of the earls of Leicefter, Warwick, and other nobility. After fpending three years at the univerfity, he removed to the Middle Temple, where he refided the fame length of time, and then travelled into foreign parts. Not long after his return to England, he married, in 1577, Juliana Arundel, of Trerice. In 1581, Mr. Carew was made juftice of the peace, and in 1586 was appointed high fheriff of the county of Cornwall; about which time he was likewife queen's deputy for the militia. In 1589, he was elected a member of the Society of Antiquaries, a diftinction to which he was intitled by his literary abilities and purfuits. What particularly engaged his attention was his native country, his "Survey" of which was publifhed, in 4to, at London, in 1602. It hath been twice reprinted, firft in 1723, and next in 1769. Of this work Cambden has fpoken in high terms, and acknowledges his obligations to the author. Another work of our author was a tranflation from the Italian, intituled, "The examination of Men's Wits." This was publifhed at London in 1594, but has been afcribed by fome to his father. According to Wood, Carew wrote alfo, "The true and ready Way to learn the Latin Tongue," in anfwer to a query, whether the ordinary method of teaching the Latin by the rules of grammar be the beft mode of inftructing youth in that language? This tract is involved in Mr. Hartlib's book upon the fame fubject, and with the fame title. It is certain that Carew was a gentleman of confiderable abilities and literature, and that he was held in great eftimation by fome of the moft eminent fcholars of his time. He was particularly intimate with Sir Henry Spelman, who extols him for his ingenuity, virtue, and learning.

Carew (George), brother to the fubject of the laft article, was educated in the univerfity of Oxford, after which he ftudied the law in the inns of court, and then travelled to foreign countries for farther improvement. On his return to his native country, he was called to the bar, and after fome time was appointed fecretary to Sir Chriftopher Hatton, lord chancellor of England. This was by the fpecial recommendation of queen Elizabeth herfelf, who gave him a prothonotaryfhip in the chancery, and conferred upon him the honour of knighthood. In 1597, Sir George Carew, who was then a mafter in chancery, was fent ambaffador to the king of Poland. In the next reign, he was one of the commiffioners for treating with the Scotch concerning an union between the two kingdoms; after which he was appointed ambaffador to the court of France, where he continued from the latter end of the year 1605 till 1609. During his refidence in that country, he formed an intimacy with Thuanus, to whom he communicated an account of the tranfactions in Poland whilft he was employed there, which was of great fervice to that admirable author in drawing up the 121ft book of his hiftory. After Sir George Carew's return from France, he was advanced to the important poft of mafter of the court of Wards, which honourable fituation he did not long live to enjoy; for it appears from a letter written by Thuanus to Cambden in the fpring 1613, that he was then lately deceafed. Sir George Carew married Thomafine, daughter of Sir Francis Godolphin, great grandfather of the lord treafurer Godolphin, and had by her two fons and three daughters. When Sir George Carew returned, in 1609, from his French embaffy, he drew up, and addreffed to James I. "A Relation of the State of France, with the characters of Henry IV. and the principal perfons of that Court." The characters are drawn from perfonal knowledge and clofe obfervation, and might be of fervice to a general hiftorian of that period. The compofition is perfpicuous and manly, and entirely free from the pedantry which prevailed in the reign of James I. but this is the lefs furprifing, as Sir George Carew's tafte had been formed in a better æra, that of queen Elizabeth. The valuable tract we are fpeaking of lay for a long time in MS. till happily falling into the hands of the earl of Hardwicke, it was communicated by him to Dr. Birch, who publifhed it, in 1749, at the end of his "Hiftorical View of the Negociations between the Courts of England, France, and Bruffels, from 1592 to 1617." That intelligent and induftrious writer juftly obferves, that it is a model upon which ambaffadors may form and digeft their notions and reprefentations; and the late celebrated poet Mr. Gray hath fpoken of it as an excellent performance.

CAREY (Harry), a man diftinguifhed by both poetry and mufic, but perhaps more fo by a certain facetioufnefs, which made him agreeable to every body. He publifhed in 1720 a little collection of poems; and in 1732, fix cantatas, written and compofed by himfelf. He alfo compofed fundry fongs for modern comedies, particularly thofe in the "Provoked Hufband;" he wrote a farce called "The Contrivances," in which were feveral little fongs to very pretty airs of his own compofition: he alfo wrote two or three little dramas for Goodman's Fields Theatre, which were very favourably received. In 1729, he publifhed by fubfcription his poems much enlarged: with the addition of one intituled "Namby Pamby," in which Ambrofe Philips is ridiculed. Carey's talent, fays his hiftorian, lay in humour and inoffenfive fatire: to ridicule the rant and bombaft of modern tragedies he wrote one, to which he gave the ftrange title of "Chrononhotonthologos," acted in 1734. He alfo wrote a farce called "The Honeft Yorkfhireman." Carey was a thorough Englifhman, and had an unfurmountable averfion to the Italian opera and the fingers in it: he wrote a burlefque opera on the fubject of the "Dragon of Wantley;" and afterwards a fequel to it, intituled, "The Dragonefs:" both which were efteemed a true burlefque upon the Italian opera. His qualities being of the entertaining kind, he was led into more expence than his finances could bear, and thus was frequently in diftrefs. His friends however were always ready to affift him by their little fubfcriptions to his works: and encouraged by thefe, he republifhed, in 1740, all the fongs he had ever compofed, in a collection, intituled, "The Mufical Century, in 100 Englifh Ballads, &c." and in 1743, his dramatic works, in a fmall volume, 4to. With all his mirth and good humour, he feems to have been at times deeply affected with the malevolence of

fome of his own profeffion, who, for reafons that no one can guefs at, were his enemies; and this, with the preffure of his circumftances, is fuppofed to have occafioned his untimely end; for, about 1744, in a fit of defperation, he laid violent hands on himfelf, and, at his houfe in Warner-ftreet, Cold-bath Fields, put a period to a life, which, fays Sir John Hawkins, had been led without reproach. It is to be noted, and it is fomewhat fingular in fuch a character, that in all his fongs and poems on wine, love, and fuch kinds of fubjects, he feems to have manifefted an inviolable regard for decency and good morals.

CARGADORS, a name which the Dutch give to thofe brokers whofe bufinefs is to find freight for fhips outward bound, and to give notice to the merchants, who have commodities to fend by fea, of the fhips that are ready to fail, and of the places for which they are bound.

CARGAPOL, or KARGAPOL, the capital of a territory of the fame name, in the province of Dwina, in Mufcovy. E. long. 36. N. lat. 63.

CARGO denotes all the merchandifes and effects which are laden on board a fhip.

Super-CARGO, a perfon employed by merchants to go a voyage, overfee the cargo, and difpofe of it to the beft advantage.

CARIATI, a town of Italy, in the kingdom of Naples, and province of Hither Calabria, with a bifhop's fee, and the title of a principality. It is two miles from the gulf of Taranto, and 37 north-eaft of Cofenza. E. long. 17. 19. N. lat. 30. 38.

CARIBBEE ISLANDS, a clufter of iflands fituated in the Atlantic ocean between 59 and 63 degrees of weft longitude, and between 11 and 18 degrees of north latitude. They lie in the form of a bow or femicircle, ftretching almoft from the coaft of Florida north, to near the river Oroonoque. Thofe that lie neareft the eaft have been called the *Windward Iflands*, the others the *Leeward*, on account of the winds blowing generally from the eaftern point in thofe quarters. Abbé Raynal conjectures them to be the tops of very high mountains formerly belonging to the continent, which have been changed into iflands by fome revolution that has laid the flat country under water. The direction of the Caribbee iflands, beginning from Tobago, is nearly N. and N. N. W. This direction is continued, forming a line fomewhat curved towards the north-weft, and ending at Antigua. In this place the line becomes at once curved; and extending itfelf in a ftraight direction to the weft and north-weft, meets in its courfe with Porto-Rico, St. Domingo, and Cuba, known by the name of the *Leeward Iflands*, which are feparated from each other by channels of various breadths. Some of thefe are fix, others 15 or 20 leagues broad: but in all of them the foundings are from 100 to 120 or 150 fathoms. Between Grenada and St. Vincent's there is alfo a fmall archipelago of 30 leagues, in which the foundings are not above ten fathoms. The Caribbee iflands take their name from the aborigines of the country; and the fea in which they lie, is fometimes called, by modern geographers, the Archipelago of the Caribbees. They have the general name of Weft Indies, but, by the French, they are called the Antilles. The name of Caribbee, however, fhould properly be confined to the fmaller iflands, which lie between Porto-Rico and Tobago. Thefe were inhabited by the Caribbees, a fierce race of men, no wife refembling their feeble and timid neighbours in the larger iflands. Columbus, in his fecond voyage, was a witnefs to their intrepid valour. The fame character they have maintained invariably in all fubfequent contefts with the people of Europe; and, even in our times, we have feen them make a gallant ftand in defence of the laft territory (the ifland of St. Vincent) which the rapacity of their invaders had left in their poffeffion. The Britifh iflands are Jamaica, Barbadoes, St. Chriftopher's, Antigua, Nevis, Montferrat, Barbuda, Anguilla, Dominica, St. Vincent, Granada, the Bahama iflands, part of the Virgin iflands, and Tobago; which laft was taken from the French, April 15, 1793. Cuba, Porto-Rico, Trinidad, and Margaretta belong to the Spaniards, who likewife have the eaftern part of Hifpaniola. To the French belonged Martinico, Guadaloupe, St. Lucia, Marigalante, Defeada, and the weftern part of Hifpaniola. The Dutch have St. Euftatia, Curacao, Saba, and St. Martin; the Danes, St. Thomas, St. Croix, and part of the Virgin iflands; and the Swedes, St. Bartholomew. Some changes indeed have taken place in the courfe of the prefent war: but what arrangements a peace will produce cannot be forefeen.

CARIBBIANA, or CARIBIANA, the north-eaft coaft of Terra Firma, in South America, otherwife called *New* ANDALUSIA.

CARICA, the PAPAW; a genus of the decandria order, belonging to the diœcia clafs of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The calyx of the male is fcarce any; the corolla is quinquefid and funnel-fhaped; the filaments in the tube of the corolla, a longer and fhorter one alternately. The calyx of the female quinquedentated; the corolla is pentapetalous, with five ftigmata; the fruit unilocular and a polyfpermous berry.

The fpecies are, 1. The papaya, which rifes with a thick, foft, herbaceous ftem, to the height of 18 or 20 feet, naked till within two or three feet of the top. The leaves come out on every fide, upon very long footftalks. Thofe which are fituated undermoft are almoft horizontal, but thofe on the top are erect: thefe leaves in full grown plants are very large, and divided into many lobes deeply finuated. The ftem of the plant, and alfo the footftalks of the leaves, are hollow. The flowers of the male plant are produced from between the leaves on the upper part of the plant. They have footftalks near two feet long; at the end of which the flowers ftand in loofe clufters, each having a feparate fhort footftalk: thefe are of a pure white, and have an agreeable odour. The flowers of the female papaya alfo come out from between the leaves towards the upper part of the plant, upon very fhort footftalks, fitting clofe to the ftem: they are large, and bell-fhaped, compofed of fix petals, and are commonly yellow: when thefe fall away, the germen fwells to a large flefhy fruit, of the fize of a fmall melon. Thefe fruits are of different forms: fome angular, and compreffed at both ends; others oval, or globular; and fome pyramidal. The fruit, and all the other parts of the tree abound with a milky acrid juice, which is applied for killing of ring-worms. When the roundifh fruit are nearly ripe, the inhabitants of India boil and eat them with their meat as we do turnips. They have fomewhat the flavour of a pompion. Previous to boiling they foak them for fome time in falt and water, to extract the corrofive juice; unlefs the meat they are to be boiled with fhould be very falt and old, and then this juice being in them will make it as tender as a chicken. But they moftly pickle the long fruit, and thus they make no bad fuccedaneum for mango. The buds of the female flowers are gathered, and made into a fweetmeat; and the inhabitants are fuch good managers of the produce of this tree, that they boil the fhells of the ripe fruit into a repaft, and the infides are eaten with fugar in the manner of melons. The ftem being hollow, has given birth to a proverb in the Weft India iflands; where, in fpeaking of a diffembling perfon, they fay he is as hollow as a *popo*. 2. The profpofa, differs from the other in having a branching ftalk, the lobes of the leaves entire, the flower of a rofe-colour, and the fruit fhaped like a pear, and of a fweeter flavour than the papaya.

Thefe plants being natives of hot countries, cannot be preferved in Britain unlefs conftantly kept in a warm ftove, which fhould be of a proper height to contain them. They are eafily

propagated by feeds which are brought in plenty from the Weft Indies, though the feeds of the European plants ripen well. The feeds fhould be fown in a hot-bed early in the fpring: when the plants are near two inches high, they fhould be removed into feparate fmall pots, and each plunged into a hot-bed of tanner's bark, carefully fhading them from the fun till they have taken root; after which, they are to be treated in the fame manner as other tender exotics. When they are removed into other pots, care muft be taken as much as poffible to preferve the ball of earth about them, becaufe wherever their roots are laid bare they feldom furvive. When they are grown to a large fize, they make a noble appearance with their ftrong upright ftems, garnifhed on every fide near the top with large fhining leaves, fpreading out near three feet all round the ftem: the flowers of the male fort coming out in clufters on every fide, and the fruit of the female growing round the ftalks between the leaves, are fo different from any thing of European production, as certainly to entitle thefe plants to a place in the gardens of the curious. The fruit of the firft fpecies is by the inhabitants of the Caribbee iflands eaten with pepper and fugar as melons, yet much inferior to a melon in its native country; but thofe which have ripened in Britain were very unpalatable. The only ufe to which they can be put is, when they are about half grown, to foak them in falt water to get out the acrid juice, and then to pickle them for mangos, for which they are a good fubftitute.

CARICATURA, in painting, denotes the concealment of real beauties, and the exaggeration of blemifhes, but ftill fo as to preferve a refemblance of the object. The word is Italian; formed of *carica*, a load or burden.

CARICOUS, an epithet given to fuch tumors as refemble the fhape of a fig. Such are produced by the piles.

CARIES, the death or mortification of a bone. See SURGERY.

CARIGNAN, a fortified town of Piedmont, fituated on the river Po, about feven miles fouth of Turin. E. long. 7. 25. N. lat. 44. 30. It was taken in 1544 by the French; who demolifhed the fortifications, but fpared the caftle.

CARILLONS, a fpecies of chimes frequent in the low countries, particularly at Ghent and Antwerp, and played on a number of bells in a belfry, forming a complete feries or fcale of tones and femitones, like thofe on the harpfichord and organ. There are pedals communicating with the great bells, upon which the *carilloneur* with his feet plays the bafe to fprightly airs, performed with his two hands upon the upper range of keys. Thefe keys are projecting fticks, wide enough afunder to be ftruck with violence and velocity by either of the hands edgeways, without the danger of hitting the neighbouring key. The player is provided with a thick leather covering for the little finger of each hand, to guard againft the violence of the ftroke. Thefe carillons are heard through a large town.

CARINA, a Latin term, properly fignifying the *keel* of a fhip; or that long piece of timber running along the bottom of the fhip from head to ftern, upon which the whole ftructure is built or framed. The term is alfo frequently ufed to fignify the whole capacity or bulk of a fhip; including the hull or all the fpace below the deck. Hence the word is alfo fometimes ufed by a figure for the whole fhip.

CARINA is alfo ufed in the ancient architecture. The Romans gave the name *carina* to all buildings in form of a fhip, as we ftill give the name *nave* to the middle or principal vault of our Gothic churches; becaufe it has that figure.

CARINA, among anatomifts, is ufed to denote the *fpina dorfi*; and likewife for the fibrous rudiments or embryo of a chick appearing in an incubated egg. The carina confifts of the entire *vertebræ*, as they appear after ten or twelve days incubation. It is thus called, becaufe it is bent in the form of a fhip's keel. Botanifts alfo, for the like reafon, ufe the word *carina*, to exprefs the lower petal of a papilionaceous flower.

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CARINÆ were alfo weepers or women hired among the ancient Romans to weep at funerals: they were thus called from *Caria*, the country whence moft of them came.

CARINOLA, an epifcopal town of Italy, in the kingdom of Naples, and Terra di Lavoro. E. long. 15. 5. N. lat. 41. 15.

CARINTHIA, a duchy of Germany, in the dominions of Auftria, bounded on the N. by Auftria, on the E. by Stiria, on the S. by Carniola and Friuli, on the W. by Tirol and the archbifhopric of Saltzburg. It abounds in corn. Clagenfurt is the capital.

CARIPI, a kind of cavalry in the Turkifh army. The caripi to the number of about 1000, are not flaves, nor bred up in the feraglio, like the reft; but are generally Moors or renegado Chriftians, who having followed adventures, being poor, and having their fortune to feek by their dexterity and courage, have arrived at the rank of horfe-guards to the grand fignior.

CARISSA, in botany; a genus of the monogynia order, belonging to the pentandria clafs of plants; and in the natural method ranking under the 30th order, *Contortæ*. It has two many-feeded berries.

CARITAS. The *poculum caritatis*, or grace-cup, was an extraordinary allowance of wine or other liquors, wherein the religious at feftivals drank in commemoration of their founder and benefactors.

CARISBROOK CASTLE, a caftle fituated in the middle of the ifle of Wight, where king Charles I. was imprifoned. W. long. 1. 30. N. lat. 50. 40.

CARISTO, an epifcopal city of Greece, in the eaftern part of the ifland of Negropont, near Cape Loro. E. long. 24. 15. N. lat. 38. 6.

CARKE, denotes the 30th part of a SARPLAR of wool.

CARLE. See CHURL.

CARLETON (Sir Dudley), was born in Oxfordfhire, 1573, and bred in Chrift-church college. He went as fecretary to Sir Ralph Winwood into the Low Countries, when king James refigned the cautionary towns to the States; and was afterwards employed for 20 years as ambaffador to Venice, Savoy, and the United Provinces. King Charles created him vifcount Dorchefter, and appointed him one of his principal fecretaries of ftate; in which office he died in 1631. He was efteemed a good ftatefman, though an honeft man; and publifhed feveral political works.

CARLINA, the CARLINE-THISTLE; a genus of the polygamia æqualis order, belonging to the fyngenefia clafs of plants; and in the natural method ranking under the 49th order, *Compofitæ*. The calyx is radiated with long coloured marginal fcales. There are feven fpecies, only one of which is a native of Britain, viz. the vulgaris. The others are natives of the fouth of France or Italy; and are very eafily propagated in this country by feeds, which muft be fown on a bed of frefh undunged earth, where they are to remain, as they do not bear tranfplanting. The roots have been ufed in medicine, and for that purpofe imported from thofe countries where the plants grow naturally. They have a ftrong fmell, and a fubacrid, bitterifh, weakly aromatic tafte. They have been for fome time greatly efteemed as diaphoretic and alexipharmic among foreign phyficians; but they never were much in ufe in this country, and the prefent practice has entirely rejected them.

CARLINE, or CAROLINE, a filver coin current in the Neapolitan dominions, and worth about 4d. of our money.

CARLINES, or CARLINGS, in a fhip, two pieces of timber lying fore and aft, along from one beam to another, directly

over the keel; ferving as a foundation for the whole body of the fhip. On thefe the ledges reft, whereon the planks of the deck and other matters of carpentry are made faft. The carlines have their ends let into the beams what is called *culver-tail-wife*.

CARLINE-*Knees*, are timbers going athwart the fhip, from the fides to the hatch-way, ferving to fuftain the deck on both fides.

CARLINGFORD, a port-town of Ireland, feated on Carlingford bay, in the county of Louth, and province of Leinfter, 22 miles N. of Drogheda. W. long. 6. 24. N. lat. 24. 5.

CARLISLE, an ancient city of Cumberland, of which it is the capital, with a market on Saturday. It is walled round, and is pleafantly fituated above a rich tract of meadows, bordering the Eden and two other rivers, which here unite their ftreams. The gates of this city are called the Englifh, Irifh, and Scotch. It has a caftle, which ftands on the W. fide of the town: the houfes are well built, and the cathedral is a ftately ftructure. Carlifle has a confiderable manufactory of printed linens and checks, and is noted for the making of whips and fifh-hooks. It was taken by the rebels in 1745, but retaken by the duke of Cumberland. It fends two members to parliament; and is 60 miles S. of Edinburgh, and 301 N. N. W. of London. Long. 2. 53. W. Lat. 54. 56. N.

CARLISLE, the county town of Cumberland, in the ftate of Pennfylvania, in N. America. It contains 3 places of worfhip, about 300 ftone houfes, and 1500 inhabitants. They have alfo a court-houfe and a college. Thirty-fix years ago this fpot was a wildernefs, inhabited by Indians and wild beafts. A like inftance of the rapid progrefs of the arts of civilized life is fcarcely to be found in hiftory. It is 100 miles W. by N. of Philadelphia. Long. 77. 30. W. Lat. 40. 10. N.

CARLOCK, in commerce, a fort of ifinglafs, made with the fturgeon's bladder, imported from Archangel. The chief ufe of it is for clarifying wine, but it is alfo ufed by the dyers. The beft carlock comes from Aftracan, where a great quantity of fturgeon is caught.

CARLOSTAD, or CARLSTAD, a town of Sweden in Wermeland, feated on the lake Warmer, in E. long. 14. 4. N. lat. 59. 16.

CARLOSTED, or *Carlftadt*, a town of Hungary, capital of Croatia, and the ufual refidence of the governors of the province. It is feated on the river Kulph, in E. long. 16. 5. N. lat. 45. 34.

CARLOWITZ, a fmall town of Hungary, in Sclavonia, remarkable for a peace concluded here between the Turks and Chriftians in 1669. It is feated on the weft fide of the Danube, in E. long. 19. 5. N. lat. 45. 25.

CARLSCRONA, or CARLSCROON, a fea-port town in the Baltic, belonging to Sweden. It derives its origin and name from Charles XI. who firft laid the foundations of a new town in 1680, and removed the fleet from Stockholm to this place, on account of its advantageous fituation in the centre of the Swedifh feas, and the fuperior fecurity of its harbour. The greateft part of Carlfcrona ftands upon a fmall rocky ifland, which rifes gently in a bay of the Baltic; the fuburbs extend over another fmall rock, and along the mole clofe to the bafon, where the fleet is moored. The way into the town from the main land is carried over a dyke to an ifland, and from thence along two long wooden bridges joined by a barren rock. The town is fpacious, and contains about 18,000 inhabitants. It is adorned with one or two handfome churches, and a few tolerable houfes of brick; but the generality of the buildings are of wood. The fuburbs are fortified towards the land by a ftone-wall. The entrance into the harbour, which is extremely difficult from a number of fhoals and rocky iflands, is ftill further fecured from the attack of an enemy's fleet by two ftrong forts built on two iflands, under the batteries of which all veffels muft pafs.

Formerly veffels in this port, when careened and repaired, were laid upon their fides in the open harbour, until a dock, according to a plan given by Polheim, was hollowed in the folid rock: it was begun in 1714, and finifhed in 1724; but as it was too fmall for the admiffion of men of war, it has lately been enlarged, and is now capable of receiving a fhip of the firft rate. But new docks have been begun upon a ftupendous plan worthy of the ancient Romans. According to the original fcheme, it was intended to conftruct 30 docks, for building and laying up the largeft fhips, at the extremity of the harbour. The project indeed was begun in 1757; but was much neglected until the acceffion of his late majefty, who warmly patronized the undertaking. At the commencement of the works, 25,000l. were annually expended upon them; which fum has been leffened to about 6000l. per annum, and the number of docks reduced to 20. The firft dock was finifhed in 1779, and it was computed that the whole number would be executed in 20 years.

CARLSTADT, a town of Germany, in the circle of Franconia, and bifhopric of Wurtfburg, feated on the river Maine, in E. long. 9. 51. N. lat. 50. 0.

CARLTON, a town in Norfolk held by this tenure, that they fhall prefent 1000 herrings baked in 14 pies to the king, wherever he fhall be when they firft come in feafon.

CARMAGNIOLA, a fortified town of Italy, in Piedmont, with a good caftle. It was taken by the French in 1691, and retaken by prince Eugene the fame year. It is feated in a country abounding in corn, flax, and filk, near the river Po, in E. long. 7. 32. N. lat. 44. 43.

CARMEL, a high mountain of Paleftine, ftanding on the fkirts of the fea, and forming the moft remarkable head-land on all that coaft. It extends eaftward from the fea as far as the plain of Jezreel, and from the city of that name quite to Cæfarea on the fouth. It feems to have had the name of *Carmel* from its great fertility, this word, according to the Hebrew import, fignifying the *vine of God*, and is ufed in fcripture to denote any fruitful fpot, or any place planted with fruit-trees. What has rendered mount Carmel moft celebrated and revered both by Jews and Chriftians, is its having been the refidence of the prophet Elijah, who is fuppofed to have lived there in a cave (which is there fhown), before he was taken up into heaven.

CARMELITES, an order of religious, making one of the four tribes of mendicants or begging friars; and taking its name from mount Carmel, formerly inhabited by Elias, Elifha, and the children of the prophets; from whom this order pretends to defcend in an uninterrupted fucceffion. The manner in which they make out their antiquity has fomething in it too ridiculous to be related. Some among them pretend they are defcendants of Jefus Chrift; others go further, and make Pythagoras a Carmelite, and the ancient druids regular branches of their order. In 1209, Albert, Patriarch of Jerufalem, gave the folitaries a rigid rule, which Papebroch has fince printed. In 1217, or according to others 1226, pope Honorius III. approved and confirmed it. This rule contained 16 articles; one of which confined them to their cells, and enjoined them to continue day and night in prayer; another prohibited the brethren having any property; another enjoined fafting from the feaft of the holy crofs till Eafter, except on Sundays: abftinence at all times from flefh was enjoined by another article; one obliged them to manual labour; another impofed a ftrict filence on them from vefpers till the tierce the next day. The peace concluded by the emperor Frederic II. with the Saracens, in the year 1229, fo difadvantageous to Chriftendom, and fo

beneficial to the infidels, occafioned the Carmelites to quit the Holy Land, under Alan the fifth general of the order. He firft fent fome of the religious to Cyprus, who landed there in the year 1238, and founded a monaftery in the foreft of Fortania. Some Sicilians, at the fame time, leaving mount Carmel, returned to their own country, where they founded a monaftery in the fuburbs of Meffina. Some Englifh departed out of Syria, in the year 1240, to found others in England. Others of Provence, in the year 1244, founded a monaftery in the defert of Aigualates, a league from Marfeilles: and thus, the number of their monafteries increafing, they held their European general chapter in the year 1245, at their monaftery of Aylesford in England. This order is fo much increafed, that it has, at prefent, 38 provinces, befides the congregation of Mantua, in which are 54 monafteries, under a vicar-general; and the congregations of Barefooted Carmelites in Italy and Spain, which have their peculiar generals.

After the eftablifhment of the Carmelites in Europe, their rule was in fome refpects altered; the firft time, by pope Innocent IV. who added to the firft article a precept of chaftity, and relaxed the 11th, which enjoins abftinence at all times from flefh, permitting them, when they travelled, to eat boiled flefh; this pope likewife gave them leave to eat in a common refectory, and to keep affes or mules for their ufe. Their rule was again mitigated by the popes Eugenius IV. and Pius II. Hence the order is divided into two branches, viz. *the Carmelites of the ancient obfervance*, called the *moderate* or *mitigated*; and thofe *of the ftrict obfervance*, who are the *Barefooted Carmelites*; a reform fet on foot in 1540, by S. Therefa, a nun of the convent of Avila, in Caftile: thefe laft are divided into two congregations, that of Spain and that of Italy.

The habit of the Carmelites was at firft white, and the cloak laced at the bottom with feveral lifts. But pope Honorius IV. commanded them to change it for that of the Minims. Their fcapulary is a fmall woollen habit of a brown colour, thrown over their fhoulders. They wear no linen fhirts; but inftead of them linfey wolfey, which they change twice a-week in the fummer, and once a-week in the winter. If a monk of this order lies with a woman, he is prohibited faying mafs for three or four years, is declared infamous, and obliged to difcipline himfelf publicly once a-week. If he is again guilty of the fame fault, his penance is doubled; and if a third time, he is expelled the order.

CARMEN, an ancient term among the Latins, ufed in a general fenfe to fignify a verfe; but more particularly to fignify a fpell, charm, form of expiation, or execration, couched in a few words placed in a myftic order, on which its efficacy depended. Pezron derives the word *carmen* from the Celtic *carm*, the fhout of joy, or the verfes which the ancient bards fung to encourage the foldiers before the combat. *Carmen* was anciently a denomination given alfo to precepts, laws, prayers, imprecations, and all folemn formulæ couched in a few words placed in a certain order, though written in profe. In this fenfe it was that the elder Cato wrote a *Carmen de moribus*, which was not in verfe but in profe.

CARMENTALIA, a feaft among the ancient Romans, celebrated annually upon the 11th of January, in honour of Carmenta, or Carmentis, a prophetefs of Arcadia, mother of Evander, with whom fhe came into Italy 60 years before the Trojan war. The folemnity was alfo repeated on the 15th of January, which is marked in the old calendar by *Carmentalia relata*. This feaft was eftablifhed on occafion of a great fecundity among the Roman dames, after a general reconciliation with their hufbands, with whom they had been at variance, in the regard of the ufe of coaches being prohibited them by an edict of the fenate. This feaft was celebrated by the women: he who offered the facrifices was called *facerdos carmentalis*.

CARMINATIVES, an exploded name for fuch medicines as were ufed in colics, or other flatulent diforders, to expel wind. Such were coriander feeds, anifeeds, peppermint, &c.

CARMINE, a powder of a very beautiful red colour, bordering upon purple; and ufed by painters in miniature, though rarely on account of its great price. The manner of preparing it is kept a fecret by the colour-makers; neither do any of thofe receipts which have been publifhed at all direct us as to the manner of making it. See COLOUR-*Making*.

CARMONA, a town of Italy in Frioli, and in the county of Goritz, feated on a mountain near the river Indri. It belongs to the houfe of Auftria. E. long. 5. 37. N. lat. 46. 15.

CARMONA, an ancient town of Spain in Andalufia. The gate towards Seville is one of the moft extraordinary pieces of antiquity in all Spain. It is feated in a fertile country, 15 miles eaft of Seville. W. long. 5. 37. N. lat. 37. 24.

CARNATION, in botany. See DIANTHUS.

CARNATION-*Colour*, among painters, is underftood of all the parts of a picture, in general, which reprefent flefh, or which are naked and without drapery. Titian and Corregio in Italy, and Rubens and Vandyke in Flanders, excelled in carnations. In colouring for flefh, there is fo great a variety, that it is hard to lay down any general rules on the fubject; neither are there any regarded by thofe who have acquired a fkill in this way.

CARNATION, among dyers. To dye a carnation, or red rofe colour, it is directed to take liquor of wheat-bran a fufficient quantity, alum three pounds, tartar two ounces; boil them and enter twenty yards of broad cloth; after it has boiled three hours, cool and wafh it: take frefh clear bran liquor a fufficient quantity, madder five pounds; boil and fodden according to art. The Bow dyers know that the folution of tin, being put in a kettle to the alum and tartar, in another procefs, makes the cloth, &c. attract the colour, fo that none of the cochineal is left, but the whole is abforbed by the cloth.

CARNEADES, a celebrated Greek philofopher, was a native of Cyrene in Africa, and founder of the third academy. He was fo fond of ftudy, that he not only avoided all entertainments, but forgot even to eat at his own table; his maidfervant Meliffa was obliged to put the victuals into his hand. He was an antagonift of the Stoics; and applied himfelf with great eagernefs to refute the works of Chryfippus, one of the moft celebrated philofophers of their fect. The power of his eloquence was dreaded even by a Roman fenate. The Athenians being condemned by the Romans to pay a fine of 500 talents for plundering the city of Oropus, fent ambaffadors to Rome, who got the fine mitigated to 100 talents. Carneades the Academic, Diogenes the Stoic, and Critolaus the Peripatetic, were charged with this embaffy. Before they had an audience of the fenate, they harangued to great multitudes in different parts of the city. Carneades' eloquence was diftinguifhed from that of the others by its ftrength and rapidity. Cato the elder made a motion in the fenate that thefe ambaffadors fhould be immediately fent back, becaufe it was very difficult to difcern the truth through the arguments of Carneades. The Athenian ambaffadors (faid many of the fenators) were fent rather to force us to comply with their demands, than to folicit them by perfuafion; meaning that it was impoffible to refift the power of that eloquence with which Carneades addreffed himfelf to them. According to Plutarch, the youth at Rome were fo charmed by the fine orations of this philofopher, that they forfook their exercifes and other diverfions, and were carried with a kind of madnefs to philofophy; the fafhion of philofophifing fpreading like enthufiafm. This grieved Cato, who was particularly afraid of the fubtility of wit and ftrength of argument with which Carneades maintained either fide of a queftion. Carneades harangued in favour of juftice one day,

and the next day against it, to the admiration of all who heard him, among whom were Galba and Cato, the greatest orators of Rome. This was his element; he delighted in demolishing his own work; because it served in the end to confirm his grand principle, that there are only probabilities or resemblances of truth in the mind of man; so that of two things directly opposite, either may be chosen indifferently. Quintilian remarks, that though Carneades argued in favour of injustice, yet he himself acted according to the strict rules of justice. Carneades, according to some, lived to be 85 years old; others make him to be 90: his death is placed in the 4th year of the 162d Olympiad.

CARNEDDE, in British antiquity, denotes heaps of stones supposed to be druidical remains, and thrown together on occasion of confirming and commemorating a covenant: Gen. xxxi. 46. They are very common in the isle of Anglesey, and were also used as sepulchral monuments, in the manner of *tumuli*; for Mr. Rowland found a curious urn in one of these carnedde. Whence it may be inferred, that the Britons had the custom of heaping stones on the deceased. From this custom is derived the Welch proverb, *Karn ardyben*, "ill betide thee."

CARNEIA, in antiquity, a festival in honour of Apollo, surnamed Carneus, held in most cities of Greece, but especially at Sparta, where it was first instituted.

The reason of the name, as well as the occasion of the institution, is controverted. It lasted nine days, beginning on the 13th of the month Carneus. The ceremonies were an imitation of the method of living and discipline used in camps.

CARNEL. The building of ships first with their timber and beams, and then bringing on their planks, is called *carnel-work*, to distinguish it from clinch-work. Vessels also which go with mizzen-sails instead of main-sails are by some called carnels.

CARNELIAN, in natural history, a precious stone, of which there are three kinds, distinguished by three colours, a red, a yellow, and a white. The red is very well known among us; is found in roundish or oval masses, much like our common pebbles; and is generally met with between an inch and two or three inches in diameter: it is of a fine, compact, and close texture; of a glossy surface; and, in the several specimens, is of all the degrees of red, from the palest flesh-colour to the deepest blood-red. It is generally free from spots, clouds, or variegations: but sometimes it is veined very beautifully with an extremely pale red, or with white; the veins forming concentric circles, or other less regular figures, about a nucleus, in the manner of those of agate. The pieces of carnelian which are all of one colour, and perfectly free from veins, are those which our jewellers generally make use of for seals, though the variegated ones are much more beautiful. The carnelian is tolerably hard, and capable of a very good polish: it is not at all affected by acid menstrua: the fire divests it of a part of its colour, and leaves it of a pale red; and a strong and long continued heat will reduce it to a pale dirty gray. The finest carnelians are those of the East Indies; but there are very beautiful ones found in the rivers of Silesia and Bohemia; and we have some that are not despicable in England.

CARNERO, in geography, a name given to that part of the gulph of Venice which extends from the western coast of Istria to the island of Grossa and the coast of Morlachia.

CARNERO is likewise the name of the cape to the west of the mouth of the bay of Gibraltar.

CARNIFEX, among the Romans, the common executioner. On account of the odiousness of his office, the carnifex was expressly prohibited by the laws from having his dwelling-house within the city. In middle-age writers carnifex also denotes a butcher. Under the Anglo-Danish kings, the carnifex was an officer of great dignity; being ranked with the archibishop of York, earl Goodwin, and the lord steward. Flor. Wigorn. ann. 1040. *Rex Hardecanutus Alfricum Ebor. Archiep. Goodwinum comitem, Edrienum dispensatorem, Throud suum* carnific *et alios magnæ dignitatis viros Londinum misit.*

CARNIOLA, a duchy of Germany bounded on the south by the Adriatic sea, and that part of Istria possessed by the republic of Venice; on the north, by Carinthia and Stiria; on the east, by Sclavonia and Croatia; on the west, by Friuli, the county of Gorz or Goritz, and a part of the gulf of Venice; extending in length about 110 miles, and in breadth about 50. It had its ancient name *Carnia*, as well as the modern one *Carniola*, from its ancient inhabitants the *Carni*, a tribe of Scythians, otherwise called *Japides*, whence this and the adjacent countries were also called *Japidia*. The duchy is divided into the Upper, Lower, Middle, and Inner, Carniola. The principal commodities exported hence are, iron, steel, lead, quicksilver, white and red wine, oil of olives, cattle, sheep, cheese, linen, and a kind of woollen stuff called *mahalan*, Spanish leather, honey, walnuts, and timber; together with all manner of wood-work, as boxes, dishes, &c. Except the Walachians or Uskokes, who are of the Greek church, and style themselves *Staraverzi*, i. e. *old believers*, all the inhabitants at present are Roman Catholics. Carniola was long a marquisate or margravate; but in the year 1231 was erected into a duchy. As its proportion towards the maintenance of the army, it pays annually 363,171 florins; but only two regiments of foot are quartered in it.

CARNIVAL, or CARNAVAL, a time of rejoicing, a season of mirth, observed with great solemnity by the Italians, particularly at Venice, holding from the twelfth day till Lent. The word is formed from the Italian *Carnavalle*; which Mr. Du Cange derives from *Carn-a-val*, by reason the flesh then goes to pot, to make amends for the season of abstinence then ensuing. Accordingly, in the corrupt Latin, he observes, it was called *Carnelevamen*, and *Carnisprivium*; as the Spaniards still denominate it *carnes tollendas*. Feasts, balls, operas, concerts of music, intrigues, marriages, &c. are chiefly held in carnival time. The carnival begins at Venice the second holiday in Christmas: then it is they begin to wear masks, and open their play-houses and gaming-houses; the place of St. Mark is filled by mountebanks, jack-puddings, pedlars, courtesans and such like mob, who flock thither from all parts. There have been no less than seven sovereign princes and 30,000 foreigners there to partake of those diversions.

CARNIVOROUS, an epithet applied to those animals which naturally seek and feed on flesh. It has been a dispute among naturalists, whether man is naturally carnivorous. Those who take the negative side of the question, insist chiefly on the structure of our teeth, which are mostly incisores or molares; not such as *carnivorous* animals are furnished with, and which are proper to tear flesh in pieces: to which it may be added, that, even when we do feed on flesh, it is not without a preparatory alteration by boiling, roasting, &c. But in fact the human race are furnished with teeth necessary for the preparation of all kinds of foods; and from thence it would seem, that nature intended we should live on all. Some visionary writers have likewise disputed whether mankind were *carnivorous* before the flood. St. Jerom, Chrysostom, Theodoret, and other ancients, maintain, that all animal food was then forbidden; which opinion is also strenuously supported among the moderns by Curcellæus, yet refuted by Heidegger, Danzius, Bockhart, &c.

CARNOSITY is used by some authors for a little fleshy excrescence, tubercle, or wen, formed in the urethra, the neck of the bladder, or penis, which hinder the passage of the urine. These caruncles however have been demonstrated in few if any instances by dissection; and Mr. Hunter denies their existence.

CARO (Annibal), a celebrated Italian poet, was born at Civita Nuovo in 1507. He became fecretary to the duke of Parma, and afterwards to cardinal Farnefe. He was alfo made a knight of Malta. He tranflated Virgil's Æneid into his own language, with fuch propriety and elegance of expreffion, that he was allowed by the beft judges to have equalled the original. He alfo tranflated Ariftotle's rhetoric, two oratorios of Gregory Nazianzen, with a difcourfe of Cyprian. He wrote a comedy; and a mifcellany of his poems was printed at Venice in 1584. He died at Rome in 1566.

CAROLINA, a county of North America, divided into N. and S. and comprehending two of the United States. It is bounded on the N. by Virginia, and on the E. by the ocean, on the S. by Florida, and on the W. by Louifiana, lying between 30 and 35 degrees N. lat. The chief produce is tobacco, indigo, and rice. The animals, trees, fruits, and plants, are much the fame as in Virginia. They have bears, whofe flefh is efteemed good eating; and they make hams of their legs. Befide thefe they have wild cats, wolves, a fort of tigers, beavers, otters, mufk-rats, oppoffums, racoons, minxes, a kind of rabbits; elks, different from the European; ftags, fallow-deer, feveral forts of fquirrels, foxes, and two forts of rats. The birds are fo numerous, that it would be tedious to mention their names; and there are many forts of fifhes, quite unknown to Europe. Their native fruits are chiefly peaches, but they have fome of the beft fruits tranfplanted from Europe, which thrive well.

CAROLINE. See CARLINE.

CAROLINE-*Books*, the name of four books, compofed by order of Charlemagne, to refute the fecond council of Nice. Thefe books are couched in very harfh and fevere terms, containing 120 heads of accufation againft the council of Nice, and condemning the worfhip of images.

CAROLOSTADIANS, or CARLOSTADIANS, an ancient fect or branch of Lutherans, who denied the real prefence of Chrift in the eucharift. They were thus denominated from their leader Andrew Caroloftadius, who having originally been archdeacon of Witteinberg, was converted by Luther, and was the firft of all the reformed clergy who took a wife; but difagreeing afterwards with Luther, chiefly in the point of the facrament, founded a fect apart. The Caroloftadians are the fame with what are otherwife denominated Sacramentarians, and agree in moft things with the Zuinglians.

CAROLUS, an ancient Englifh broad piece of gold ftruck under Charles I. Its value has of late been at 23 fhillings fterling, though at the time it was coined it is faid to have been rated at 20 fhillings.

CAROLUS, a fmall copper coin, with a little filver mixed with it, ftruck under Charles VIII. of France. The carolus was worth 12 deniers when it ceafed to be current. Thofe which are ftill current in trade in Lorrain, or in fome neighbouring provinces, go under the name of French fols.

CAROTIDS, in anatomy, two arteries of the neck, which convey the blood from the aorta to the brain; one called the right, and the other the left, carotid. See ANATOMY.

CARP, in ichthyology, the Englifh name of a fpecies of cyprinus. See BARBEL and *Carp*-FISHING. The carp is the moft valuable of all kinds of fifh for ftocking ponds. It is very quick in its growth, and brings forth its fpawn three times a year, fo that the increafe is very great. The female does not begin to breed till eight or nine years old; fo that in breeding-ponds a fupply muft be kept of carp of that age. The beft judges allow, that, in ftocking a breeding-pond, four males fhould be allowed to twelve females. The ufual growth of a carp is two or three inches in length in a year; but, in ponds which receive the fattening of common fewers, they have been known to grow from five inches to 18 in one year. A feeding-pond of one acre extent will very well feed 300 carp of three years old, 300 of two years old, and 400 of one year old. Carp delight greatly in ponds that have marley fides; they love alfo clay-ponds well fheltered from the winds and grown with weeds and long grafs at the edges, which they feed on in the hot months. Carp and tench thrive very faft in ponds and rivers near the fea, where the water is a little brackifh; but they are not fo well tafted as thofe which live in frefh water. Grains, blood, chicken-guts, and the like, may at times be thrown into carp-ponds, to help to fatten the fifh. To make them grow large and fat, the growth of grafs under the water fhould by all means poffible be encouraged. For this purpofe, as the water decreafes in the fummer, the fides of the pond left naked and dry fhould be well raked with an iron rake, to deftroy all the weeds, and cut up the furface of the earth; hay-feed fhould then be fown plentifully in thefe places; and more ground prepared in the fame manner, as the water falls more and more away. By this means there will be a fine and plentiful growth of young grafs along the fides of the pond to the water's edge; and when the rain fills up the pond again, this will be all buried under the water, and will make a feeding-place for the fifh, where they will come early in the morning, and will fatten greatly upon what they find there.

CARPÆA, a kind of dance anciently in ufe among the Athenians and Magnefians, performed by two perfons, the one acting a labourer, the other a robber. The labourer, laying by his arms, goes to ploughing and fowing, ftill looking warily about him as if afraid of being furprifed: the robber at length appears, and the labourer, quitting his plough, betakes himfelf to his arms, and fights in defence of his oxen. The whole was performed to the found of flutes, and in cadence. Sometimes the robber was overcome and fometimes the labourer; the victor's reward being the oxen and plough. The defign of the exercife was to teach and accuftom the peafants to defend themfelves againft the attacks of ruffians.

CARPENTER, a perfon who practifes CARPENTRY. The word is formed from the French *charpentier*, which fignifies the fame, formed of *charpente*, which denotes timber; or rather from the Latin *carpentarius*, a maker of *carpenta* or carriages.

CARPENTER *of a Ship*, an officer appointed to examine and keep in order the frame of a fhip, together with her mafts, yards, boats, and all other wooden machinery. It is his duty, in particular to keep the fhip *tight*; for which purpofe he ought frequently to review the decks and fides, and caulk them when it is neceffary. In the time of battle, he is to examine, up and down, with all poffible attention, in the lower apartments of the fhip, to ftop any holes that may have been made by fhot, with wooden plugs provided of feveral fizes.

CARPENTRAS, an epifcopal town of France, in the late province of Provence, and capital of Venaiffin. Before the late revolution, it was fubject to the pope, and is feated on the river Aufon, at the foot of a mountain, 14 miles N. E. of Avignon. Long 5. 6. E. Lat. 44. 8. N.

CARPENTRY, the art of cutting, framing, and joining large pieces of wood, for the ufes of building. It is one of the arts fubfervient to architecture, and is divided into houfe-carpentry and fhip-carpentry: the firft is employed in raifing, roofing, flooring of houfes, &c. and the fecond in the building of fhips, barges, &c. The rules in carpentry are much the fame with thofe of JOINERY; the only difference is, that carpentry is ufed in the larger and coarfer work, and joinery in the fmaller and more curious.

CARPENTUM, in antiquity, a name common to divers forts of vehicles, anfwering to coaches as well as waggons, or even carts, among us. The carpentum was originally a kind of car or vehicle in which the Roman ladies were carried; though in after times it was alfo ufed in war. Some derive the

word from *carro*; others from *Carmenta* the mother of Evander, by a converſion of the *m* into *p*.

CARPET, a ſort of covering of wool, or other materials, wrought with the needle or on a loom, which is part of the furniture of a houſe, and commonly ſpread over tables, or laid on the floor. Perſian and Turkey carpets have been long eſteemed, though at Paris there is a manufactory after the manner of Perſia, where they make them little inferior, not to ſay finer than the true Perſian carpets. They are velvety, and perfectly imitate the carpets which come from the Levant. There are alſo carpets of Germany, ſome of which are made of woollen ſtuffs, as ſerges, &c. and called ſquare carpets: others are made of wool alſo, but wrought with the needle, and pretty often embelliſhed with ſilk; and laſtly, there are ſome made of dog's hair. We have likewiſe carpets of a very ſuperior quality made in Britain; thoſe at preſent the moſt faſhionable, the moſt durable, and at the ſame time the moſt beautiful, are called the *Bruſſels*, though of Engliſh manufacture.

Carpet-*Knights*, a denomination given to gown-men and others, of peaceable profeſſions, who, on account of their birth, office, or merits to the public, or the like, are, by the prince, raiſed to the dignity of knighthood. They take the appellation *carpet*, becauſe they uſually receive their honours from the king's hands in the court, kneeling on a carpet. By this they are diſtinguiſhed from knights created in the camp, or field of battle, on account of their military proweſs. Carpet-knights poſſeſs a medium between thoſe called *truck*, or *dung-hill-knights*, who only purchaſe or merit the honour by their wealth, and *knights-bachelors*, who are created for their ſervices in the war.

CARPI, a principality of Modena in Italy, lying about four leagues from that city. It formerly belonged to the houſe of Pio; the elder ſons of which bore the title of *Princes of St. Gregory*. In the beginning of the 14th century *Manfroy* was the firſt prince of Carpi; but in the 16th, the emperor Cha. V. gave the principality to Alfonzo duke of Ferrara. This nobleman, in recompenſe, gave to Albert Pio, to whom the principality of Carpi belonged of right, the town of Saſſuolo and ſome other lands. Albert was, however, at laſt obliged to retire to Paris: where being ſtripped of all his eſtates, he died in 1538, with the reputation of being one of the beſt and braveſt men of his age. The family of Pio is yet in being, and continues attached to the French court. Some of them have even been raiſed to the purple, and ſtill make a figure in Europe.

Carpi, a town of Italy in the duchy of Modena, and capital of the laſt mentioned principality. It has a ſtrong caſtle, and is ſituated in E. long. 11. 12. N. lat. 44. 45.

Carpi, a town of the Veroneſe in Italy, memorable for a victory gained by the Imperialiſts over the French in 1701. It is ſubject to the Venetians: and is ſituated on the river Adige, in E. long. 11. 39. N. lat. 45. 10.

CARPI (Ugo da), an Italian painter, of no very conſiderable talents in that art, but remarkable for being the inventor of that ſpecies of engraving on wood, diſtinguiſhed by the name of chiaro-ſcuro, in imitation of drawing. This is performed by uſing more blocks than one; and Ugo da Carpi uſually had three; the firſt for the outline and dark ſhadows, the ſecond for the lighter ſhadows, and the third for the half tint. In that manner he ſtruck off prints after ſeveral deſigns, and cartoons of Raphael; particularly one of the Sybil, a Deſcent from the Croſs, and the Hiſtory of Simon the Sorcerer. He died in 1500. This art was brought to a ſtill higher degree of perfection by Balthaſar Peruzzi of Siena, and Parmigiano, who publiſhed ſeveral excellent deſigns in that manner.

Carpi (Girolamo da), hiſtory and portrait-painter, was born at Ferrara in 1501, and became a diſciple of Garofala. When he quitted that maſter, he devoted his whole time to ſtudy the works of Correggio, and to copy them with a moſt critical care and obſervation; in which labour he ſpent ſeveral years at Parma, Modena, and other cities of Italy, where the beſt works of that exquiſite painter were preſerved. He acquired ſuch an excellence in the imitation of Correggio's ſtyle, and copying his pictures, that many paintings finiſhed by him were taken for originals, and not only admired, but were eagerly purchaſed by the connoiſſeurs of that time. Nor is it improbable that ſeveral of the paintings of Girolamo da Carpi paſs at this day for the genuine works of Correggio himſelf. He died in 1556.

CARPINUS, the Horn-beam, in botany; a genus of the polyandria order, belonging to the monœcia claſs of plants; and in the natural method ranking under the 50th order, *Amentaceæ*. The calyx of the male is monophyllous and ciliated; there is no corolla, but 20 ſtamina. The calyx of the female is monophyllous and ciliated; no corolla; two germens, with two ſtyles on each. The fruit is an egg-ſhaped nut. There are two ſpecies, *viz*.

1. The betulus, or common horn-beam; a deciduous tree, native of Europe and America. Its leaves are of a darkiſh green, and about the ſize of thoſe of the beech, but more pointed and deeply ſerrated. Its branches are long, flexible, and crooked; yet in their general appearance very much reſemble thoſe of the beech; indeed there is ſo great a likeneſs between thoſe two trees, eſpecially in the ſhrubby and underwood ſtate, that it would be difficult to diſtinguiſh them at the firſt glance, were it not for that gloſſy varniſh with which the leaves of the beech are ſtrongly marked. In the days of Evelyn, when topiary work was the gardener's idol, the hornbeam might be conſidered as deſerving of thoſe endearing expreſſions which that enthuſiaſtic writer has been pleaſed to laviſh upon it: nevertheleſs, as an ornamental in modern gardening it ſtands low; and its preſent uſes are few. As an underwood it affords ſtakes and edders, fuel and charcoal. Its timber ranks with that of the beech and the ſycamore; and the inner bark is ſaid to be much uſed in Scandinavia to dye yellow. The only ſuperior excellence of the horn-beam lies in its fitneſs for ſcreen fences for ſheltering gardens, nurſeries, and young plantations from the ſeverities of the winter ſeaſon. It may be trained to almoſt any height, and by keeping it trimmed on the ſides, it becomes thick of branches, and conſequently thick of leaves; which being by their nature retained upon the plant after they wither, a horn-beam hedge occaſions a degree of ſhelter nearly equal to that given by a brick wall. Indeed, being leſs reflective than that expenſive ſkreen, it affords a more uniform temperature of air to the plants which ſtand near it. In this point of view, too, the horn-beam is uſeful to be planted promiſcuouſly, or in alternate rows, amongſt more tender plants in expoſed ſituations, in the ſame manner as the birch; to which it has more than one preference: namely, it is warmer in winter; and Hanbury ſays, the horn-beam is peculiarly grateful to hares and rabbits; conſequently it may prevent their injuring its more valuable neighbours: yet, like Evelyn, he ſeems to be of opinion that it is diſreliſhed by deer. If this be really the caſe, the horn-beam may on many occaſions be introduced into deer-parks with ſingular propriety. Of this ſpecies there are three varieties, viz. The Eaſtern Horn-beam, Flowering Horn-beam, and American Horn-beam.

2. The oſtrya, or hop horn-beam, is a native of Italy and of Virginia. This is of a taller growth than the eaſtern kind. It will arrive to the height of twenty feet, or more. The leaves are nearly the ſize of the common ſort, and ſome people admire this tree on account of the ſingular appearance it makes with

its ſeeds, before they begin to fall. There is a variety which grows to thirty feet high, ſhoots freely, has long rough leaves like thoſe of the elm, and longiſh yellow coloured flowers, called the *Virginian flowering hop horn-beam.*

The common horn-beam may be propagated either by layering (at almoſt any time of the year), or from ſeeds, in the following manner: Let the ſeeds be ſown in the ſeminary-ground, in beds four feet wide, with an alley of about two feet, and from one to two inches deep. In this bed they muſt remain till the ſecond ſpring before they make their appearance; and all the ſummer they lie concealed, the weeds ſhould conſtantly be plucked up as ſoon as they peep; for if they are neglected, they will get ſo ſtrong, and the fibres of their roots will be ſo far ſtruck down among the ſeeds, as to endanger the drawing many ſeeds out with them, on weeding the ground. After the young plants appear, they ſhould conſtantly be kept clear of weeds during the next ſummer; and if they were to be now and then gently refreſhed with water in dry weather, it would prove ſerviceable to them. In the ſpring following they may be taken out of theſe beds, and planted in the nurſery, in which ſituation they may remain till they are of a ſufficient ſize to plant out for ſtandards. The other ſorts are to be propagated by layers; for which purpoſe a few plants for ſtools muſt be procured. The ſtools of the eaſtern horn-beam ſhould be planted a yard, and the other ſorts a yard and a half or two yards aſunder. After theſe plants have made ſome young ſhoots, they ſhould be layered in the autumn, and by that time twelvemonth they will have ſtruck root; at which time, or any time in the winter, or early in the ſpring, they ſhould be taken off, and planted in the nurſery-way, obſerving always to bruſh up the ſtool, that it may afford fine young ſhoots for freſh layering by the autumn following. The diſtance the plants ſhould be allowed in the nurſery need be no more than one foot, in rows that are two feet aſunder; and here they may ſtand, with the uſual nurſery care of weeding and digging the rows in winter, until they are to be finally planted out.

CARPOBALSAM, an old article in the Materia Medica, denotes the fruit of the tree which yields the true oriental balſam. The carpobalſam was uſed in Egypt, according to Proſper Alpinus, in all the intentions in which the balſam itſelf was employed.

CARPOCRATIANS, a branch of the ancient Gnoſtics, ſo called from *Carpocrates,* who in the ſecond century revived and improved upon the errors of Simon Magus, Menander, Saturninus, and other Gnoſtics. He owned, with them, one ſole principle, the father of all things, whoſe name as well as nature was unknown. The world, he taught, was created by angels, vaſtly inferior to the firſt principle. He oppoſed the divinity of Jeſus Chriſt; making him a mere man begotten carnally on the body of Mary by Joſeph, though poſſeſſed of uncommon gifts which ſet him above other creatures. He inculcated a community of women; and taught, that the ſoul could not be purified, till it had committed all kinds of abominations, making that a neceſſary condition of perfection.

CARPOLITHI, or FRUIT-STONE ROCKS of the Germans, are compoſed of a kind of jaſper, of the nature of the amygdaloides, or almond ſtones. Bertrand aſſerts that the latter are thoſe which appear to be compoſed of elliptical pieces like petrified almonds, though in truth they are only ſmall oblong pieces of calcareous ſtone rounded by attrition, and ſometimes ſmall muſcle ſhells connected by a ſtony concretion. The name of Carpolithi, however, is given in general by writers on foſſils, to all ſorts of ſtony concretions that have any reſemblance to fruit of whatever kind.

CARPUS, the wriſt. See ANATOMY, page 167.

CARR, a kind of rolling throne, uſed in triumphs, and at the ſplendid entries of princes. See CHARIOT. The word is from the ancient Gauliſh, or Celtic, *Carr;* mentioned by Cæſar, in his Commentaries, under the name *Carrus.* Plutarch relates, that Camillus having entered Rome in triumph, mounted on a carr drawn by four white horſes, it was looked on as too haughty an innovation.

CARR is alſo uſed for a kind of light open chariot. The carr, on medals, drawn either by horſes, lions, or elephants, uſually ſignifies either a triumph or an apotheoſis; ſometimes alſo a proceſſion of the images of the gods at a ſolemn ſupplication, and ſometimes of thoſe of ſome illuſtrious family at a funeral. The carr covered, and drawn by mules, only ſignifies a conſecration, and the honour done any one of having his image carried at the games of the circus. See CONSECRATION, &c.

CARRAC, or CARRACA, a name given by the Portugueſe to the veſſels they ſend to Braſil and the Eaſt Indies; being very large, round built, and fitted for fight as well as burden. Their capacity lies in their depth, which is very extraordinary. They are narrower above than underneath, and have ſometimes ſeven or eight floors; they carry about 2000 tons, and are capable of lodging 2000 men; but of late they are little uſed. Formerly they were alſo in uſe among the knights of Rhodes, as well as among the Genoeſe, and other Italians. It is a cuſtom among the Portugueſe, when the carracs returned from India, not to bring any boat or ſloop for the ſervice of the ſhip beyond the iſland of St. Helena; at which place they ſink them on purpoſe, in order to take from the crew all hopes or poſſibility of ſaving themſelves, in caſe of ſhipwreck.

CARRARA MARBLE, among our artificers, the name of a ſpecies of white marble, which is called *marmor lunenſe,* and *liguſtrium* by the ancients: it is diſtinguiſhed from the Parian, now called the ſtatuary marble, by being harder and leſs bright.

CARRAVEIRA, a town of Turkey in Europe, with a Greek archbiſhop's ſee. E. long. 22. 25. N. lat. 40. 27.

CARRIAGE, a vehicle ſerving to convey perſons, goods, merchandizes, and other things, from one place to another. For the conſtruction and mechanical principles of wheel-carriages, ſee MECHANICS.

CARRIAGE *of a cannon,* the frame or timber-work on which it is mounted, ſerving to point it for firing, or to carry it from one place to another. It is made of two planks of wood, commonly of one-half the length of the gun, called the cheeks, and joined by three wooden tranſums, ſtrengthened with three bolts of iron. It is mounted on two wheels, but on a march has two fore-wheels with limbers added. The principal parts of a carriage are the cheeks, tranſums, bolts, plates, trainbands, bridge, bed, hooks, trunnion holes, and capſquare.

Block-CARRIAGE, a cart made on purpoſe for carrying mortars and their beds from place to place.

Truck-CARRIAGE, two ſhort planks of wood, ſupported on two axle-trees, having four trucks of ſolid wood for carrying mortars or guns upon a battery, where their own carriages cannot go. They are drawn by men.

CARRICK, the ſouthern diviſion of the ſhire of Ayr in Scotland. It borders on Galloway; ſtretches 32 miles in length; and is a hilly country fit for paſturage. The chief rivers are the Stencher and Girven, both abounding with ſalmon; here are alſo ſeveral lakes and foreſts; and the people on the coaſt employ themſelves in the herring-fiſhery, though they have no harbour of any conſequence. The only towns of this diſtrict are Bargeny and Maybole, two inconſiderable villages, yet the firſt gave the title (now extinct) of baron to a branch of the Hamilton family. The prince of Wales, as prince of Scotland, is earl of Carrick.

CARRICK *on Sure,* a town of Ireland, in Tipperary, 14

miles N. W. of Waterford. Long. 7. 10. W. Lat. 52. 34. N.

CARRICK-*Fergus*, a borough of Ireland, in the county of Antrim. It is rich and populous, with a good harbour and a caſtle, and is ſeated on a bay of the Iriſh Channel of the ſame name; 85 miles N. of Dublin. Long. 5. 46. W. Lat. 54. 43. N.

CARRIER, is a perſon that carries goods for others for hire. A common carrier, having the charge and carriage of goods, is to anſwer for the ſame, or the value, to the owner. And where goods are delivered to a carrier, and he is robbed of them, he ſhall be charged and anſwer for them, becauſe of the hire. If a common carrier who is offered his hire, and who has convenience, refuſes to carry goods, he is liable to an action, in the ſame manner as an inn-keeper who refuſes to entertain a gueſt. (See ASSUMPSIT) One brought a box to a carrier, with a large ſum of money, and the carrier demanded of the owner what was in it; he anſwered, that it was filled with ſilks, and ſuch like goods: upon which the carrier took it, and was robbed, and adjudged to make it good; but a ſpecial acceptance, as, *provided there is no charge of money*, would have excuſed the carrier. A perſon delivered to a carrier's book-keeper two bags of money ſealed up, to be carried from London to Exeter, and told him that it was 200l. and took his receipt for the ſame, with promiſe of delivery for 10s. *per cent.* carriage and riſk: though it be proved that there was 400l. in the bags, if the carrier be robbed, he ſhall anſwer only for 200l. becauſe there was a particular undertaking for that ſum and no more; and his reward, which makes him anſwerable, extends no farther. If a common carrier loſes goods which he is intruſted to carry, a ſpecial action on the caſe lies againſt him, on the cuſtom of the realm, and not trover; and ſo of a common carrier by boat. An action will lie againſt a porter, carrier, or barge-man, upon his bare receipt of the goods, if they are loſt through negligence. Alſo a lighter-man ſpoiling goods he is carrying, by letting water come to them, action of the caſe lies againſt him, on the common cuſtom.

CARRIER-*Pigeon*, or *courier pigeon*, a ſort of pigeon uſed, when properly trained, to be ſent with letters from one place to another. See COLUMBA. Though you carry theſe birds hood-winked, 20, 30, nay, 60 or 100 miles, they will find their way in a very little time to the place where they were bred. They are trained to this ſervice in Turkey and Perſia: and are carried firſt, while young, ſhort flights of half a mile, afterwards more, till at length they will return from the fartheſt part of the kingdom. Every Baſhaw has a baſket of theſe pigeons bred in the ſeraglio, which, upon any emergent occaſion, as an inſurrection, or the like, he diſpatches, with letters tied under their wings, to the ſeraglio; which proves a more ſpeedy method, as well as a more ſafe one, than any other; he ſends out more than one pigeon, however, for fear of accidents. Lithgow aſſures us, that one of theſe birds will carry a letter from Babylon to Aleppo, which is 30 days journey, in 48 hours. This is alſo a very ancient practice: Hirtius and Brutus, at the ſiege of Modena, held a correſpondence with one another by means of pigeons. And Ovid tells us, that Tauroſthenes, by a pigeon ſtained with purple, gave notice to his father of his victory at the Olympic Games, ſending it to him at Ægina.

CARRON, a river of Stirlingſhire in Scotland, which riſes on the ſouth ſide of the Campſey Hills, and flows into the frith of Forth, below Falkirk. Two miles from its ſource, it forms a fine caſcade, called the Fall of Achinlilly; and on its banks are the celebrated Carron Works.

CARRON-*Works*, an extenſive foundry, belonging to the Carron Company, and ſeated on the river Carron, one mile from Falkirk. This foundry conſiſts of the greateſt iron works in Europe. All ſorts of iron goods are made in it, from the moſt trifling article for domeſtic uſe, to a cannon that diſcharges a ball of 42 pounds. Above a thouſand men are here employed; and hence a great quantity of large cannon are exported to Ruſſia, Germany, and other foreign parts. Theſe works were erected in 1761; before which time there was not a ſingle houſe on the ſpot. "Theſe forges," ſays Mr. Gilpin, "exhibit a ſet of infernal ideas. In one place, where coal is converted into coak, by diſcharging it of its ſulphur, and the fire ſpread of courſe over a large ſurface, the columns of ſmoke, the ſpiry flames, and the ſuffocating heat of the glimmering air, are wonderfully affecting. How vaſt the fire is, we may conceive, when we are told, that it often conſumes 100 tons of coal in a day. At night, its glare is inconceivably grand. The maſſy bellows which rouſe the furnaces are put in motion by water, and, receiving the air in large cylinders, force it out again through ſmall orifices, roaring with aſtoniſhing noiſe. The fire of the furnace thus rouſed, becomes a glowing ſpot, which the eye can no more look at than at the ſun. Under ſuch intenſe heat, the rugged ſtone inſtantly diſſolves in ſtreams of liquid iron." The preſent proprietors are a chartered company, with a capital of 150,000l. ſterling, a common ſeal, &c. but their ſtock is confined to a very few individuals.

CARRONADE, a ſhort kind of ordnance, capable of carrying a large ball, and uſeful in cloſe engagements at ſea. It takes its name from Carron, the place where this ſort of ordnance was firſt made, or the principle applied to an improved conſtruction. See the above article, and GUNNERY.

CARROT, in Botany. See DAUCUS.

Deadly Carrot. See THAPSIA.

CARROUSAL, a courſe of horſes and chariots, or a magnificent entertainment exhibited by princes on ſome public rejoicing. It conſiſts in a cavalcade of ſeveral gentlemen, richly dreſſed and equipped after the manner of ancient cavaliers, divided into ſquadrons meeting in ſome public place, and practiſing juſts, tournaments, &c. The laſt carrouſals were in the reign of Louis XIV. The word comes from the Italian word *carofello*, a diminutive of *carro*, "chariot." Tertullian aſcribes the invention of carrouſals to Circe; and will have them inſtituted in honour of the Sun, her father; whence ſome derive the word from *carrus*, or *carrus ſolis*. The Moors introduced cyphers, liveries, and other ornaments of their arms, with trappings, &c. for their horſes. The Goths added creſts, plumes, &c.

CARRUCA, in antiquity, a ſplendid kind of carr, or chariot, mounted on four wheels, richly decorated with gold, ſilver, ivory, &c. in which the emperors, ſenators, and people of condition, were carried. The word comes from the Latin *carrus*, or Britiſh carr, which is ſtill the Iriſh name for any wheel-carriage.

CARRUCA, or CARUCA, is alſo uſed in middle-age writers for a plough.

CARRUCA was alſo ſometimes uſed for *carrucata*. See CARRUCATE.

CARRUCAGE, *carrucagium*, a kind of tax anciently impoſed on every plough, for the public ſervice. See CARRUCATE and HIDAGE.

CARRUCAGE, CARUCAGE, or CARUAGE, in huſbandry, denotes the ploughing of ground, either ordinary, as for grain, hemp, and flax; or extraordinary, as for woad, dyers weed, rape, &c.

CARRUCATE, *carrucata*, in our ancient laws and hiſtory, denotes a plough land, or as much arable ground as can be tilled in one year with one plough. In Doomſday Inquiſition, the arable land is eſtimated in carrucates, the paſture in hides, and the meadow in acres. Skene makes the *carrucata* the ſame with *hilda* or *hida terræ*; Littleton the ſame with ſoc. The

meaſure of a carrucate appears to have differed in reſpect of place as well as time. In the reign of Richard I. it was eſtimated at 60 acres, and in another charter of the ſame reign at 100 acres: in the time of Edward I. at 180 acres; and in the 23d of Edward III. a carrucate of land in Burceſter contained 112 acres, and in Middleton 150 acres. By a ſtatute under William III. for charging perſons to the repair of the highways, a plough-land is rated at 50 *l. per annum*, and may contain houſes, mills, wood, paſture, &c.

CARRYING, in falconry, ſignifies a hawk's flying away with the quarry. Carrying is one of the ill qualities of a hawk, which ſhe acquires either by a diſlike of the falconer, or not being ſufficiently broke to the lure.

Carrying, among huntſmen. When a hare runs on rotten ground, or even ſometimes in a froſt, and it ſticks to her feet, they ſay ſhe carries.

Carrying, among riding-maſters. A horſe is ſaid to carry low, when, having naturally an ill-ſhaped neck, he lowers his head too much. All horſes that arm themſelves carry low, but a horſe may carry low without arming. A French branch or gigot is preſcribed as a remedy againſt carrying low. A horſe is ſaid to carry well, when his neck is raiſed or arched, and he holds his head high and firm, without conſtraint.

Carrying *Wind*, a term uſed by our dealers in horſes to expreſs ſuch a one as frequently toſſes his noſe as high as his ears, and does not carry handſomely. This is called *carrying wind*; and the difference between carrying in the wind, and beating upon the hand, is this: that the horſe that beats upon the hand, ſhakes the bridle and reſiſts it, while he ſhakes his head; but the horſe that carries in the wind puts up his head without ſhaking, and ſometimes beats upon the hand. The oppoſite to carrying in the wind, is arming and carrying low; and even between theſe two there is a difference in wind.

CARS, or Kars, a conſiderable and ſtrong town of Aſia, in Armenia, ſeated on a river of the ſame name, with a caſtle almoſt impregnable. E. long. 43. 50. N. lat. 41. 30.

CARSE, or *Carſe of Gowry*, a diſtrict of Perthſhire in Scotland. It lies on the north ſide of the Tay, and extends 14 miles in length from Dundee to Perth, and is from two to four in breadth.

CARSTAIRS (William), an eminent Scots divine, whoſe merit and good fortune called him to act in great ſcenes, and to aſſociate with men to whoſe ſociety and intercourſe his birth gave him few pretenſions to aſpire. A ſmall village in the neighbourhood of Glaſgow was the place of his nativity. His father, of whom little is known, exerciſed the functions of a clergyman. Young Carſtairs turned his thoughts to the profeſſion of theology; and the perſecutions and oppreſſions of government, both in regard to civil and religious liberty, having excited his ſtrongeſt indignation, it became a matter of prudence that he ſhould proſecute his ſtudies in a foreign univerſity. He went accordingly to Utrecht, where he became acquainted with penſionary Fagel, and entered with warmth into the intereſt of the prince of Orange. His prudence, his reſerve, and his political addreſs, were ſtrong recommendations of him to that prince, who employed him in perſonal negotiations in Holland, England, and Scotland, and, on being elevated to the Engliſh throne, alſo appointed him his chaplain for Scotland. William, who carried politics into religion, was ſolicitous that epiſcopacy ſhould prevail there as univerſally as in England. Carſtairs, more verſant in the affairs of his native country, ſaw all the impropriety of this project, and the danger that would ariſe from the enforcing of it. His reaſonings, his remonſtrances, his entreaties, overcame the firmneſs of king William. He yielded to conſiderations founded alike in policy and in prudence; and to Carſtairs Scotland is indebted for the full eſtabliſhment of its church in the Preſbyterian form of government.

The death of king William was a ſevere affliction to him; and it happened before that prince had provided for him with the liberality he deſerved. He was continued, however, in the office of chaplain for Scotland by queen Anne; and he was invited to accept the principalty of the univerſity of Edinburgh. He was one of the miniſters of the city, and four times moderator of the general aſſembly. Placed at the head of the church, he proſecuted its intereſt with zeal and with integrity. Nor were his influence and activity confined to matters of religion. They were exerted with ſucceſs in promoting the culture of the arts and ſciences. The univerſities of Scotland owe him obligations of the higheſt kind. He procured, in particular, an augmentation of the ſalaries of their profeſſors; a circumſtance to which may be aſcribed their reputation, as it enabled them to cultivate with ſpirit the different branches of knowledge.

A zeal for truth, a love of moderation and order, prudence, and humanity, diſtinguiſhed principal Carſtairs in an uncommon degree. His religion had no mixture of auſterity; his ſecular tranſactions were attended with no imputation of artifice; and the verſatility of his talents made him paſs with eaſe from a court to a college. He was among the laſt who ſuffered torture before the privy-council, in order to make him divulge the ſecrets intruſted to him, which he firmly reſiſted; and after the revolution, that inhuman inſtrument the thumb-ſcrew was given to him as a preſent by the council. This excellent perſon died in 1715: and in 1774 his *State-papers and Letters*, with an account of his life, were publiſhed in one vol. 4to, by the Rev. Dr. M'Cormick.

CARSUGHI (Rainier), a Jeſuit, born at Citerna in Tuſcany, in 1647, was author of a Latin poem, entituled, *Ars bene ſcribendi*, which is eſteemed both for the elegance of the ſtyle and for the excellent precepts it contains. He alſo wrote ſome good epigrams. He died in 1709.

CARTAMA, a town of Spain in the kingdom of Grenada, formerly very conſiderable. It is ſeated at the foot of a mountain, near the river Guadala-Medina, in W. long. 4. 28. N. lat. 36. 40.

CART, a land carriage with two wheels, drawn commonly by horſes, to carry heavy goods, &c. from one place to another. The word ſeems formed from the French *charrette*, which ſignifies the ſame, or rather the Latin *carreta*, a diminutive of *carrus*. See Carr. In London and Weſtminſter, carts ſhall not carry more than twelve ſacks of meal, ſeven hundred and fifty bricks, one chaldron of coals, &c. on pain of forfeiting one of the horſes (6 Geo. I. cap. 6.). By the laws of the city, carr-men are forbidden to ride either on their carts or horſes. They are to lead or drive them on foot through the ſtreets on the forfeiture of ten ſhillings (Stat. 1 Geo. I. cap. 57.). Criminals uſed to be drawn to execution in a cart. Bawds and other malefactors are whipped at the cart's tail. Scripture makes mention of a ſort of carts or drags uſed by the Jews to do the office of threſhing. They were ſupported on low thick wheels, bound with iron, which were rolled up and down on the ſheaves, to break them, and force out the corn. Something of the like kind alſo obtained among the Romans, under the denomination of *plauſtra*, of which Virgil makes mention, Georg. I.

Cart-*Bote*, in law, ſignifies wood to be employed in making and repairing inſtruments of huſbandry.

Carts *of War*, a peculiar kind of artillery anciently in uſe among the Scots. They are thus deſcribed in an act of parliament, A. D. 1456: "It is thocht ſpeidfull, that the king mak requeiſt to certain of the great burrous of the land that are of ony myght, to mak carts of weir, and in ilk cart twa

gunnis, and ilk ane to have twa chalmers, with the remanent of the graith that effeirs thereto, and an cunnand man to ſhut thame." By another act, A. D. 1471, the prelates and barons are commanded to provide ſuch carts of war againſt their old enemies the Engliſh.

CARTE (Thomas), the hiſtorian, was the ſon of Mr. Samuel Carte prebendary of Lichfield, and born in 1686. When he was reader in the abbey-church at Bath, he took occaſion in a 30th of January ſermon, 1714, to vindicate Charles I. with reſpect to the Iriſh maſſacre, which drew him into a controverſy with Mr. Chandler the diſſenting miniſter; and on the acceſſion of the preſent royal family he refuſed to take the oaths to government, and put on a lay habit. He is ſaid to have acted as a kind of ſecretary to Biſhop Atterbury before his troubles; and in the year 1722, being accuſed of high treaſon, a reward of 1000l. was offered for apprehending him: but Queen Caroline, the great patroneſs of learned men, obtained leave for him to return home in ſecurity. He publiſhed, 1. An edition of Thuanus, in ſeven volumes, folio. 2. The life of the firſt Duke of Ormond, three volumes, folio. 3. The hiſtory of England, 4 volumes, folio. 4. A Collection of original letters and papers concerning the affairs of England, two volumes, octavo; and ſome other works. He died in April, 1754. His hiſtory of England ends in 1654. His deſign was to have brought it down to the Revolution; for which purpoſe he had taken great pains in copying every thing valuable that could be met with in England, Scotland, France, Ireland, &c. At his death, all his papers fell into the hands of his widow, who afterwards married Mr. Jernegan, a member of the church of Rome. They are now depoſited in the Bodleian library, having been delivered by Mr. Jernegan to the univerſity, 1778, for a valuable conſideration. Whilſt they were in this gentleman's poſſeſſion, the earl of Hardwicke paid 200l. for the peruſal of them. For a conſideration of 300l. Mr. Macpherſon had the uſe of them; and from theſe and other materials compiled his hiſtory and ſtate-papers. Mr. Carte was a man of a ſtrong conſtitution and indefatigable application. When the ſtudies of the day were over, he would eat heartily, and in converſation was cheerful and entertaining.

CARTE-*blanche*, a ſort of white paper, ſigned at the bottom with a perſon's name, and ſometimes alſo ſealed with a ſeal, giving another perſon power to ſuperſcribe what conditions he pleaſes. Much like this is the French *blanc ſigne*, a paper without writing, except a ſignature at the bottom, given by contending parties to arbitrators or friends, to fill up with the conditions they judge reaſonable, in order to end the difference.

CARTEL, an agreement between two ſtates for the exchange of their priſoners of war.

CARTEL ſignifies alſo a letter of defiance or a challenge to decide a controverſy either in a tournament or in a ſingle combat. See DUEL.

CARTEL-*Ship*, a ſhip commiſſioned in time of war to exchange the priſoners of any two hoſtile powers; alſo to carry any particular requeſt or propoſal from one to another: for this reaſon the officer who commands her is particularly ordered to carry no cargo, ammunition, or implements of war, except a ſingle gun for the purpoſe of firing ſignals.

CARTES (René des), deſcended of an ancient family in Touraine in France, was one of the moſt eminent philoſophers and mathematicians in the 17th century. At the Jeſuits College at La Fleche, he made a very great progreſs in the learned languages and polite literature, and became acquainted with Father Marſenne. His father deſigned him for the army; but his tender conſtitution then not permitting him to expoſe himſelf to ſuch fatigues, he was ſent for to Paris, where he launched into gaming, in which he had prodigious ſucceſs. Here Marſenne perſuaded him to return to ſtudy; which he purſued till he went to Holland, in May 1616, where he engaged as a volunteer among the prince of Orange's troops. While he lay in garriſon at Breda, he wrote a *treatiſe on muſic*, and laid the foundation of ſeveral of his works. He was at the ſiege of Rochelle in 1628; returned to Paris; and, a few days after his return, at an aſſembly of men of learning in the houſe of Monſignor Bagni, the Pope's Nuncio, was prevailed upon to explain his ſentiments with regard to philoſophy, when the nuncio urged him to publiſh his ſyſtem. Upon this he went to Amſterdam, and from thence to Franeker, where he began his *metaphyſical meditations*, and drew up his *diſcourſe on meteors*. He made a ſhort tour to England; and, not far from London, made ſome obſervations concerning the declination of the magnet. He returned to Holland, where he finiſhed his *treatiſe on the world*. His books made a great noiſe in France; and Holland thought of nothing but diſcarding the old philoſophy, and following his. Voetius being choſen rector of the univerſity of Utrecht, cauſed his philoſophy to be prohibited, and wrote againſt him; but he immediately publiſhed a vindication of himſelf. In 1647 he took a journey into France, where the king ſettled a penſion of 3000 livres upon him. Chriſtina, queen of Sweden, having invited him into that kingdom, he went thither, where he was received with the greateſt civility by her majeſty, who engaged him to attend her every morning at five o'clock, to inſtruct her in philoſophy, and deſired him to reviſe and digeſt all his writings which were unpubliſhed, and to form a complete body of philoſophy from them. She likewiſe propoſed to allow him a revenue, and to form an academy of which he was to be the director. But thoſe deſigns were broken off by his death in 1650. His body was interred at Stockholm, and 17 years afterwards removed to Paris, where a magnificent monument was erected to him in the church of St. Genevieve du Mont. The great Dr. Halley, in a paper concerning optics, obſerves, that though ſome of the ancients mention refraction as an effect of tranſparent mediums, Des Cartes was the firſt who diſcovered the laws of refraction, and reduced dioptrics to a ſcience. As to his philoſophy, Dr. Keil, in his Introduction to his Examination of Dr. Burnet's Theory of the Earth, ſays, that Des Cartes was ſo far from applying geometry to natural philoſophy, that his whole ſyſtem is one continued blunder on account of his negligence in that point; the laws obſerved by the planets in their revolutions round the ſun not agreeing with his theory of vortices. His philoſophy has accordingly given way to the more accurate diſcoveries and demonſtrations of the Newtonian ſyſtem.

CARTESIANS, a ſect of philoſophers, who adhered to the ſyſtem of Des Cartes, founded on the two following principles, the one metaphyſical, the other phyſical. The metaphyſical one is, *I think, therefore I am*: the phyſical principle is, that *nothing exiſts but ſubſtance*. Subſtance he makes of two kinds; the one a ſubſtance that thinks, the other a ſubſtance extended; whence actual thought, and actual extenſion, are the eſſence of ſubſtance. The eſſence of matter being thus fixed in extenſion, the Carteſians conclude that there is no vacuum, nor any poſſibility thereof in nature; but that the univerſe is abſolutely full: mere ſpace is excluded by this principle; becauſe extenſion being implied in the idea of ſpace, matter is ſo too. Upon theſe principles, the Carteſians explained mechanically how the world was formed, and how the preſent celeſtial phenomena came to take place.

CARTHAGE, a famed city of antiquity, the capital of Africa Propria; and which, for many years, diſputed with Rome the ſovereignty of the world. According to Velleius Paterculus, this city was built 65, according to Juſtin and Trogus 72, according to others 100 or 140 years before the foundations of Rome were laid. It is on all hands agreed, that the Phœnicians were the founders. The beginning of the

Carthaginian hiſtory, like that of all other nations, is obſcure and uncertain. About 503 years before the birth of Chriſt, the Carthaginians entered into a treaty with the Romans. It related chiefly to matters of navigation and commerce. From it we learn, that the whole iſland of Sardinia, and part of Sicily, were then ſubject to Carthage; that they were very well acquainted with the coaſts of Italy, and had made ſome attempts upon them before this time; and that, even at this early period, a ſpirit of jealouſy had taken place between the two republics. The character tranſmitted of the Carthaginians is extremely bad; but we have it only on the authority of the Romans, who being their implacable enemies cannot be much relied on. As to their religion, manners, &c. theſe were much the ſame with the Phœnicians, of which they were a colony.

On the ruins of Carthage there now ſtands only a ſmall village called *Melcha*. The few remains of Carthage conſiſt only of ſome fragments of walls and 17 ciſterns for the reception of rain-water. Theſe are to be ſeen on the coaſt of the Mediterranean, 10 miles N. E. of Tunis, near a promontory called *Cape Carthage*. Long. 10. 25. E. Lat. 36. 50. N. The preſent ruins are by no means the remains of the ancient city deſtroyed by the Romans; who, after taking it, entirely eraſed it, and ploughed up the very foundations; ſo truly did they adhere to the well-known advice perpetually inculcated by Cato the Elder, *Delenda eſt Carthago*. It was again built by the Gracchi family, who conducted a colony to re-people it: and continually increaſing in ſplendour, it became at length the capital of Africa under the Roman emperors. It ſubſiſted near 700 years after its firſt demolition, until it was entirely deſtroyed by the Saracens in the beginning of the 7th century.

It is a ſingular circumſtance, that the two cities of Carthage and Rome ſhould have been built juſt oppoſite one to the other; the bay of Tunis and the mouth of the Tiber being in a direct line.

New-CARTHAGE, a conſiderable town of Mexico, in the province of Coſtarica. It is a very rich trading place. W. long. 86. 7. N. lat. 9. 5.

CARTHAGENA, a large, rich, and ſtrong town of S. America, on the coaſt of Terra Firma, with a biſhop's ſee, and one of the beſt harbours in America. The entrance is ſo narrow, that only one ſhip can enter at a time; and it is defended by three forts. All the revenues of the king of Spain from New Grenada and Terra Firma are brought to this place. It was taken by the Engliſh in 1585, and by the French in 1697, who found a great booty: but admiral Vernon, in 1741, though he had taken the caſtles, was obliged to abandon the ſiege. Long. 75. 22. W. Lat. 10. 27. N.

CARTHAGENA, a ſea-port town of Spain, in the kingdom of Murcia, and capital of a territory of the ſame name; built by Aſdrubal, a Carthaginian general, and named after Carthage. It has the beſt harbour in all Spain, but nothing elſe very conſiderable; the biſhop's ſee being transferred to Toledo. In 1706 it was taken by Sir John Leake; but the duke of Berwick retook it afterwards. W. long. 0. 58. N. lat. 37. 36.

CARTHAMUS, in botany; a genus of the order of polygamia æqualis, belonging to the ſyngeneſia claſs of plants, and in the natural method ranking under the 49th order, *Compoſitæ*. The calyx is ovate, imbricated with ſcales, cloſe below, and augmented with ſubovate foliaceous appendices at top. Of this genus there are nine ſpecies; but the only remarkable one is the tinctorius, with a ſaffron-coloured flower. This is a native of Egypt, and ſome of the warm parts of Aſia. It is at preſent cultivated in many parts of Europe, and alſo in the Levant, from whence great quantities of it are annually imported into Britain for the purpoſes of dyeing and painting. It is an annual plant, and riſes with a ſtiff ligneous ſtalk, about two feet and a half or three feet in height, dividing upwards into many branches, garniſhed with oval pointed leaves ſitting cloſe to the branches. The flowers grow ſingle at the extremity of each branch; the heads of the flowers are large, incloſed in a ſcaly empalement; each ſcale is broad at the baſe, flat, and formed like a leaf of the plant, terminating in a ſharp ſpine. The lower part of the empalement ſpreads open; but the ſcales above cloſely embrace the florets, which are of a fine ſaffron colour, and are the part uſed for the purpoſes above mentioned. The good quality of this commodity is in the colour, which is of a bright ſaffron hue: and in this the Britiſh carthamus very often fails; for if there happens much rain during the time the plants are in flower, the flowers change to a dark or dirty yellow, as they likewiſe do if the flowers are gathered with any moiſture remaining upon them. The plants are propagated by ſeeds, which ſhould be ſown in drills, at two feet and a half diſtance from one another, in which the ſeeds ſhould be ſcattered ſingly. The plants will appear in leſs than a month; and in three weeks or a month after, it will be proper to hoe the ground; at which time the plants ſhould be left ſix inches diſtant: after this they will require a ſecond hoeing; when they muſt be thinned to the diſtance at which they are to remain. If after this they are hoed a third time, they will require no farther care till they come to flower; when, if the ſafflower is intended for uſe, the florets ſhould be cut off from the flowers as they come to perfection: but this muſt be performed when they are perfectly dry; and then they ſhould be dried in a kiln with a moderate fire, in the ſame manner as the true ſaffron. But in thoſe flowers which are propagated for ſeeds, the florets muſt be cut off, or the ſeeds will prove abortive. The ſeeds of carthamus have been celebrated as a cathartic; but they operate very ſlowly, and for the moſt part diſorder the ſtomach and bowels, eſpecially when given in ſubſtance. Triturated with diſtilled aromatic waters, they form an emulſion leſs offenſive, but inferior in efficacy to the more common purgatives. They are greedily eaten by a ſpecies of Egyptian parrot, though to other birds or beaſts they are ſaid to prove poiſonous.

CARTHUSIANS, a religious order founded in the year 1080, by one Bruno. The Carthuſians, ſo called from the deſert of *Chartreux*, the place of their inſtitution, are remarkable for the auſterity of their rule. They are not to go out of their cells, except to church, without leave of their ſuperior, nor ſpeak to any perſon without leave. They muſt not keep any portion of their meat or drink till next day; their beds are of ſtraw, covered with a felt; their clothing two hair-cloths, two cowls, two pair of hoſe, and a cloak, all coarſe. In the refectory, they are to keep their eyes on the diſh, their hands on the table, their attention on the reader, and their hearts fixed on God. Women are not allowed to come into their churches. It is computed that there are 172 houſes of Carthuſians; whereof five are of *Nuns*, who practiſe the ſame auſterities as the Monks. They are divided into 16 provinces; each of them has two viſitors. There have been ſeveral canonized ſaints of this order, four cardinals, 70 archbiſhops and biſhops, and a great many very learned writers.

CARTHUSIAN-*Powder*, the ſame with the exploded medicine called kermes-mineral. See KERMES.

CARTILAGE, in anatomy, a body approaching to the nature of bone; but ſmooth, flexible, and elaſtic. See ANATOMY, p. 168.

CARTILAGINOUS, in ichthyology, a title given to all fiſh whoſe muſcles are ſupported by cartilages inſtead of bones: and comprehends the ſame genera of fiſh to which Linnæus has given the name of *amphibia nantes*: but the word *amphibia* ought properly to be confined to ſuch animals as inhabit both elements; and can live, without any inconvenience, for a conſi-

derable time, either on land or in water; such as tortoises, frogs, and several species of lizards; and among the quadrupeds, hippopotami, &c. &c. Many of the cartilaginous fish are viviparous, being excluded from an egg, which is hatched within them. The egg consists of a white and a yolk; and is lodged in a case formed of a thick tough substance, not unlike softened horn: such are the eggs of the *ray* and *shark* kinds. Some again differ in this respect, and are oviparous: such is the *sturgeon*, and others. They breathe either through certain apertures beneath, as in the *rays*; on their sides, as in the *sharks*, &c. or on the top of the head, as in the *pipe-fish*: for they have not covers to their gills like the bony fish.

CARTMEL, a town of Lancashire in England. It is seated among the hills called Cartmel-fells, not far from the sea, and near the river Kent: adorned with a very handsome church, built in the form of a cross like a cathedral. The market is well supplied with corn, sheep, and fish. W. long. 2. 43. N. lat. 54. 15.

CARTON, or CARTOON, in painting, a design drawn on strong paper, to be afterwards calked through, and transferred on the fresh plaster of a wall to be painted in fresco. It is also used for a design coloured, for working in mosaic, tapestry, &c. The word is from the Italian *Cartoni*, (*carta* "paper," and *oni* "large") denoting many sheets of paper pasted on canvas, on which large designs are made, whether coloured or with chalks only. Of these many are to be seen at Rome, particularly by Domenichino. Those by Andrea Mantegna, which are at Hampton Court, were made for paintings in the old ducal palace at Mantua. But the most famous performances of this sort are those of Raphael.

The *Cartoons of Raphael*, so deservedly applauded throughout Europe, are seven in number, and form only a small part of the sacred historical designs executed by that great artist, while engaged in the chambers of the Vatican under the auspices of Popes Julius II. and Leo X. When finished, they were sent to Flanders, to be copied in tapestry, for adorning the pontifical apartments: which tapestries were not sent to Rome till several years after the decease of Raphael, and even in all probability were not finished and sent there before the terrible sack of that city in the time of Clement VII. when Raphael's scholars were fled from thence, and none left to enquire after the original Cartoons, which lay neglected in the store-rooms of the manufactory. The great revolution also which followed in the Low Countries prevented their being noticed amidst the entire neglect of the works of art. It was therefore a most fortunate circumstance that these seven escaped the wreck of the others, which were torn in pieces, and remain dispersed as fragments in different collections. These seven were purchased by Rubens for Charles I. and they have been so roughly handled from the first, that holes were pricked for the weavers to pounce the outlines; and other parts were almost cut through in tracing them. In this state too they as fortunately escaped the sale amongst the royal collection, by the disproportionate appraisement of these seven at 300l. and the nine pieces, being the Triumph of Julius Cæsar by Andrea Mantegna, appraised at 1000l. They seem to have been taken little notice of till King William built a gallery, purposely to receive them, at Hampton Court; whence they were moved to the Queen's Palace; but they are now at Windsor Castle, where they may be seen.

CARTOUCHE, in architecture and sculpture, an ornament representing a scroll of paper. It is usually a flat member, with wavings, to represent some inscription, device, cypher, or ornament of armoury. They are, in architecture, much the same as modillions; only these are set under the cornice in wainscoting, and those under the cornice of the eaves of a house.

CARTOUCHE, in the military art, a case of wood, about three inches thick at the bottom, girt with marlin, holding about four hundred musket-balls, besides six or eight balls of iron, of a pound weight, to be fired out of a hobit, for the defence of a pass, &c. A cartouche is sometimes made of a globular form, and filled with a ball of a pound weight; and sometimes it is made for the guns, being of a ball of half or quarter of a pound weight, according to the nature of the gun, tied in form of a bunch of grapes, on a tompion of wood, and coated over.

CARTRIDGE, in the military art, a case of pasteboard or parchment, holding the exact charge of a fire-arm. Those for muskets, carabines, and pistols, hold both the powder and ball for the charge; and those of cannon and mortars are usually in cases of pasteboard or tin, sometimes of wood, half a foot long, adapted to the caliber of the piece.

CARTRIDGE-*Box*, a case of wood or turned iron, covered with leather, holding a dozen musket-cartridges. It is worn upon a belt, and hangs a little lower than the right pocket-hole.

CARTWRIGHT (William), an eminent divine and poet, born at Northway, near Tewksbury, in Gloucestershire, in September 1611. He finished his education at Oxford; afterwards went into holy orders, and became a most florid preacher in the university. In 1642 he had the place of succentor in the church of Salisbury; and, in 1643, was chosen junior proctor in the university. He was also metaphysical reader there. Wit, judgment, elocution, a graceful person and behaviour, occasioned that encomium of him from dean Fell, "That he was the utmost that man could come to." He was an expert linguist; an excellent orator; and at the same time was esteemed an admirable poet. There are extant of his, four plays, and some poems. He died in 1643, aged 33.

CARVAGE, *carvagium*, the same with CARRUCAGE. Henry III. is said to have taken carvage, that is, two marks of silver of every knight's fee, towards the marriage of his sister Isabella to the emperor. Carvage could only be imposed on the tenants *in capite*.

CARVAGE also denotes a privilege whereby a man is exempted from the service of carrucage.

CARUCATURIUS, in ancient law books, he that held land in soccage, or by plough tenure.

CARUCATE. See CARRUCATE.

CARVER, a cutter of figures or other devices in wood. See CARVING. Carvers answer to what the Romans called *sculptores*, who were different from *cælatores*, or engravers, as these last wrought in metal.

CARVER is also an officer of the table, whose business is to cut up the meat, and distribute it to the guests. The word is formed from the Latin *carptor*, which signifies the same. The Romans also called him *carpus*, sometimes *scissor*, *scindendi magister*, and *structor*. In the great families at Rome, the carver was an officer of some figure. There were masters to teach them the art regularly, by means of figures of animals cut in wood. The Greeks also had their carvers, called δαιτροι, q. d. *deribitores*, or *distributors*. In the primitive times, the master of the feast carved for all his guests. Thus in Homer, when Agamemnon's ambassadors were entertained at Achilles's table, the hero himself carved the meat. Of later times, the same office on solemn occasions was executed by some of the chief men of Sparta. Some derive the custom of distributing to every guest his portion, from those early ages when the Greeks first left off feeding on acorns, and learned the use of corn. The new diet was so great a delicacy, that to prevent the guests from quarrelling about it, it was found necessary to make a fair distribution. In Scotland, the king has an hereditary carver in the family of Anstruther.

CARUI, or CARVI, in botany. See CARUM.

CARVING, in a general sense, the art or act of cutting or

fashioning a hard body, by means of some sharp instrument, especially a chissel. In this sense carving includes statuary and engraving, as well as cutting in wood. In a more particular sense, however, it is the art of engraving or cutting figures in wood, which, according to Pliny, is prior both to statuary and painting. To carve a figure or design, it must be first drawn or pasted on the wood; which done, the rest of the block, not covered by the lines of the design, are to be cut away with little narrow-pointed knives. The wood fittest for the use is that which is hard, tough, and close, as beech, but especially box: to prepare it for drawing the design on, they wash it over with white-lead tempered in water; which better enables it either to bear ink or the crayon, or even to take the impression by chalking. When the design is to be pasted on the wood, this whitening is omitted, and they content themselves with seeing the wood well planed. Then wiping over the printed side of the figure with gum tragacanth dissolved in water, they clap it smooth on the wood, and let it dry: which done, they wet it slightly over, and fret off the surface of the paper gently, till all the strokes of the figure appear distinctly. This done, they fall to cutting or carving, as above.

CARUM, in botany; a genus of the digynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The fruit is ovate, oblong, and striated; the involucrum monophyllous; the petals are carinated or keel-shaped below, and emarginated by their inflection. The species are, 1. The *carui*, or caraway of the shops, grows naturally in many parts of Britain. It is a biennial plant, which rises from seeds one year, flowers the next, and perishes soon after the seeds are ripe. It hath a taper root like a parsnip, but much smaller, which runs deep into the ground, sending out many small fibres, and hath a strong aromatic taste. From the root arise one or two smooth, solid, channelled stalks, about two feet high, garnished with winged leaves, having long naked foot-stalks. 2. The *hispanicum* is also a biennial, and is a native of Spain. It rises with a stronger stalk than the former, which seldom grows more than a foot and a half high; but is closely garnished with fine narrow leaves like those of dill. Both these plants are propagated by seeds, which ought to be sown in autumn. Sheep, goats, and swine, eat this plant; cows and horses are not fond of it. Parkinson says, the young roots of caraway are better eating than parsnips. The tender leaves may be boiled with pot-herbs. The seeds have an aromatic smell, and a warm pungent taste. They are used in cakes, incrusted with sugar, as sweetmeats, and distilled with spirituous liquors, for the sake of the flavour they afford. They are frequently employed as a medicine in flatulent colics and complaints of the stomach.

CARUNCULA, or CARUNCLE, in anatomy, a term denoting a little raw wart or piece of flesh. The term is applied to several parts of the human body. Thus,

CARUNCULÆ *Myrtiformes*, in anatomy, denote fleshy knobs about the size of a myrtle-berry, supposed to owe their origin to the breaking of the hymen in coitu. See ANATOMY, p. 209.

CARUNCLES *in the urethra*, have been said to proceed from a gonorrhœa, or an ulceration of the urethra; but late anatomists, particularly Mr. Hunter, have denied that such substances are ever discovered on dissection, except at a very short way down the urethra.

CARUS, a sudden deprivation of sense and motion, affecting the whole body. See MEDICINE.

CARUS (Marcus Aurelius), was raised from a low station, by his great merit, to be emperor of Rome in 282. He showed himself worthy of the empire; subdued its enemies; and gave the Romans a prospect of happy days, when he was unfortunately killed by lightning in 284.

CARWAR, a town of Asia, on the coast of Malabar in the East Indies, and where the East India Company have a factory, fortified with two bastions. The valleys about it abound in corn and pepper, which last is the best in the East Indies. The woods on the mountains abound with quadrupeds, such as tigers, wolves, monkeys, wild hogs, deer, elks, and a sort of beeves of a prodigious size. The religion of the natives is Paganism; and they have a great many strange and superstitious customs. E. long. 73. 7. N. lat. 15. 0.

CARY (Lucius), Lord viscount Falkland, a young nobleman of great abilities and accomplishments, was born in Oxfordshire about the year 1610. About the time of his father's death in 1633, he was made gentleman of the privy chamber to king Charles I. and afterwards secretary of state. Before the assembling of the long parliament, he had devoted himself to literature, and every pleasure which a fine genius, a generous disposition, and an opulent fortune, could afford. When called into public life, he stood foremost in all attacks on the high prerogatives of the crown; but when civil convulsions came to an extremity, and it was necessary to choose a side, he tempered his zeal, and defended the limited powers that remained to monarchy. He wrote several things both poetical and political; and in some of the king's declarations, supposed to be penned by lord Falkland, we find the first regular definition of the English constitution that occurs in any composition published by authority. His predecessor, the first viscount Cary, was ennobled for being the first who gave king James an account of queen Elizabeth's death.

CARY (Robert), a learned English chronologer, born in Devonshire about the year 1615. On the restoration he was preferred to the archdeaconry of Exeter, but on some pretext was ejected in 1664, and spent the rest of his days at his rectory of Portlemouth, where he died in 1688. He published *Palæologia Chronica*, a chronology of ancient times, in three parts, didactical, apodeictical, and canonical; and translated the hymns of the church into Latin verse.

CARYATES, in antiquity, a festival in honour of Diana surnamed *Caryatis*, held at Caryum, a city of Laconia. The chief ceremony was a certain dance said to have been invented by Castor and Pollux, and performed by the virgins of the place. During Xerxes' invasion, the Laconians not daring to appear and celebrate the customary solemnity, to prevent incurring the anger of the goddess by such an intermission, the neighbouring swains are said to have assembled and sung pastorals or *bucolismi*, which is said to have been the origin of *bucolic* poetry.

CARYATIDES, or CARIATES. See ARCHITECTURE, p. 290.

CARYL (Joseph), a divine of the last century, bred at Oxford, and some time preacher to the society of Lincoln's-inn, an employment he filled with much applause. He became a frequent preacher before the long parliament, a licenser of their books, one of the assembly of divines, and one of the triers for the approbation of ministers; in all which capacities he showed himself a man of considerable parts and learning, but with great zeal against the king's person and cause. On the restoration of Charles II. he was silenced by the act of uniformity, and lived privately in London, where, besides other works, he distinguished himself by a laborious *Exposition of the Book of Job*; and died in 1672.

CARYLL (John), a late English poet, was of the Roman Catholic persuasion, being secretary to queen Mary the wife of James II. and one who followed the fortunes of his abdicating master; who rewarded him, first with knighthood, and then with the honorary titles of earl Caryll and baron Dartford. How long he continued in that service is not known: but he was in England in the reign of queen Anne, and recommended the subject of the "Rape of the Lock" to Mr. Pope, who, on its publication addressed it to him. He was also the intimate

friend of Pope's "Unfortunate Lady." He was the author of two plays: 1. "The English Princess, or the Death of Richard III. 1667," 4to. 2. "Sir Solomon, or the Cautious Coxcomb, 1671," 4to.: and in 1700 he published "The Psalms of David, translated from the Vulgat," 12mo. In Tonson's edition of Ovid's Epistles, that of "Briseis to Achilles" is said to be by Sir John Caryll; and in Nichols's Select Collection of Miscellany Poems, vol. ii. p. 1. the first Eclogue of Virgil is translated by the same ingenious poet. He was living in 1717, and at that time must have been a very old man. See three of his letters in the "Additions to Pope," vol. ii. p. 114.

CARYOCAR, in botany; a genus of the tetragynia order, belonging to the polyandria class of plants. The calyx is quinquepartite, the petals five, the styles more frequently four. The fruit is a plum, with nuclei, and four furrows netted.

CARYOPHYLLÆI, in botany, the name of a very numerous family or order in Linnæus's Fragments of a natural method: containing, besides the class of the same name in Tournefort, many other plants, which from their general appearance seem pretty nearly allied to it. The following are the genera, viz. Agrostema, Cucubalus, Dianthus, Drypis, Gypsophila, Lychnis, Saponaria, Silene, Velazia, Alsine, Arenaria, Bufonia, Cerastium, Cherleria, Glinus, Holosteum, Loeflingia, Moehringia, Polycarpon, Sagina, Spergula, Stellaria, Minuartia, Mollugo, Ortegia, Pharnaceum, Queria. All the plants of this order are herbaceous, and mostly annual. Some of the creeping kinds do not rise an inch, and the tallest exceed not seven or eight feet. See BOTANY, Part III.

CARYOPHYLLUS, the PINK, in botany. See DIANTHUS.

CARYOPHYLLUS, the CLOVE-TREE, in botany; a genus of the monogynia order, belonging to the polyandria class of plants; and in the natural method ranking under the 19th order, *Hesperideæ*. The corolla is tetrapetalous; the calyx tetraphyllous; the berry monospermous below the receptacle of the flower. Of this there is but one species, viz. the aromaticus, which is a native of the Molucca islands, particularly of Amboyna, where it is principally cultivated. The clove-tree resembles, in its bark, the olive; and is about the height of the laurel, which it also resembles in its leaves. No verdure is ever seen under it. It has a great number of branches, at the extremities of which are produced vast quantities of flowers, that are first white, then green, and at last pretty red and hard. When they arrive at this degree of maturity, they are, properly speaking, *cloves*. As they dry, they assume a dark yellowish cast; and, when gathered, become of a deep brown. The season for gathering the cloves is from October to February. The boughs of the trees are then strongly shaken, or the cloves beat down with long reeds. Large cloths are spread to receive them, and they are afterwards either dried in the sun or in the smoke of the bamboo cane. The cloves which escape the notice of those who gather them, and are purposely left upon the tree, continue to grow till they are about an inch in thickness; and these falling off, produce new plants, which do not bear in less than eight or nine years. Those which are called *mother cloves* are inferior to the common sort, but are preserved in sugar by the Dutch, and in long voyages eaten after their meals to promote digestion.

The clove, to be in perfection, must be full sized, heavy, oily, and easily broken; of a fine smell, and of a hot aromatic taste, so as almost to burn the throat. It should make the fingers smart when handled, and leave an oily moisture upon them, when pressed. In the East Indies, and in some parts of Europe, it is so much admired as to be thought an indispensable ingredient in almost every dish. As a medicine, cloves are very stimulating, and possess in an eminent degree the general virtues of substances of that class. Their pungency resides in their essential oil, which is specifically heavier than water. The clove tree is never cultivated in Europe. At Amboyna the Dutch have allotted the inhabitants 4000 parcels of land, on each of which they were at first allowed, and about the year 1720 compelled, to plant about 125 trees, amounting in all to 500,000. Each of these trees produces annually, on an average, more than two pounds of cloves; and consequently the collective produce must weigh more than a million. The cultivator is paid with the specie that is constantly returned to their East India Company, and receives some unbleached cottons which are brought from Coromandel.

CARYOTA, in botany; a genus belonging to the natural order of *Palmæ*. The male calyx is common, the corolla tripartite; the stamina very numerous: the female calyx the same; the corolla tripartite; one pistil, and a dispermous berry.

CASA, in ancient and middle-age writers, is used to denote a cottage or house. Thus CASA *Santa*, denotes the chapel of the holy virgin at Loretto. The *Santa Casa* is properly the house, or rather chamber, in which the blessed virgin is said to have been born, where she was betrothed to her spouse Joseph, where the angel saluted her, the Holy Ghost overshadowed her, and by consequence where the Son of God was conceived or incarnated. Of this building the Catholics tell many wonderful stories too childish to transcribe. The *Santa Casa* or holy chamber consists of one room, forty-four spans long, eighteen broad, and twenty-three high. Over the chimney, in a niche, stands the image called the great *Madona* or Lady, four feet high, made of cedar, and, as they say, wrought by St. Luke, who was a carver as well as a physician. The mantle or robe she has on, is covered with innumerable jewels of inestimable value. She has a crown, which was given her by Louis XIII. of France, and a little crown for her son.

CASAL, a strong town of Italy, in Montferrat, with a citadel and a bishop's see. It was taken by the French from the Spaniards in 1640; and the duke of Mantua sold it to the French in 1681. In 1695 it was taken by the allies, who demolished the fortifications, but the French retook it, and fortified it again. The king of Sardinia became master of it in 1706, from whom the French took it in 1745; however, the king of Sardinia got possession of it again in 1746. A terrible earthquake happened here in the beginning of the year 1783. It is seated on the river Po, 37 miles N. E. of Turin. Lon. 8. 27. E. Lat. 45. 18. N.

CASAL-*Maggiore*, a strong town of Italy, in the duchy of Milan, seated on the river Po, 20 miles S. E. of Cremona. Lon. 10. 35. E. Lat. 44. 56. N.

CASA NOVA (Marc Anthony), a Latin poet, born at Rome, succeeded particularly in epigrams. The poems he composed in honour of the illustrious men of Rome are also much admired. He died in 1527.

CASAN, a considerable town of Asia, and capital of a kingdom of the same name in the Russian empire, with a strong castle, a citadel, and an archbishop's see. The country about it is very fertile in all sorts of fruit, corn, and pulse. It carries on a great trade in furs, and furnishes wood for the building of ships. The kingdom of Casan is bounded on the north by Perma, on the east by Siberia, on the south by the river Wolga, and on the west by the province of Moscow. E. long. 53. 25. N. lat. 55. 38.

CASAS (Bartholomew de las), bishop of Chiapa, distinguished for his humanity and zeal for the conversion of the Indians, was born at Seville in 1474; and went with his father, who sailed to America with Christopher Columbus in 1493. At his return to Spain he embraced the state of an ecclesiastic, and obtained a curacy in the island of Cuba; but some time after quitted his cure in order to procure liberty for the Indians, whom he saw treated by the Spaniards in the most cruel and

barbarous manner, which naturally gave them an unconquerable averſion to Chriſtianity. Bartholomew exerted himſelf with extraordinary zeal, for 50 years together, in his endeavours to perſuade the Spaniards that they ought to treat the Indians with equity and mildneſs; for which he ſuffered a number of perſecutions from his countrymen. At laſt the court, moved by his continual remonſtrances, made laws in favour of the Indians, and gave orders to the governors to obſerve them, and ſee them executed. He died at Madrid in 1566, aged 92. He wrote ſeveral works, which breathe nothing but humanity and virtue. The principal of them are, 1. An account of the deſtruction of the Indies. 2. Several treatiſes in favour of the Indies, againſt Dr. Sepulveda, who wrote a book to juſtify the inhuman barbarities committed by the Spaniards. 3. A very curious, and now ſcarce work in Latin, on this queſtion, "Whether kings or princes can, conſiſtently with conſcience, or in virtue of any right or title, alienate their ſubjects, and place them under the dominion of another ſovereign?"

CASATI (Paul), a learned Jeſuit, born at Placentia in 1617, entered early among the Jeſuits; and, after having taught mathematics and divinity at Rome, was ſent into Sweden to queen Chriſtina, whom he prevailed on to embrace the popiſh religion. He wrote, 1. *Vacuum proſcriptum.* 2. *Terra machinis mota.* 3. *Mechanicorum libri octo.* 4. *De Igne Diſſertationes;* which is much eſteemed. 5. *De Angelis Diſputatio Theolog.* 6. *Hydroſtaticæ Diſſertationes.* 7. *Opticæ Diſputationes.* It is remarkable that he wrote this treatiſe on optics at 88 years of age, and after he was blind. He alſo wrote ſeveral books in Italian.

CASAUBON (Iſaac), was born at Geneva in 1559; and Henry IV. appointed him his library-keeper in 1603. After this prince's death, he went into England with Sir Henry Wotton, ambaſſador from King James I. where he was kindly received and engaged in writing againſt Baronius's Annals. He died not long after this, in 1614; and was interred in Weſtminſter-abbey, where a monument was erected to him. He was deeply ſkilled in the Greek, and in criticiſm; publiſhed ſeveral valuable commentaries; and received the higheſt eulogiums from all his cotemporaries.

Casaubon (Meric), ſon of the preceding, was born at Geneva in 1559. He was bred at Oxford, and took the degree of maſter of arts in 1621. The ſame year he publiſhed a book in defence of his father againſt the calumnies of certain Roman Catholics; which gained him the favour of King James I. and a conſiderable reputation abroad. He was made prebendary of Canterbury by archbiſhop Laud. In the beginning of the civil war he loſt all his ſpiritual promotions, but ſtill continued to publiſh excellent works. Oliver Cromwell, then lieutenant-general of the parliament's forces, would have employed his pen in writing the hiſtory of the late war; but he declined it, ſaying that his ſubject would oblige him to make ſuch reflections as would be ungrateful, if not injurious, to his lordſhip. Notwithſtanding this anſwer, Cromwell, ſenſible of his worth, ordered three or four hundred pounds to be paid to him by a bookſeller in London, whoſe name was Cromwell, on demand, without requiring from him any acknowledgment of his benefactor. But this offer he rejected, though his circumſtances were then low. At the ſame time it was propoſed by his friend Mr. Greaves, who belonged to the library at St. James's, that, if Caſaubon would gratify Cromwell in the requeſt above mentioned, all his father's books which were then in the royal library, having been purchaſed by King James, ſhould be reſtored to him, and a penſion of 300l. a-year paid to the family as long as the youngeſt ſon of Dr. Caſaubon ſhould live; but this alſo was refuſed. He likewiſe refuſed handſome offers from Chriſtina queen of Sweden, being determined to ſpend the remainder of his life in England. At the reſtoration he recovered all his preferments, and continued writing till his death in 1671. He was the author of an Engliſh tranſlation of Marcus Aurelius Antoninus's meditations, and of Lucius Florus; editions of ſeveral of the claſſics, with notes; a treatiſe of uſe and cuſtom; a treatiſe of enthuſiaſm: with many other works; and he left a number of MSS. to the univerſity of Oxford.

CASARINA, in botany; a genus of the monandria order, belonging to the monœcia claſs of plants. The male has the calyx of the amentum; the corolla a bipartite ſmall ſcale. The female has a calyx of the amentum, no corolla; the ſtyle bipartite.

CASCADE, a ſteep fall of water from a higher into a lower place. The word is French, formed of the Italian *caſcata,* which ſignifies the ſame; of *caſcare, to fall;* and that from the Latin *cadere.* Caſcades are either natural, as that at Tivoli, &c. or artificial, as thoſe of Verſailles, &c. and either falling with gentle deſcent, as thoſe of Sceaux; or in form of a buffet, as at Trianon; or down ſteps, in form of a perron, as at St. Cloud; or from baſon to baſon, &c.

CASCAIS, a town of Eſtremadura in Portugal, ſituated at the mouth of the river Tagus, 17 miles eaſt of Liſbon. W. long. 10. 15. N. lat. 38. 40.

CASCARILLA. See Clutia and Croton.

CASE, among grammarians, implies the different inflections or terminations of nouns, ſerving to expreſs the different relations they bear to each other, and to the things they repreſent. See Grammar.

Case alſo denotes a receptacle for various articles; as a caſe of knives, of lancets, of piſtols, &c.

Case, in printing, a large flat oblong frame placed aſlope, divided into ſeveral compartments or little ſquare cells; in each of which are lodged a number of types or letters of the ſame kind, whence the compoſitor takes them out, each as he needs it, to compoſe his matter. See Printing.

Case is alſo uſed for a particular number or quantity of different things. Thus a caſe of crown-glaſs contains uſually 24 tables, each table being nearly circular, and about three feet ſix inches diameter; of Newcaſtle glaſs, 35 tables; of Normandy glaſs, 25.

Case-*Hardening of Iron,* is a ſuperficial converſion of that metal into ſteel, by the ordinary method of converſion, namely, by cementation with vegetable or animal coals. This operation is generally practiſed upon ſmall pieces of iron wrought into tools and inſtruments to which a ſuperficial converſion is ſufficient; and it may be performed conveniently by putting the pieces of iron to be caſe-hardened, together with the cement, into an iron box, which is to be cloſely ſhut, and expoſed to a red heat during ſome hours. By this cementation a certain thickneſs from the ſurface of the iron will be converted into ſteel, and a proper hardneſs may be afterwards given by ſudden extinction of the heated pieces of converted iron into a cold fluid. See Steel.

Case-*Shot,* in the military art, muſket-balls, ſtones, old iron, &c. put into caſes, and ſhot out of great guns.

CASEMENT, or Casemate, in architecture, a hollow moulding, which ſome architects make one fixth of a circle, and others one fourth.

Casement is alſo uſed in building, for a little moveable window, uſually within a larger, being made to open or turn on hinges.

CASERN, in fortification, lodgings built in garriſon-towns, generally near the rampart, or in the waſte parts of the town, for lodging ſoldiers of the garriſon. There are uſually two beds in each caſern for ſix ſoldiers to lie, who mount the guard alternately; the third part being always on duty.

CASERTA, an epiſcopal town of Italy in the kingdom of Naples, and in the Terra di-Lavoro, with the title of a duchy,

feated at the foot of a mountain of the fame name, in E. long. 15. 5. N. lat. 41. 5.

CASES (Peter-James), of Paris, the moft eminent painter of the French fchool; the churches of Paris and Verfailles abound with his works. He died in 1754, aged 79.

CASH, in a commercial ftyle, fignifies the ftock or ready money which a merchant or other perfon has in his prefent difpofal to negotiate; fo called from the French term *caiffe*, i. e. *cheft* or *coffer*, for the keeping of money. M. Savary fhews, that the management of the cafh of a company is the moft confiderable article, and that whereon its good or ill fuccefs chiefly depends.

CASH-*Book*. See BOOK-KEEPING.

CASHEL, or CASHIL, a town of Ireland in the county of Tipperary, and province of Munfter, with an archbifhop's fee. It was formerly the royal feat and metropolis of the kings of Munfter; and on the afcent to the cathedral is a large ftone on which every new king of Munfter was, as the inhabitants report from tradition, folemnly proclaimed. Cafhel is at prefent but fmall to what we may fuppofe it to have been in ancient days. The archbifhop's palace is a fine building. Here is a very handfome market houfe, a feffions houfe, the county infirmary, a charity fchool for twenty boys and the fame number of girls, and a very good barrack for two companies of foot. W. long. 7. 36. N. lat. 52. 16.

CASHEW-NUT. See ANACARDIUM.

CASHIER, the cafh-keeper; he who is charged with the receiving and paying the debts of a fociety. In the generality of foundations, the cafhier is called *treafurer*. CASHIERS *of the Bank*, are officers who fign the notes that are iffued out, examine and mark them when returned for payment, &c.

CASHMERE, a province of Hindoftan Proper, fubject to the king of Candahar. It is bounded on the W. by the Indus, on the N. by the Indian Caucafus, and on the E. and S. by Lahore. The country is celebrated for its romantic beauties, the fertility of its foil, and the temperature of the atmofphere. Thefe particulars may be accounted for, when it is confidered, that it is an elevated and extenfive valley, furrounded by fteep mountains, that tower above the regions of fnow; and that its foil is compofed of the mud depofited by a large river, which originally formed its waters into a lake, that covered the whole valley, until it opened itfelf a paffage through the mountains, and left this fertilized valley an ample field to human induftry. "Although this account," fays major Rennel, "has no living teftimony to fupport it, yet hiftory and tradition, and, what is yet ftonger, appearances, have impreffed a conviction of its truth on the minds of all who have vifited the fcene, and contemplated the different parts of it." The periodical rains, which almoft deluge the reft of India, are fhut out of Cafhmere by the height of the mountains, fo that only light fhowers fall there. Thefe, however, are fufficiently abundant to feed fome thoufands of cafcades, which are precipitated into the valley, from every part of the ftupendous and romantic bulwark that encircles it. The foil is the richeft that can be conceived, and its productions thofe of the temperate zone. A vaft number of ftreams from all quarters of the valley bring their tribute to the Chelum, the parent of the foil, and a large navigable river. Many fmall lakes are fpread over the furface, and fome of them contain floating iflands. In a word, the fcene is beautifully picturefque, and a part of the romantic circle of mountains make up a portion of every landfcape. The fuperftition of the inhabitants has multiplied the places of worfhip of Mahadeo, Befchan, and Brama. All Cafhmere is holy land, and miraculous fountains abound. But to one dreadful evil they are conftantly fubject, namely, earthquakes; and, to guard againft the moft terrible effects, all their houfes are built of wood. Among other curious manufactures of Cafhmere is that of fhawls, which are diftributed all over the weftern and fouthern Afia. They make a part of the drefs of the Egyptian Mamlouks as well as of the Britifh fair. The delicate wool of which they are made, is the produce of a fpecies of goat of this country, or of the adjoining Thibet. Here are bred a fpecies of fheep, called Hundoo, which, like thofe of Peru, are employed in carrying burdens. The Cafhmireans have a language of their own, faid to be anterior to that of the Sanfcrit, and a religion too, it is thought, different from that of the Hindoos. In fine, to ufe the words of an oriental writer, "Cafhmere is a garden in perpetual fpring." It is 80 miles long and 40 broad.

CASHMERE, a large city of Hindoftan Proper, capital of the province or valley of Cafhmere. It is built on both fides of the river Chelum, and is 285 miles E. by S. of Cabul. Long. 73. 11. E. Lat. 33. 49. N.

CASIMIR (Matthias Sorbiewfki), a Polifh Jefuit, born in 1597. He was a moft excellent poet; and is, fays Mr. Baillet, an exception to the general rule of Ariftotle and the other ancients, which teach us to expect nothing ingenious and delicate from northern countries. His odes, epodes, and epigrams, have been thought not inferior to thofe of the fineft wits of Greece and Rome. Dr. Watts has tranflated one or two of his fmall pieces, which are added to his Lyric Poems. He died at Warfaw in 1640, aged 43. There have been many editions of his poems; the beft of which is that of Paris, publifhed in 1759.

CASING *of* TIMBER-WORK, among builders, is the plaftering the houfe all over the outfide with mortar, and then ftriking it while it is wet, by a ruler, with the corner of a trowel, to make it refemble the joints of free-ftone. Some direct it to be done upon heart-laths, becaufe the mortar would in a little time deftroy the fap-laths; and to lay on the mortar in two thickneffes, *viz.* a fecond before the firft is dry.

CASK, or CASQUE, a piece of defenfive armour wherewith to cover the head and neck; otherwife called the *head-piece* and *helmet*. See HELMET. The word is French, *cafque*, from *caffidum* or *caffieus*, a diminutive of *caffis* a helmet. Le Gendre obferves, that anciently, in France, the gens d'armes all wore *cafks*. The king wore a *cafk* gilt; the dukes and counts filvered; gentlemen of family polifhed fteel; and the reft plain iron. The cafk is frequently feen on ancient medals, where we may obferve great varieties in the form and fafhion of it; as the Greek fafhion, the Roman fafhion, &c. F. Joubert makes it the moft ancient of all the coverings of the head, as well as the moft univerfal; kings, emperors, and even gods themfelves, being feen with it. That which covers the head of Rome has ufually two wings like thofe of Mercury: and that of fome kings is furnifhed with horns like thofe of Jupiter Ammon; and fometimes barely bulls or rams horns, to exprefs uncommon force.

CASK, or CASQUE, in heraldry, the fame with helmet. See HERALDRY.

CASK, a veffel of capacity, for preferving liquors of divers kinds; and fometimes alfo dry goods, as fugar, almonds, &c. —A cafk of fugar is a barrel of that commodity, containing from eight to eleven hundred weight. A cafk of almonds is about three hundred weight.

CASKET, in a general fenfe, a little coffer or cabinet. See CABINET.

CASKETS, in the fea language, are fmall ropes made of finnet, and faftened to gromets, or little rings upon the yards; their ufe is to make faft the fail to the yard when it is to be furled.

CASLON (William), eminent in an art of the greateft confequence to literature, the art of letter-founding, was born

in 1692, in that part of the town of Hales Owen which is ſituated in Shropſhire. Though he juſtly attained the character of being the Coryphæus in that employment, he was not brought up to the buſineſs, but ſerved a regular apprenticeſhip to an engraver of ornaments on gun-barrels; and after the expiration of his term, carried on this trade in Vine-ſtreet, near the Minories. He employed himſelf likewiſe in making tools for the book-binders, and for the chaſing of ſilver-plate. Whilſt he was engaged in this buſineſs, the elder Mr. Bowyer accidentally ſaw, in a bookſeller's ſhop, the lettering of a book uncommonly neat; and enquiring who the artiſt was by whom the letters were made, was hence induced to ſeek an acquaintance with Mr. Caſlon. Not long after, Mr. Bowyer took Caſlon to James's foundery, in Bartholomew-cloſe. Caſlon had never before that time ſeen any part of the buſineſs; and being aſked by his friend, if he thought he could undertake to cut types, he requeſted a ſingle day to conſider the matter, and then replied that he had no doubt but he could. Upon this anſwer, Mr. Bowyer, Mr. Bettenham, and Mr. Watts, had ſuch a confidence in his abilities, that they lent him 500 l. to begin the undertaking, and he applied himſelf to it with equal aſſiduity and ſucceſs. In 1720, the ſociety for promoting Chriſtian knowledge, in conſequence of a repreſentation from Mr. Solomon Negri, a native of Damaſcus in Syria, who was well ſkilled in the Oriental tongues, and had been profeſſor of Arabic in places of note, deemed it expedient to print for the uſe of the Eaſtern churches, the New Teſtament and Pſalter, in the Arabic language. Theſe were intended for the benefit of the poor Chriſtians in Paleſtine, Syria, Meſopotamia, Arabia, and Egypt, the conſtitution of which countries did not permit the exerciſe of the art of printing. Upon this occaſion Mr. Caſlon was pitched upon to cut the fount; in his ſpecimens of which he diſtinguiſhed it by the name of Engliſh Arabic. Under the further encouragement of Mr. Bowyer, Mr. Bettenham, and Mr. Watts, he proceeded with vigour in his employment; and arrived at length to ſuch perfection, that he not only freed us from the neceſſity of importing types from Holland, but in the beauty and elegance of thoſe made by him he ſo far exceeded the productions of the beſt artificers, that his workmanſhip was frequently exported to the Continent. In ſhort, his foundery became, in proceſs of time, the moſt capital one of any in this or any foreign country. Having acquired opulence in the courſe of his employment, he was put into the commiſſion of the peace for the county of Middleſex. Towards the latter end of his life, he retired in a great meaſure from the active part of the buſineſs; and his death happened in January 1766.

CASPIAN SEA, a great inland ſea of Aſia, bounded on the N. by the country of the Calmuc Tartars; on the E. by a tribe of the Turcomans; on the S. E. the S. and S. W. by Georgia and Circaſſia. It is about 680 miles in length, reckoning from Gurief to Medſharifar, and in part more than 260 miles in breadth. It has no tide, and, on account of its frequent ſhoals, is navigable only for veſſels drawing from nine to ten feet water. It has ſtrong currents, and, like all inland ſeas, is ſubject to violent ſtorms, which the Ruſſian veſſels, wretchedly conſtructed, weather with difficulty. Its waters are brackiſh. The fiſhery is a nurſery for ſailors. The Uralian Coſſacs enjoy the right of fiſhing on each ſide of the river Ural; and the inhabitants of Aracan have an excluſive privilege on the remaining ſhores belonging to Ruſſia. The roe of the ſturgeons and belaga ſupply large quantities of caviare; and the fiſh, which are chiefly ſalted and dried, form a conſiderable article of conſumption in the Ruſſian empire. The Caſpian abounds with ſea-dogs, which are hunted and caught in great numbers. Long. from 40° to 53° E. Lat. from 37° to 47° N.

CASQUE, or CASK. See CASK.

CASSADA. See JATROPHA.

CASSANA (Nicolo), called NICOLETTO, an eminent Italian painter, was born at Venice in 1659, and became a diſciple of his father Giovanni Franceſco Caſſano, a Genoeſe, who had been taught the art of painting by Bernardino Strozzi. He ſoon diſtinguiſhed himſelf not only by the beauty of his colouring, but by the gracefulneſs of his figures in hiſtorical compoſitions, as well as in portrait. The moſt eminent perſonages ſolicited him to enrich their cabinets with ſome of his performances; and were more particularly deſirous to obtain their portraits, becauſe in that branch he excelled beyond competition. The grand duke of Tuſcany, who was an excellent judge of merit in all profeſſions, and as liberal an encourager of it, invited Nicoletto to his court; and he there painted the portraits of that prince and the princeſs Violante his conſort. Thoſe performances procured him uncommon applauſe, as well as a noble gratuity, and he was employed and careſſed by the principal nobility of Florence. Beſides ſeveral hiſtorical ſubjects painted by this maſter while he reſided in that city, one was a very capital deſign: the ſubject of it was the *Conſpiracy of Catiline*; it conſiſted of nine figures as large as life, down to the knees; and the two principal figures were repreſented as with one hand joined in the preſence of their companions, and in the other hand holding a cup of blood. Some of the Engliſh nobility on their travels ſat to him for their portraits; which being ſent to London, and highly admired, Nicoletto was invited to England, with ſtrong aſſurances of a generous reception; and on his arrival he experienced the kindneſs, the reſpect, and the liberality, ſo peculiar to the natives of this kingdom. He had the honour of being introduced to the preſence of queen Anne, and to paint her portrait; in which he ſucceeded ſo happily, that the queen diſtinguiſhed him by many marks of favour and honour: but he had not the happineſs to enjoy his good fortune for any length of time, dying in London, univerſally regretted, in the year 1713.

CASSANA (Giovanni Agoſtino), called *L'Abate Caſſana*, was brother to the preceding, and born in 1664. He was educated along with him by their father Franceſco Caſſana; and he finiſhed his ſtudies at Venice, where his brother Nicolo reſided for ſome time. Although he compoſed and deſigned hiſtorical ſubjects with expertneſs, and with a correctneſs of outline equal to his brother; yet, from prudence and fraternal affection, he declined to interfere with him, and choſe therefore to deſign and paint all ſorts of animals and fruits. In that ſtyle he arrived at a high degree of excellence, imitating nature with extraordinary beauty and truth; expreſſing the various plumage of his birds, and the hairs of the different animals with ſuch tenderneſs and delicacy as rendered them eſtimable to all judges and lovers of the art. His works were admitted into the collections of perſons of the firſt rank, and accounted ornaments of thoſe repoſitories of what is curious or valuable. He alſo painted fruits of thoſe kinds which were the moſt uncommon, or naturally of odd and ſingular colours; and ſuch fiſhes as ſeemed worthy to excite admiration by their unuſual form, colour, or appearance. But beſides thoſe ſubjects, he ſometimes painted the portraits of particular perſons of diſtinction, which he deſigned, coloured, and touched with the ſame degree of merit that was viſible in all his other performances. At laſt he determined to viſit Genoa, where his family had lived in eſteem; and took with him ſeveral pictures which he had already finiſhed. His intention was to diſplay his generoſity, and to appear as a perſon of more wealth and of greater conſequence than he really was; and to ſupport that character, he beſtowed his pictures on ſeveral of the principal nobility of that city. But, unhappily, he experienced no grateful return for all that prodigal munificence: he reduced

himſelf by that vain liberality to the moſt neceſſitous circumſtances; was deprived of the means to procure for himſelf even the common neceſſaries of life; and waſted away the remainder of his days in the bitterneſs of poverty, miſery, and neglect.

CASSANDER, king of Macedon after Alexander the Great, was the ſon of Antipater. He made ſeveral conqueſts in Greece, aboliſhed democracy at Athens, and gave the government of that ſtate to the orator Demetrius. Olympias, the mother of Alexander, having cauſed Aridæus and his wife Eurydice, with others of Caſſander's party, to be put to death; he beſieged Pydne, whither the queen had retired, took it by a ſtratagem, and cauſed her to be put to death. He married Theſſalonica the ſiſter of Alexander the Great; and killed Roxana and Alexander, the wife and ſon of that conqueror. At length he entered into an alliance with Seleucus and Lyſimachus, againſt Antigonus and Demetrius; over whom he obtained a great victory near Ipſus in Phrygia, 301 years before the Chriſtian æra, and died three years after, in the 19th year of his reign.

CASSANDRA, in fabulous hiſtory, the daughter of Priam and Hecuba, was beloved of Apollo, who promiſed to beſtow on her the ſpirit of prophecy, provided ſhe would conſent to his love. Caſſandra ſeemed to accept the propoſal; but had no ſooner obtained that gift, than ſhe laughed at the tempter, and broke her word. Apollo, being enraged, revenged himſelf, by cauſing no credit to be given to her predictions; hence ſhe in vain propheſied the ruin of Troy. Ajax, the ſon of Oileus, having raviſhed her in the temple of Minerva, he was ſtruck with thunder. She fell into the hands of Agamemnon, who loved her to diſtraction; but in vain did ſhe predict that he would be aſſaſſinated in his own country. He was killed, with her, by the intrigues of Clytemneſtra; but their death was avenged by Oreſtes.

CASSANO, a town of Italy in the duchy of Milan, rendered remarkable by an obſtinate battle fought there between the Germans and French in 1705. It is ſubject to the houſe of Auſtria, and is ſeated on the river Adda, in E. long. 10. 0. N. lat. 45. 20.

Cassano, a town of Italy in Calabria citerior, in the kingdom of Naples, with a biſhop's ſee. E. long. 16. 30. N. lat. 39. 55.

CASSAVI, or Cassada. See Jatropha.

CASSEL, a town of France, in the department of the North and late French Flanders, ſeated on a mountain, whence may be ſeen 32 towns, and the ſea, though 50 miles from it. It is 10 miles N. E. of St. Omer. Long. 2. 36. E. Lat. 50. 48. N.

Cassel, a town of Germany, capital of the landgravate of Heſſe-Caſſel. The town is divided into the old and new; the laſt of which is well built. The ſtreets are beautiful; the market-places ſpacious; and there are four churches. The caſtle or palace, where there is a delightful proſpect, is built of free-ſtone. The gardens, the arſenal, and the cabinet of curioſities, deſerve the attention of travellers. The French refugees have a church of their own. It is ſeated on the river Fulda, 40 miles S. of Paderborn. Long. 9. 34. E. Lat. 51. 19. N.

CASSIA, in botany; a genus of the monogynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 33d order, *Lomentaceæ*. The calyx is pentaphyllous; petals five; antheræ upper, three barren; lower, three beaked: a leguminous plant. There are 30 ſpecies, all of them natives of warm climates. The moſt remarkable are,

1. The *fiſtula* or purging caſſia of Alexandria. It is a native of Egypt and both Indies, where it riſes to the height of 40 or 50 feet, with a large trunk, dividing into many branches, garniſhed with winged leaves, compoſed of five pair of ſpear-ſhaped lobes, which are ſmooth, having many tranſverſe nerves from the mid-rib to the border. The flowers are produced in long ſpikes at the end of the branches, each ſtanding upon a pretty long foot-ſtalk: theſe are compoſed, like the former, of fine yellow concave petals, which are ſucceeded by cylindrical pods from one to two feet long, with a dark brown woody ſhell, having a longitudinal ſeam on one ſide, dividing into many cells by tranſverſe partitions, each containing one or two oval, ſmooth, compreſſed ſeeds, lodged in a blackiſh pulp, which is uſed in medicine. Till of late years there were two ſorts of this drug kept in the ſhops; one brought from the Eaſt Indies, the other from the Weſt: the canes or pods of the latter are generally large, rough, thick-rinded, and the pulp nauſeous; thoſe of the former are leſs, ſmoother, the pulp blacker, and of a ſweeter taſte; this ſort is preferred to the other. The pulp of this kind is a gentle laxative medicine, and formerly gave name to an officinal electuary.

2. The *caſſia ſenna* is a ſhrubby plant cultivated in Perſia, Syria, and Arabia, for the leaves, which form a conſiderable article of commerce. They are of an oblong figure, ſharp-pointed at the ends, about a quarter of an inch broad, and not a full inch in length, of a lively yellowiſh-green colour, a faint not very diſagreeable ſmell, and a ſubacrid, bitteriſh, nauſeous taſte. They are brought from the above places, dried and picked from the ſtalks, to Alexandria in Egypt, and thence imported into Europe. Some inferior ſorts are brought from Tripoli and other places: theſe may eaſily be diſtinguiſhed by their being either narrower, longer, and ſharper pointed; or larger, broader, and round pointed, with ſmall prominent veins; or large and obtuſe, of a ſharp green colour, without any yellow caſt. Senna is a very uſeful cathartic, though ſomewhat apt to gripe if given by itſelf. Infuſions made in a very ſmall quantity of fluid will ſometimes gripe ſeverely, and purge leſs than when diluted by a large portion of a ſuitable menſtruum, or joined with ſome other medicine. The ſmell of ſenna reſides in its more volatile parts, and may be diſcharged by lightly boiling infuſions of it made in water: the liquor thus freed from the peculiar flavour of the ſenna, may be eaſily rendered grateful to the taſte, by the addition of any proper aromatic tincture or diſtilled water. The colleges both of London and Edinburgh have given ſeveral formulæ for the exhibition of this article, ſuch as thoſe of infuſion, powder, tincture, and electuary.

Cassia-*Lignea*. See Bay-tree.

CASSIDA, in botany. See Scutellaria.

Cassida; in zoology, a genus of inſects belonging to the order of coleoptera. The feelers are like threads, but thicker on the outſide: the elytra are marginated; and the head is hid under the thorax; from which laſt circumſtance is derived the name of the genus. Foreign countries afford many fine ſpecies of them. Thoſe we meet with in theſe parts have ſomething ſingular. Their larva, by the help of the two prongs which are to be found at its hinder extremity, makes itſelf, with its own excrements, a kind of umbrella, that ſhelters it from the ſun and rain. When this umbrella grows over dry, it parts with it for a new one. This larva caſts its ſlough ſeveral times. Thiſtles and verticillated plants are inhabited by theſe inſects. There is one ſpecies, of which the remarkable chryſalis reſembles an armorial eſcutcheon. It is that which produces our variegated caſſida, and is of a very ſingular form. Numbers of them are found on the ſide of ponds, upon the wild elecampane. See Pl. 61.

CASSIMER, or Casimere, the name of a thin tweeled woollen cloth, much in faſhion for ſummer uſe.

CASSIMIRE, or Cashmire. See Cashmere.

CASSINE, in botany; a genus of the trigynia order, be-

longing to the pentandria clafs of plants; and in the natural method ranking under the 23d order, *Dumofæ*. The calyx is quinquepartite; the petals are five; and the fruit is a trifpermous berry. There are three fpecies, all of them natives of warm climates. Of thefe the moft remarkable is the *yapon*, which is a native of the maritime parts of Virginia and Carolina. It rifes to the height of ten or twelve feet, fending out branches from the ground upward, garnifhed with fpear-fhaped leaves placed alternately, which continue green through the year. The flowers are produced in clofe whorls round the branches, at the foot-ftalks of the leaves; they are white, and divided into five parts, almoft to the bottom. The berries are of a beautiful red colour; and as they continue moft part of the winter upon the plants without being touched by the birds, we may reafonably conclude that they are poffeffed of a poifonous quality; as few of the wholefome innocent fruits efcape their depredations. The Indians, however, have a great opinion of this plant as an emetic, and at certain feafons of the year come in great numbers to fetch away the leaves. The Spaniards alfo who live near the gold mines of Peru, are frequently obliged to drink an infufion of this herb in order to moiften their breafts; without which they are liable to a fort of fuffocation, from the ftrong metallic exhalations that are continually proceeding from the mines. In Paraguay, the Jefuits make a great revenue by importing the leaves of this plant into many countries under the name of Paraguay or South-fea tea, which is there drunk in the fame manner as that of China or Japan is with us. It is with difficulty preferved in England.

CASSINI (Johannes Dominicus), a moft excellent aftronomer, born at Piedmont in 1635. His early proficiency in aftronomy procured him an invitation to be mathematical profeffor at Bologna when he was no more than 15 years of age: and a comet appearing in 1652, he difcovered that comets were not accidental meteors, but of the fame nature, and probably governed by the fame laws, as the planets. In the fame year he folved a problem given up by Kepler and Bullialdus as infolvable, which was, to determine geometrically the apogee and eccentricity of a planet from its true and mean place. In 1663 he was appointed infpector-general of the fortifications of the caftle of Urbino, and had afterwards the care of all the rivers in the ecclefiaftical ftate: he ftill however profecuted his aftronomical ftudies, by difcovering the revolution of Mars round his own axis; and in 1666 publifhed his theory of Jupiter's fatellites. Caffini was invited into France by Louis XIV. in 1669, where he fettled as the firft profeffor in the royal obfervatory. In 1677 he demonftrated the line of Jupiter's diurnal rotation; and in 1684 difcovered four more fatellites belonging to Saturn, Huygens having found one before. He inhabited the royal obfervatory at Paris more than forty years; and, when he died in 1712, was fucceeded by his only fon James Caffini.

CASSIODORUS (Marcus Aurelius), fecretary of ftate to Theodoric king of the Goths, was born at Squillace, in the kingdom of Naples, about the year 470. He was conful in 514, and was in great credit under the reigns of Athalaric and Vitiges; but at feventy years of age retired into a monaftery in Calabria, where he amufed himfelf in making fun-dials, water hour-glaffes, and perpetual lamps. He alfo formed a library; and compofed feveral works, the beft edition of which is that of father Garet, printed at Rouen in 1679. Thofe moft efteemed are his Divine Inftitutions, and his treatife on the Soul. He died about the year 562.

CASSIOPEIA, in fabulous hiftory, wife to Cepheus king of Ethiopia, and mother of Andromeda. She thought herfelf more beautiful than the Nereides, who defired Neptune to revenge the affront; fo that he fent a fea-monfter into the country, which did much harm. To appeafe the god, her daughter Andromeda was expofed to the monfter, but was refcued by Perfeus; who obtained of Jupiter, that Caffiopeia might be placed after her death among the ftars: hence the conftellation of that name.

Cassiopeia, in aftronomy, one of the conftellations of the northern hemifphere, fituated next to Cepheus. In 1572 there appeared a new ftar in this conftellation, which at firft furpaffed in magnitude and brightnefs Jupiter itfelf; but it diminifhed by degrees, and at laft difappeared, at the end of eighteen months. It alarmed all the aftronomers of that age, many of whom wrote differtations on it; among the reft Tycho Brahe, Kepler, Maurolycus, Lycetus, Gramineus, &c. Beza, the landgrave of Heffe, Rofa, &c. wrote to prove it a comet, and the fame which appeared to the Magi at the birth of Jefus Chrift, and that it came to declare his fecond coming: they were anfwered on this fubject by Tycho. The ftars in the conftellation Caffiopeia, in Ptolemy's Catalogue, are 13; in Hevelius's, 37; in Tycho's, 46; but in the Britannic Catalogue Mr. Flamftead makes them 55.

CASSIS, in antiquity, a plated or metalline helmet; different from the *galea*, which was of leather.

CASSITERIA, in the hiftory of foffils, a genus of cryftals, the figures of which are influenced by an admixture of fome particles of tin. The caffiteria are of two kinds; the whitifh pellucid caffiterion, and the brown caffiterion. The firft is a tolerably bright and pellucid cryftal, and feldom fubject to the common blemifhes of cryftal: it is of a perfect and regular form, in the figure of a quadrilateral pyramid; and is found in Devonfhire and Cornwall principally. The brown caffiterion is like the former in figure; it is of a very fmooth and gloffy furface, and is alfo found in great plenty in Devonfhire and Cornwall.

CASSIUS (Spurius), a renowned Roman general and conful, whofe enemies accufing him of afpiring to royalty, he was thrown down from the Tarpeian rock 485 years before Chrift; after having thrice enjoyed the confular dignity, been once general of the horfe under the firft dictator that was created at Rome, and twice received the honour of a triumph.

Cassius (Longinus), a celebrated Roman lawyer, flourifhed 113 years before Chrift. He was fo inflexible a judge, that his tribunal was called the *Rock of the impeached*. It is from the judicial feverity of this Caffius, that very fevere judges have been called *Caffians*.

Cassius (Caius), one of the murderers of Julius Cæfar: after his defeat by Mark Anthony at the battle of Philippi, he ordered one of his freed men to put him to death with his own fword, 41 years before Chrift.

CASSOCK, or Cassula, a kind of robe or gown, worn over the reft of the habit, particularly by the clergy. The word caffock comes from the French *caffaque*, an horfeman's coat.

CASSONADE, in commerce, cafk fugar, or fugar put into cafks or chefts, after the firft purification, but which has not been refined. It is fold either in powder or in lumps; the whiteft, and that of which the lumps are largeft, is the beft. Many imagine it to fweeten more than loaf fugar; but it is certain that it yields a great deal more fcum.

CASSOWARY, in ornithology. See Struthio.

CASSUMAR, in the Materia Medica, a root refembling that of zedoary. It is cardiac and fudorific, and was once famous in nervous difeafes.

CASSUMBAZAR, a town of India, in Afia, fituated on the river Ganges, in the province of Bengal. E. long. 87. and N. lat. 24.

CAST is peculiarly ufed to denote a figure or fmall ftatue of bronze. See Bronze.

Cast, among founders, is a term applied to tubes of wax fitted in divers parts of a mould of the fame matter; by means of which, when the wax of the mould is removed, the melted metal is conveyed into all the parts which the wax before poffeffed.

Cast, alfo denotes a cylindrical piece of brafs or copper, flit in two, lengthwife, ufed by the founders in fand, to form a canal or conduit in their moulds, whereby the metal may be conveyed to the different pieces intended to be caft.

Cast, among plumbers, denotes a little brazen funnel at one end of a mould, for cafting pipes without foldering, by means of which the melted metal is poured into the mould.

Cast, or *Cafte*, in fpeaking of eaftern affairs, denotes a tribe, or number of families, of the fame rank and profeffion. The divifion of a nation into cafts chiefly obtains in the dominions of the Great Mogul, kingdom of Bengal, ifland of Ceylon, and the great peninfula oppofite thereto. In each of thefe there are, according to father Martin, four principal cafts, viz. the caft of the *bramins*, which is the firft and moft noble; the caft of the *rajas*, or princes, who pretend to be defcended from royal families; the caft of the *choutres*, which comprehends all the artificers; and that of the *parias*, the loweft and moft contemptible of all. Yet Henry Lord, it muft be obferved, divides the Indians about Surat into four *cafts*, fomewhat differently from Martin, viz. into *bramins*, or priefts; *cuttery*, or foldiers; *Jhuddery*, which we call banians or merchants; and *wyfe*, the mechanics or artificers. Every art and trade is confined to its proper *caft*, nor is allowed to be exercifed by any but thofe whofe fathers profeffed the fame. So that a tailor's fon can never rife to be a painter, nor a painter's fon fall to be a tailor; though there are fome employments that are proper to all the cafts, *e. g.* any body may be a foldier or a merchant. There are alfo fome cafts which are allowed to till the ground, but not all. The caft of *parias* is held infamous, in fo much that it is a difgrace to have any dealings or converfation with them; and there are fome trades in the caft of *choutres*, which debafe their profeffors almoft to the fame rank. Thus fhoemakers, and all artificers in leather, as alfo fifhermen, and even fhepherds, are held no better than *parias*.

CASTAGNO (Andrea dal), hiftorical painter, was born at a fmall village called Caftagno, belonging to the territory of Tufcany, in 1409; and being deprived of his parents, was employed by his uncle to attend the herds of cattle in the fields; but, having accidentally feen an ordinary painter at work in the country, he obferved him for fome time with furprife and attention, and afterwards made fuch efforts to imitate him, as aftonifhed all who faw his productions. The extraordinary genius of Andrea became at laft a common topic of difcourfe in Florence; and fo far excited the curiofity of Bernardetto de Medici, that he fent for Andrea; and perceiving that he had promifing talents, he placed him under the care of the beft mafters who were at that time in Florence. Andrea diligently purfued his ftudies, devoted himfelf entirely to practice under the direction of his inftructors, became particularly eminent in defign, and in a few years made fo great a progrefs, that he found as much employment as he could poffibly execute. He painted only in diftemper, and frefco, with a manner of colouring that was not very agreeable, being rather dry and hard, till he learned the fecret of painting in oil from Dominico Venetiano, who had derived his knowledge of that new difcovery from Antonello da Meffina. Andrea was the firft of the Florentine artifts who painted in oil; but although he was in the higheft degree indebted to Dominico for difclofing the fecret, yet he filently envied the merit of the man who taught him the art; and becaufe his own works feemed to be much lefs admired than thofe of Dominico, he determined to affaffinate his friend and benefactor. This indeed he afterwards privately executed, and would have remained undetected, but that remorfe of confcience forced him to difclofe it on his death-bed, in 1480. He finifhed feveral confiderable works at Florence, by which he gained great riches, and as great a reputation; but when his villanous mifconduct became public, his memory was ever after held in the utmoft deteftation. The moft noted work of this mafter is in the hall of juftice at Florence, reprefenting the execution of the confpirators againft the houfe of Medici.

CASTALIAN Spring. See Castalius.

CASTALIO (Sebaftian), was born at Chatillon, on the Rhone, in the year 1515. Calvin conceived fuch an efteem and friendfhip for him, during the ftay he made at Strafburg in 1540 and 1541, that he lodged him fome days at his houfe, and procured him a regent's place in the college of Geneva. Caftalio, after continuing in this office near three years, was forced to quit it in the year 1544, on account of fome particular opinions which he held concerning Solomon's fong, and Chrift's defcent into hell. He retired to Bafil, where he was made Greek profeffor, and died in that place in 1564, aged 48. He incurred the high difpleafure of Calvin and Theodore Beza, for differing with them concerning predeftination and the punifhment of heretics. His works are very confiderable, both on account of their quality and number.

CASTALIUS fons; a fountain at the foot of mount Parnaffus, in Phocis, near the temple of Apollo, or near Delphi; facred to the Mufes, thence called *Caftalides*. Its murmurs were thought prophetic.

CASTANEA, in botany. See Fagus.

CASTANETS, Castagnettes, or Castanettas, a kind of mufical inftrument, wherewith the Moors, Spaniards, and Bohemians, accompany their dances, farabands, and guitars. It confifts of two little round pieces of wood dried, and hollowed in manner of a fpoon, the concavities whereof are placed on one another, faftened to the thumb, and beat from time to time with the middle finger, to direct their motion and cadences. The *caftanets* may be beat eight or nine times in the fpace of one meafure, or fecond of a minute.

CASTANOVITZ, a town of Croatia, fituated on the river Unna, which divides Chriftendom from Turkey. E. long. 17. 20. N. lat. 45. 40. It is fubject to the Houfe of Auftria.

CASTEL (Lewis Bertrand), a learned Jefuit, was born at Montpellier in 1688, and entered among the Jefuits in 1703. He ftudied polite literature in his youth; and at length applied himfelf entirely to the ftudy of mathematics and natural philofophy. He diftinguifhed himfelf by writing on gravity; the mathematics; and on the mufic of colours, a very whimfical idea, which he took great pains to reduce to practice. His piece on gravity, entitled *Traité de la Pefanteur univerfelle*, was printed at Paris, in 1724. He afterwards publifhed his *Mathematique univerfelle*; which occafioned his being unanimoufly chofen a fellow of the Royal Society of London, without the leaft folicitation. He was alfo a member of the academies of Bourdeaux and Rouen: but his *Clavecin oculaire* made the moft noife; and he fpent much time and expence in making an harpfichord for the eye, but without fuccefs. He alfo wrote for and againft Sir Ifaac Newton, and publifhed feveral other works; the principal of which are, *Le Plan du Mathematique abregée*, and a treatife intitled *Optique des Couleurs*. He led a very exemplary life, and died in 1757.

CASTELAMARA, a town of Italy, in the kingdom of Naples, and in the hither Principato, with a bifhop's fee and a good harbour. E. long. 14. 25. N. lat. 41. 40.

CASTEL-aragonese, a ftrong town of Italy, in the ifland

of Sardinia, with a bishop's see, and a good harbour. It is seated on the N. W. coast of the island, in E. long. 8. 57. N. lat. 40. 56.

Castel-*Branco*, a town of Portugal, and capital of the province of Beira; seated on the river Lyra, 35 miles N. W. of Alcantara. W. Long. 8. 0. N. lat. 39. 35.

Castel-*Franco*, a very small, but well-fortified frontier town of the Bolognese, in Italy, belonging to the Pope.

Castel *de-Vide*, a small strong town of Alentejo. It was taken by Philip V. W. long. 6. 25. N. lat. 39. 15.

Castel-*Folit*, a town of Spain, in Catalonia, seated on an inaccessible eminence, between Gironne and Campredon, about 15 miles from each other, and near the river Fulva.

Castel-*Gandolpho*, a town of Italy, in the territory of the church, with a castle, to which the pope retires in the summer season; 10 miles S. by E. of Rome. E. long. 12. 46. N. lat. 41. 44.

Castel-*Novo*, a strong town of Dalmatia, subject to the Venetians; seated on the gulph of Cataio, in E. long. 18. 45. N. lat. 42. 25.

Castel-*Rodrigo*, a town of Portugal, in the province of Tra-los-Montes, in W. long. 7. 1. N. 41. 0.

Castel-*Novo-de-Carfagnana*, a town of Italy, in the Modenese, with a strong fortress. It is the capital of the valley of Carfaguana, and seated on the river Serchio, 17 miles above Lucca.

Castel *del' Ovo*, a small island in the Tuscan Sea, in the gulph of Naples, near a town of that name, to which it is joined by a stone bridge. The fortress is called Castel del Ovo, in which there is always a good garrison.

CASTELBAR, a town of Ireland in the county of Mayo, and province of Connaught, 35 miles N. of Galway. W. long. 9. 25. N. lat. 53. 45. See Castle-*Bar*.

CASTELL (Edmund), D. D. a learned English divine of the 17th century, distinguished by his skill in the eastern languages. He was educated at Cambridge; where he was master of Catharine-hall, and Arabic professor; and was at length canon of Canterbury. He had the greatest share in the Polyglott bible, of London; and wrote the *Heptaglotton pro septem Orientalibus, &c.* On this excellent work, which occupied a great part of his life, he bestowed no less than 12,000l. though, when it was printed, the copies remained unsold upon his hands. He died in 1685; and lies buried in the church-yard of Higham Gobyon in Bedfordshire, of which he was rector. It appears from the inscription on his monument, which he erected in his lifetime, that he was chaplain to Charles II. He bequeathed all his oriental manuscripts to the university of Cambridge, on condition that his name should be written on every copy in the collection.

CASTELLA, a town of the Mantuan, in Italy, about five miles north-east of the city of Mantua. E. long. 11. 15. N. lat. 45. 30.

CASTELLAN, the name of a dignity or charge which existed before the late changes in Poland. The castellans were senators of the kingdom, but senators only of the lower class, who, in diets, sat on low seats, behind the palatines, or great senators. They were a kind of lieutenants of provinces, and commanded a part of the palatinate under the palatine.

CASTELLANY, the territory belonging to any city or town, chiefly used in France and Flanders: Thus we say, the castellany of Lille, Ypres, &c.

CASTELLARIUS, the keeper, or curator, of a castellum. Gruter gives an ancient sepulchral inscription in memory of a *castellarius*.

CASTELLATIO, in middle age writers, the act of building a castle, or of fortifying a house, and rendering it a castle.—By the ancient English laws, castellation was prohibited without the king's especial licence.

CASTELLI (Bernard), an Italian painter, was born at Genoa in 1557; and excelled in colouring and in portraits. He was the intimate friend of Tasso, and took upon himself the task of designing and etching the figures of his Jerusalem Delivered. He died at Genoa in 1629. Valerio Castelli, one of his sons, was born at Genoa in 1625, and surpassed his father. He particularly excelled in painting battles; which he composed with spirit, and executed them with so pleasing a variety, and so great freedom of hand, as gained him universal applause. His horses are admirably drawn, thrown into attitudes that are natural and becoming, full of motion, action, and life. In that style of painting he shewed all the fire of Tintoretto, united with the fine taste of composition of Paolo Veronese. He died in 1659. The works of this master are not very frequent; but they are deservedly held in very high esteem. It is believed that a greater number of his easel pictures are in the collections of the nobility and gentry of England, than in any other part of Europe.

CASTELLORUM-operatio, castle-work, or service and labour done by inferior tenants for the building and upholding of castles of defence; toward which some gave personal assistance, and others paid their contributions. This was one of the three necessary charges to which all lands among the Anglo-Saxons were expressly subject.

CASTELVERTO (Lewis), a native of Modena, of the 16th century, famous for his *Comment on Aristotle's Poetics*. He was prosecuted by the inquisition for a certain book of Melancthon, which he had translated into Italian. He retired to Basil, where he died.

CASTIGATION, among the Romans, the punishment of an offender by blows, or beating with a wand or switch. Castigation was chiefly a military punishment; the power of inflicting which on the soldiery was given to the tribunes. Some make it of two kinds; one with a stick or cane, called *fustigatio*; the other with rods, called *flagellatio*: the latter was the most dishonourable.

CASTIGATORY *for* Scolds. A woman indicted for being a common scold, if convicted, shall be placed in a certain engine of correction, called the *trebucket, castigatory*, or *cucking-stool*; which, in the Saxon language, signifies the *scolding-stool*; though now it is frequently corrupted into the *ducking-stool*; because the residue of the judgment is, that, when she is placed therein, she shall be plunged in water for her punishment.

CASTIGLIONE (Giovanni Benedetto), a celebrated painter, was born at Genoa in 1616. His first master was Gio-Battista Paggi. Afterwards he studied under Andrea Ferrari; and lastly perfected himself from the instructions of Anthony Vandyck, who at that time resided at Genoa. He painted portraits, historical pieces, landscapes, and castles: in the latter of which he is said chiefly to have excelled; as also in fairs, markets, and all kinds of rural scenes. By this master we have also a great number of etchings, which are all spirited, free, and full of taste. The effect is, in general, powerful and pleasing; and many of them have a more harmonized and finished appearance than is usual from the point; so little assisted by the graver. His drawing of the naked figure, though by no means correct, is notwithstanding managed in a style that indicates the hand of a master. His son *Francesco* was bred under himself, and excelled in the same subjects; and it is thought that many good paintings which are ascribed to Benedetto, and are frequently seen at sales, or in modern collections, are copies after him by his son Francesco, or perhaps originals of the younger Castiglione.

Castiglione, a ſmall but ſtrong town of Italy in Mantua, with a caſtle. E. long. 10. 29. N. lat. 43. 23.

CASTIGLIONI (Balthazar), an eminent Italian nobleman, deſcended from an illuſtrious and ancient family, and born at his own villa at Caſalico in the duchy of Milan in 1478. He ſtudied painting, ſculpture, and architecture, as appears from a book he wrote in favour of theſe arts; and excelled ſo much in them, that Raphael Urbino, and Buonaroti, though incomparable artiſts, never thought their works complete without the approbation of Count Caſtiglioni. When he was 26 years of age, Guido Ubaldo, Duke of Urbino, ſent him ambaſſador to Pope Julius II. He was ſent upon a ſecond embaſſy to Louis XII. of France, and upon a third to Henry VII. of England. After he had diſpatched his buſineſs here, he returned, and began his celebrated work, intitled *The Courtier*; which he completed at Rome in 1516. This work is full of moral and political inſtruction: and if we ſeek for the Italian tongue in perfection, it is ſaid to be no where better found than in this performance. Count Caſtiglioni was ſent by Clement VII. to the court of the Emperor Charles V. in quality of legate, and died at Toledo in 1529.

CASTILE (New), or The Kingdom of Toledo, a province of Spain, bounded on the north by Old Caſtile, on the eaſt by the kingdom of Arragon and Valencia, on the ſouth by that of Murcia and Andaluſia, and on the weſt by the kingdom of Leon. It is divided into three parts; Argaria to the north, Mancha to the eaſt, and Sierra to the ſouth. Madrid is the capital. Both theſe provinces are very well watered with rivers, and the air is generally pure and healthy; but the land is mountainous, dry, and uncultivated through the lazineſs of the inhabitants. The north part produces fruits and wine, and the ſouth good paſtures and fine wool. Theſe provinces are divided by a long chain of mountains, which run from eaſt to weſt.

Castile *(Old)*, a province of Spain, with the title of a kingdom. It is about 192 miles in length, and 115 in breadth; bounded on the ſouth by New Caſtile, on the eaſt by Arragon and Navarre, on the north by Biſcay and Aſturia, and on the weſt by the kingdom of Leon. Burgos is the capital town.

Castile-*de-Oro*, a large and fertile country in South America, lying to the weſt of Oroonoko. It comprehends eight governments; viz. Terra Firma, Proper Carthagena, St. Martha, Rio de la Hacha, Veniſuela, New Andaluſia, Popayan, and the new kingdom of Granada.

CASTILLAN, or Castillane, a gold coin current in Spain, and worth fourteen rials and ſixteen deniers.

Castillan is alſo a weight uſed in Spain for weighing gold. It is the hundredth part of a pound Spaniſh weight. What they commonly call a weight of gold in Spain is always underſtood of the Caſtillan.

CASTILLARA, a town of the Mantuan in Italy, ſituated ſix miles north-eaſt of the city of Mantua. E. long. 11. 25. N. lat. 45. 20.

CASTILLON, a town of France, in the department of Gironde and late province of Guienne; famous for a victory gained by the French over the Engliſh in 1451. It is ſeated on the Dordogne, 25 miles E. of Bourdeaux. Long. 0. 2. E. Lat. 44. 52. N.

CASTING, in foundery, the running of metal into a mould, prepared for that purpoſe. For Casting *of Metals, of Letters, Bells, &c.* See the article Foundery.

Casting *in Sand or Earth*, is the running of metals between two frames, or molds, filled with ſand or earth, wherein the figure that the metal is to take has been impreſſed *en creux*, by means of the pattern.

Casting, among ſculptors, implies the taking of caſts and impreſſions of figures, buſts, medals, leaves, &c. The method of taking caſts of figures and buſts is moſt generally by the uſe of plaſter of Paris, *i. e.* alabaſter calcined by a gentle heat. The advantage of uſing this ſubſtance preferably to others is, that notwithſtanding a ſlight calcination reduces it to a pulverine ſtate, it becomes again a tenacious and cohering body, on being moiſtened with water and afterwards ſuffered to dry; by which means either a concave or a convex figure may be given (by a proper mold or model) to it when wet, and retained by the hardneſs it acquires when dry: and from theſe qualities, it is fitted for the double purpoſe of making both caſts, and molds for forming thoſe caſts. The particular manner of making caſts depends on the form of the ſubject to be taken. Where there are no projecting parts, as in medals, it is very ſimple and eaſy; as likewiſe where there are ſuch as form only a right or any greater angle with the principal ſurface of the body; but where parts project in leſſer angles, or form a curve inclined towards the principal ſurface of the body, the work is more difficult.

The firſt ſtep to be taken is the forming the mold. In order to this, if the original be a bas-relief, or any other piece of a flat form, having its ſurface firſt well oiled, or greaſed, it muſt be placed on a table, and ſurrounded by a frame, the ſides of which muſt be at ſuch a diſtance from it as will allow a proper thickneſs for the ſides of the mold. As much plaſter as will be ſufficient to cover and riſe to ſuch a thickneſs as may give ſufficient ſtrength to the mold, as alſo to fill the hollow betwixt the frame and the model, muſt be moiſtened with water, till it be juſt of ſuch conſiſtence as will allow it to be poured upon the model. This muſt be done as ſoon as poſſible; or otherwiſe the plaſter will concrete or ſet, ſo as to become unfit to be uſed. The whole muſt then be ſuffered to remain in this condition, till the plaſter has attained its hardneſs; and then the frame being taken away, the preparatory caſt or mold, thus formed, may be taken off from the ſubject entire, and afterwards left to dry.

But where the model or original ſubject is of a round or erect form, a different method muſt be purſued; for the mold muſt be formed in ſeveral pieces: or if the ſubject conſiſts of detached and projecting parts, it is frequently moſt expedient to caſt ſuch parts ſeparately, and afterwards join them together. Where the ſubject forms a round, or ſpheroid, or any part of ſuch round or ſpheroid, more than one half the plaſter muſt be uſed without any frame to keep it round the model; and muſt be tempered with water to ſuch a conſiſtence, that it may be wrought with the hand like very ſoft paſte; but though it need not be ſo fluid as when prepared for flat figured models, it muſt yet be as moiſt as is compatible with its cohering ſufficiently to hold together; and being thus prepared, it muſt be put upon the model, and compreſſed with the hand, or any flat inſtrument, that the parts of it may adapt themſelves, in the moſt perfect manner, to thoſe of the ſubject, as well as be compact with reſpect to themſelves. When the model is ſo covered to a convenient thickneſs, the whole muſt be left at reſt till the plaſter be ſet and firm, ſo as to bear dividing without falling to pieces, or being liable to be put out of its form by ſlight violence; and it muſt then be divided into pieces, in order to its being taken off from the model, by cutting it with a knife with a very thin blade; and being divided, muſt be cautiouſly taken off, and kept till dry: but it muſt be always carefully obſerved, before the ſeparation of the parts be made, to notch them acroſs the joints or lines of the diviſion, at proper diſtances, that they may with eaſe and certainty be properly conjoined again; which would be much more precarious and troubleſome without ſuch directive marks. The art of properly dividing the molds, in order to make them ſeparate from the model, requires more dexterity and ſkill than any other thing, and does not admit of rules for the moſt advantageous conduct of it in every caſe. Where the ſubject is of a round or ſpheroidal form, it is beſt to

divide the mold into three parts, which will then eafily come off from the model; and the fame will hold good of a cylinder or any regularly curved figure.

The mold being thus formed, and dry, and the parts put together, it muft be firft greafed, and placed in fuch a pofition that the hollow may lie upwards, and then filled with plafter mixed with water, in the fame proportion and manner as was directed for the cafting the mold: and when the caft is perfectly fet and dry, it muft be taken out of the mold, and repaired where it is neceffary; which finifhes the operation.

Where the model forms curves which interfect each other, the conduct of the operation muft be varied with refpect to the manner of taking the caft. But in fact it muft be left to the good fenfe of the operator to judge, from the original fubjects, what parts will come off together, and what require to be feparated. The principle of the whole confifts only in this, that where under-workings, as they are called, occur, that is, wherever a ftraight line drawn from the bafis or infertion of any projection would be cut or croffed by any part of fuch projection, fuch part cannot be taken off without a divifion; which muft be made either in the place where the projection would crofs the ftraight line; or, as that is frequently difficult, the whole projection muft be feparated from the main body, and divided alfo lengthwife into two parts: and where there are no projections from the principal furfaces, but the body is fo formed as to render the furface a compofition of fuch curves, that a ftraight line being drawn parallel to the furface of one part would be cut by the outline, in one or more places, of another part, a divifion of the whole fhould be made, fo as to reduce the parts of it into regular curves, which muft then be treated as fuch. A tolerably good general rule with fome, is to apply the plafter only to fo much of the furface of the model as the eye can diftinctly fee.

In larger maffes, where there would otherwife be a great thicknefs of the plafter, a corps or body may be put within the mold, in order to produce a hollow in the caft: which both faves plafter, and renders the caft lighter. This corps may be of wood, where the forming a hollow of a ftraight figure, or a conical one with the bafis outward, will anfwer the end: but if the cavity require to be round, or of any curved figure, the corps cannot be then drawn while entire; and confequently fhould be of fuch matter as may be taken out piece-meal. In this cafe, the corps is beft formed of clay; which muft be worked upon wires to give it tenacity, and fufpended in the hollow of the mold, by crofs wires lying over the mouth; and when the plafter is fufficiently fet to bear handling, the clay muft be picked out by a proper inftrument. Where it is defired to render the plafter harder, the water with which it is tempered fhould be mixed with glue fize, which will make it very firm and tenacious.

In the fame manner, figures, bufts, &c. may be caft of lead, or any other metal, in the molds of plafter; though the expence of plafter, and the tedioufnefs of its becoming fufficiently dry, when in a very large mafs, to bear the heat of melted metal, render the ufe of clay preferable where large fubjects are wanted. The clay, in this cafe, fhould be wafhed over till it be perfectly free from gravel or ftones; and then mixed with a third or more of fine fand to prevent its cracking; or, inftead of fand, coal-afhes fifted fine may be ufed. Whether plafter or clay be employed for the cafting in metal, it is extremely neceffary to have the mold perfectly dry: otherwife the moifture, being rarefied, will make an explofion that will blow the metal out of the mold, and endanger the operator.

Cafts of medals, or fuch fmall pieces as are of a fimilar form, may be made in plafter by the method directed for bas-relievos. Indeed there is nothing more required than to form a mold by laying them on a proper board; and having furrounded them by a rim made of a piece of a card, or any other pafteboard, to fill the rim with foft tempered plafter of Paris; which mold, when dry, will ferve for feveral cafts. It is nevertheless a better method to form the mold of melted fulphur; which will produce a fharper impreffion in the caft, and be more durable than thofe made of plafter. The cafts are likewife frequently made of fulphur, which being melted muft be treated exactly in the fame manner as plafter.

For taking cafts from medals, a mixture of brimftone and red lead are very proper: equal parts of thefe are to be put over the fire in a ladle, till they foften to the confiftence of pap; then they are kindled with a piece of paper, and ftirred for fome time. The veffel being afterwards covered clofe, and continued on the fire, the mixture grows fluid in a few minutes. It is then to be poured on the metal, previoufly oiled and wiped clean. The cafts are very neat; their colour fometimes a pretty deep black, fometimes a dark grey: they are very durable; and, when foiled, may be wafhed clean in fpirits of wine. Some recommend tin-foil for taking off cafts from medals. The thinneft kind of this fhould be laid over the fubject from which the impreffion is to be taken, and then rubbed with a brufh, the point of a fkewer, or a pin, till it has perfectly received the impreffion. The tin-foil fhould now be pared clofe to the edge of the medal, till it is brought to the fame circumference: the medal muft then be reverfed, and the tin-foil will drop off into a chip-box or mold placed ready to receive it. Thus the concave fide of the foil will be uppermoft, and upon this, plafter of Paris, prepared in the ufual manner, may be poured. When dry, the whole is to be taken out, and the tin-foil fticking on the plafter will give a perfect reprefentation of the medal, refembling filver. If the box or mold be a little larger than the medal, the plafter running round the tin-foil, will give the appearance of a white frame or circular border; whence the new made medal will appear more neat and beautiful.

Impreffions of medals, having the fame effect as cafts, may be made alfo of ifinglafs-glue, by the following means: Melt the ifinglafs, beaten as when commonly ufed, in an earthen pipkin, with the addition of as much water as will cover it, ftirring it gently till the whole is diffolved; then with a brufh of camel's hair, cover the medal, which fhould be previoufly well cleanfed and warmed, and then laid horizontally on a board or table, greafed in the part around the medal. Let them reft afterwards till the glue be properly hardened; and then, with a pin, raife the edge of it; and feparate it carefully from the medal: the caft will thus be formed by the glue as hard as horn; and fo light, that a thoufand will fcarcely weigh an ounce. In order to render the relief of the medal more apparent, a fmall quantity of carmine may be mixed with the melted ifinglafs; or the medal may be previoufly coated with leaf-gold by breathing on it, and then laying it on the leaf, which will by that means adhere to it: but the ufe of leaf-gold is apt to impair a little the fharpnefs of the impreffion.

Impreffions of medals may be likewife taken in putty; but it fhould be the true kind made of calx of tin, and drying oil. Thefe may be formed in the molds previoufly taken in plafter or fulphur; or molds may be made of its own fubftance, in the manner directed for thofe of the plafter. Thefe impreffions will be very fharp and hard; but the greateft difadvantage that attends them, is their drying very flowly, and being liable in the mean time to be damaged. Impreffions of prints, or other engravings, may be taken from copper plates, by rubbing vermilion or any other colouring matter into the ftrokes of the graver, then cleanfing them thoroughly, and laftly pouring plafter upon them.

Casting is alfo fometimes ufed for the quitting, laying, or throwing afide any thing; thus deer caft their horns, fnakes their fkins, lobfters their fhells, hawks their feathers, &c. annually.

CASTING *of feathers* is more properly called *moulting* or *mewing*. A horſe *caſts* his hair, or coat, at leaſt once a year, viz. in the ſpring when he caſts his winter coat; and ſometimes, at the cloſe of autumn, he caſts his ſummer coat, in caſe he has been ill kept. Horſes alſo ſometimes *caſt* their hoofs, which happens frequently to coach horſes brought from Holland; theſe, being bred in a moiſt marſhy country, have their hoofs too flabby: ſo that coming to a drier ſoil, and leſs juicy provender, their hoofs fall off, and others that are firmer ſucceed.

CASTING *a Colt*, denotes a mare's proving abortive.

CASTING-*Net*, a ſort of fiſhing net ſo called, becauſe it is to be *caſt*, or thrown out; which when exactly done, nothing eſcapes it, but weeds and every thing within its extent are brought up.

CASTLE, a fortreſs or place rendered defenſible either by nature or art. It frequently ſignifies with us the principal manſion of a nobleman. In the time of Henry II. there were no leſs than 1115 caſtles in England, each of which included a manor.

CASTLES, walled with ſtone, and deſigned for reſidence as well as defence, are, for the moſt part, according to Mr. Groſe, of no higher antiquity than the Conqueſt: for although the Saxons, Romans, and even, according to ſome writers on antiquity, the ancient Britons, had caſtles built with ſtone: yet theſe were both few in number, and, at that period, through neglect or invaſions, either deſtroyed, or ſo much injured, that little more than their ruins were remaining. This is aſſerted by many of our hiſtorians and antiquaries, and aſſigned as a reaſon for the facility with which William the Conqueror not only made himſelf maſter of this country, but alſo kept his newly-acquired ſubjects in awe. The turbulent and unſettled ſtate of the kingdom likewiſe, in the ſucceeding reigns, ſerved to multiply them prodigiouſly, every baron or leader of a party building a caſtle; inſomuch that towards the latter end of the reign of king Stephen they amounted to the almoſt incredible number of 1115.

The materials of which caſtles were built, varied according to the places of their erection; but the manner of their conſtruction ſeems to have been pretty uniform. The outſides of the walls were generally built with the ſtones neareſt at hand, laid as regularly as their ſhapes would admit; the inſides were filled up with the like materials, mixed with a great quantity of fluid mortar, which was called by the workmen groutwork. The general ſhape or plan of theſe caſtles depended entirely on the caprice of the architects, or the form of the ground intended to be occupied: neither do they ſeem to have confined themſelves to any particular figure in their towers; ſquare, round, and polygonal, oftentimes occurring in the original parts of the ſame building.

The ſituation of the caſtles of the Anglo-Norman kings and barons was moſt commonly on an eminence, and near a river; a ſituation on ſeveral accounts eligible. The whole ſite of the caſtle (which was frequently of great extent and irregular figure) was ſurrounded by a deep and broad ditch, ſometimes filled with water, and ſometimes dry, called the *foſſe*. Before the great gate, was an outwork, called a *barbacan*, or *antemural*, which was a ſtrong and high wall, with turrets upon it, deſigned for the defence of the gate and draw-bridge. On the inſide of the ditch ſtood the wall of the caſtle, about eight or ten feet thick, and between 20 and 30 feet high, with a parapet, and a kind of embraſures, called *crennels*, on the top. On this wall, at proper diſtances, ſquare towers of two or three ſtories high were built, which ſerved for lodging ſome of the principal officers of the proprietor of the caſtle, and for other purpoſes; and on the inſide were erected lodgings for the common ſervants or retainers, granaries, ſtorehouſes, and other neceſſary offices. On the top of this wall, and on the flat roofs of theſe buildings, ſtood the defender of the caſtle, when it was beſieged, and from thence diſcharged arrows, darts, and ſtones, on the beſiegers. The great gate of the caſtle ſtood in the courſe of this wall, and was ſtrongly fortified with a tower on each ſide, and rooms over the paſſage, which was cloſed with thick folding-doors of oak, often plated with iron, and with an iron portcullis or grate let down from above. Within this outward wall was a large open ſpace or court, called, in the largeſt and moſt perfect caſtles, the *outer bayle*, or *ballium*, in which ſtood commonly a church or chapel. On the inſide of this outer bayle were another ditch, wall, gate, and towers, incloſing the inner bayle or court, within which the chief tower or *keep* was built. This was a very large ſquare fabric, four or five ſtories high, having ſmall windows in prodigious thick walls, which rendered the apartments within it dark and gloomy. This great tower was the palace of the prince, prelate, or baron, to whom the caſtle belonged, and the reſidence of the conſtable or governor. Under ground were diſmal dark vaults, for the confinement of priſoners, which made it ſometimes be called the *dungeon*. In this building alſo was the great hall, in which the owner diſplayed his hoſpitality, by entertaining his numerous friends and followers. At one end of the great halls of caſtles, palaces, and monaſteries, there was a place raiſed a little above the reſt of the floor, called the *deis*, where the chief table ſtood, at which perſons of the higheſt rank dined. Though there were unqueſtionably great variations in the ſtructure of caſtles, yet the moſt perfect and magnificent of them ſeem to have been conſtructed nearly on the above plan. Such, to give one example, was the famous caſtle of Bedford, as appears from the following account of the manner in which it was taken by Henry III. A. D. 1224. The caſtle was taken by four aſſaults: "In the firſt was taken the barbacan; in the ſecond the outer ballia; at the third attack, the wall by the old tower was thrown down by the miners, where, with great danger, they poſſeſſed themſelves of the inner ballia, through a chink; at the fourth aſſault the miners ſet fire to the tower, ſo that the ſmoke burſt out, and the tower itſelf was cloven to that degree, as to ſhow viſibly ſome broad chinks: whereupon the enemy ſurrendered." See a repreſentation of a caſtle in Plate 61, where 1 is the barbacan, 2 the ditch or moat, 3 the wall of the outer ballium, 4 the outer ballium, 5 the artificial mount, 6 the wall of the inner ballium, 7 the inner ballium, 8 the keep or dungeon.

On the ſea-coaſts of Scotland we generally find the ſtrongeſt and moſt ancient, as well as the moſt impregnable caſtles. Theſe had to defend themſelves from the invaſion of the foreign enemy, as well as the attacks of the domeſtic foe. Thus we find the barons, whoſe lands extended to the ſea-coaſt, perched, like the eagle, on the moſt inacceſſible rocks that lay within their poſſeſſions. Of this kind were Slains caſtle, Tantallon, and Dunotter on the eaſt coaſt, and Dunvegan in the iſle of Sky, with Dunolly on the weſt coaſt. Theſe muſt have been moſt uncomfortable retreats, except to a barbarous people, or when a preſſing danger forced the baron to ſeek his ſafety in the only poſſible retreat left him.

CASTLE, in ancient writers, denotes a town or village ſurrounded with a ditch and wall, furniſhed with towers at intervals, and guarded by a body of troops. The word is from the Latin, *caſtellum*, a diminutive from *caſtrum*. *Caſtellum* originally ſeems to have ſignified a ſmaller fort for a little garriſon: though Suetonius uſes the word where the fortification was large enough to contain a cohort. The *caſtella*, according to Vegetius, were often like towns, built on the borders of the empire, and where there were conſtant guards and fences againſt the enemy. Horſley takes them for much the ſame with what were otherwiſe denominated *ſtations*.

CASTLE, or *Caſtle-ſteed*, is alſo an appellation given by the country-people in the north to the Roman *caſtella*, as diſtin-

guished from the *castra stativa*, which they usually call *chesters*. Horsley represents this as an useful criterion, whereby to discover or distinguish a Roman camp or station. There are several of these castella on Severus's wall: they are generally 60 feet square; their north side is formed by the wall itself, which falls in with them; the intervals between them are from six furlongs and an half to seven; they seem to have stood closest where the stations are widest. The neighbouring people call them *castles* or *castle-steads*, by which it seems probable that their ancient Latin name has been *castellum*. Some modern writers call them *mile-castles*, or military *castelle*: Horsley sometimes *exploratory castles*. In these *castella* the *areans* had their stations, who were an order of men whose business was to make incursions into the enemy's country, and give intelligence of their motions.

Castle, in the sea language, is a part of the ship, of which there are two; the fore-castle, being the elevation at the prow, or the uppermost deck towards the mizen, the place where the kitchens are: the hind-castle is the elevation which rises on the stern, over the last deck, where the officers' cabins and places of assembly are.

Castle (Edmund). See Castel.

Castle-*Bar*, a borough and market-town, capital of the county of Mayo in Ireland, is a well-inhabited place, and carries on a brisk trade: it has a barrack for a troop of horse; and there is here a charter-school capable of receiving fifty children, and endowed with two acres of land, rent-free, by the Right Honourable Lord Lucan, who has also granted a lease of twenty acres more at a pepper-corn yearly.

Castle-*Cary*, a remarkable Roman station about four miles west from Falkirk on the borders of Stirlingshire in Scotland.

Castle-*Rising*, a borough-town of Norfolk in England, which sends two members to parliament. E. long. 0. 40. N. lat. 52. 46.

Castle-*work*, service or labour done by inferior tenants, for the building and upholding castles of defence, toward which some gave their personal assistance, and others paid their contributions. This was one of the three necessary charges to which the Anglo-Saxons were expressly subject.

CASTLETOWN, the capital of the isle of Man, seated on the south-west part of the island. It has a strong castle; but of no great importance, on account of its distance from the rocky and shallow harbour. W. long. 4. 39. N. lat. 53. 30.

CASTOR, the Beaver, in zoology. See Beaver.

Castor, in astronomy, a moiety of the constellation Gemini; called also Apollo. Its latitude northwards, for the year 1700, according to Hevelius, was 10° 4′ 23″; and its longitude, of Cancer, 16° 4′ 14″. It is also called Rasalgenze, Apollo, Aphellan, Avellar, and Anelar.

Castor and *Pollux*, in Pagan mythology. Jupiter having an amour with Leda, the wife of Tyndarus king of Sparta, in the form of a swan, she brought forth two eggs, each containing twins. From that impregnated by Jupiter proceeded Pollux and Helena, who were both immortal; from the other Castor and Clytemnestra, who being begot by Tyndarus were both mortal. They were all, however, called by the common ame of *Tyndaridæ*.

Castor and *Pollux*, a fiery meteor, which at sea appears sometimes sticking to a part of the ship, in form of one, two, or even three or four fire-balls: when one is seen alone, it is more properly called *Helena*; two are denominated Castor and Pollux, and sometimes Tyndaridæ. Castor and Pollux are called by the Spaniards, *San Elmo*; by the French *St. Elme*, *St. Nicolas*, *St. Clare*, *St. Helene*; by the Italians, *Hermo*; by the Dutch, *Vree Vuuren*. Castor and Pollux are commonly judged to portend the cessation of a storm, and a future calm; being rarely seen till the tempest is nigh spent. Helena alone portends ill, and indicates the severest part of the storm yet behind. When the meteor sticks to the masts, yards, &c. they conclude, from the air's not having motion enough to dissipate this flame, that a profound calm is at hand: if it flutter about, it indicates a storm.

CASTOREUM, in the Materia Medica, *Castor*; the inguinal glands of the beaver. See Beaver. The ancients had a notion that it was lodged in the testicles; and that the animals, when hard pressed, would bite them off, and leave them to its pursuers, as if conscious of what they wanted to destroy him for. The best sort of castor comes from Russia; but though once in great esteem as a medicine, it is now very little regarded by physicians.

CASTRATION, in surgery, the operation of cutting off diseased testicles. Castration is much in use in Asia, especially among the Turks, who practise it on their slaves, to prevent any commerce with their women. The Turks often make a general amputation. Castration also obtains in Italy, where it is used with a view to preserve the voice for singing, See Eunuch. The Persians, and other eastern nations, have various methods of making eunuchs. Castration was for some time the punishment of adultery. By the laws of the Visigoths, sodomites underwent the same punishment. By the civil law, it is made penal in physicians and surgeons to castrate, even with consent of the party, who is himself included in the penalty, and his effects forfeited. The offence of Mayhem by castration is, according to all our old writers, felony; though committed upon the highest provocation. See a record to this purpose of Henry III. transcribed by Sir Edward Coke, 3 Inst. 62. or Blackstone's Com. vol. iv.

Castration is also supposed to have been in some sort practised on women. Athenæus mentions that king Andramytes was the first who castrated women. Hesychius and Suidas say that Gyges did the same thing. Galen observes, and justly, that women cannot be castrated without danger of life. Dalechampius, on the forementioned passage of Athenæus, holds, that it is only to be understood as some mechanical means of hindering coition.

Castration, in respect of brutes, is called Gelding in males, and Spaying in females.

Castration also denotes the art of retrenching, or cutting away any part of a thing from its whole. Castrating a book, among booksellers, is the taking out some leaf, sheet, or the like, which renders it imperfect and unfit for sale. The term is also applied to the taking away particular passages, on account of their obscenity, their libellous tendency, &c.

Castration, among botanists, a term derived from the fancied analogy betwixt plants and animals. The castration of plants consists in cutting off the *antheræ*, or tops of the stamina, before they have attained maturity, and dispersed the pollen or fine dust contained within their substance. This operation has been frequently practised by the moderns, with a view to establish or confute the doctrine of the sexes of plants; the antheræ or tops being considered by the sexualists as the male organs of generation. The experiment of castration succeeds principally on plants which, like the melon, have their male flowers detached from the female. In such as have both male and female flowers contained within the same covers, this operation cannot be performed without endangering the neighbouring organs.

CASTREL, a kind of hawk resembling the lanner in shape, but the hobby in size. The castrel is also called kestrel, and is of a slow and cowardly kind; her game is the grous, though she will kill a partridge.

CASTRES, a town of France, in the department of Tarn and late province of Languedoc, of which it was recently an episcopal see. It is seated in a fine valley, on the river Agout. In the reign of Louis XIII. Castres was a kind of protestant republic; but, in 1629, its fortifications were demolished.

Near this town are mines of Turquoiſe ſtones. It was the birth place of Rapin Thoyras, Abel Bowyer, and M. Dacier. It is 20 miles S. of Alby. Long. 2. 20. E. Lat. 43. 37. N.

CASTRO, the capital of the iſland of Chiloe, on the coaſt of Chili in South America. W. long. 82. S. lat. 43.

Castro is alſo the capital of a duchy of the ſame name in the Pope's territories in Italy, ſituated on the confines of Tuſcany. E. long. 12. 35. N. lat, 42. 30.

Castro (Pietro de), a celebrated painter, who flouriſhed about the middle of the 17th century. The ſubjects which this great artiſt choſe to paint, were what are diſtinguiſhed by the name of ſtill life; vaſes, ſhells, muſical inſtruments, gems, veſſels of gold, ſilver, and cryſtal, books, and rich bracelets; and in thoſe ſubjects his choice and diſpoſition were elegant, and his execution admirable.

CASTRUCCIO (Caſtracani), a celebrated Italian general, was born (nobody knows of whom) at Lucca in Florence in 1284, and left in a vineyard covered with leaves, where he was found by Dianora, a widow lady, the ſiſter of Antonio, a canon of St. Michael in Lucca, who was deſcended from the illuſtrious family of the Caſtracani. The lady having no children, they reſolved to bring him up, and educated him as carefully as if he had been their own. They intended him for a prieſt; but he was ſcarcely 14 years old when he began to devote himſelf to military ſports and thoſe violent exerciſes which ſuited his great ſtrength of body. The factions named the *Guelfs* and *Gibelines* then ſhared all Italy between them; and in theſe ſtruggles he eminently diſtinguiſhed himſelf as the champion of the latter. The Gibelines, indeed, conſidered him as the chief of their party; and thoſe who had been baniſhed their country fled to him for protection, and unanimouſly promiſed, that if he could reſtore them to their eſtates, the ſovereignty of their country ſhould be his reward. Flattered by theſe promiſes, he entered into a league with the prince of Milan. He kept his army conſtantly on foot, employing it as beſt ſuited his own deſigns. For ſervices he had done the pope, he was made ſenator of Rome. At length the Florentines entered into a war with him, but Caſtruccio fought his way through them; and the ſupreme authority of Tuſcany was ready to fall into his hands, when a period was put to his life. In May 1328, he gained a complete victory over the Florentines, whoſe army amounted to 30,000 foot and 10,000 horſe; in which 22,000 of them were ſlain, with the loſs of not quite 16,000 of his own men: but as he was returning from the field of battle, tired with the action, and covered with ſweat, he halted a little, in order to thank and careſs his ſoldiers as they paſſed; when, the north wind blowing upon him, he was immediately ſeized with an ague, which he at firſt neglected, but it carried him off in a few days, in the 44th year of his age. Machiavel, who has written the life of Caſtruccio, ſays, that he was not only an extraordinary man in his own age, but would have been ſo in any other. He was of a noble aſpect, and of the moſt winning addreſs. He had all the qualities that make a man great; was grateful to his friends, juſt to his ſubjects, terrible to his enemies. No man was more forward to encounter dangers; no man more careful to eſcape them. He had an uncommon preſence of mind, and often made repartees with great ſmartneſs. Some of them are recorded, which diſcover a ſingular turn of humour; and, for a ſpecimen, we ſhall mention ſome inſtances of them.—Paſſing one day through a ſtreet where there was a houſe of bad fame, he ſurpriſed a young man, who was juſt coming out, and who, upon ſeeing him, was all over bluſhes and confuſion: "Friend, you ſhould not be aſhamed when you come out, but when you go in."—One aſking a favour of him with a thouſand impertinent and ſuperfluous words; "Hark you, friend; when you would have any thing with me for the future, ſend another man to aſk it."—Another great talker having tired him with a tedious diſcourſe, excuſed himſelf at laſt, by ſaying, he was afraid he had been troubleſome. "No, indeed (replied he), for I did not mind one word you ſaid."—He was forced to put a citizen of Lucca to death, who had formerly been a great inſtrument of his advancement; and being reproached by ſomebody for having dealt ſo ſeverely with an old friend, replied, "No, you are miſtaken, it was with a new foe."—One of his courtiers, deſirous to regale him, made a ball and invited him to it. Caſtruccio came, entertained himſelf among the ladies, danced, and did other things which did not ſeem to comport with the dignity of his rank. One of his friends intimating that ſuch freedoms might diminiſh the reverence that ought to be paid him: "I thank you for your caution; but he who is reckoned wiſe all the day, will never be reckoned a fool at night."

CASTRUM doloris, in middle-age writers, denotes a catafalco, or a lofty tomb of ſtate, erected in honour of ſome perſon of eminence, uſually in the church where his body is interred; and decorated with arms, emblems, lights, and the like. Eccleſiaſtical writers ſpeak of a ceremony of conſecrating a *caſtrum doloris*; the edifice was to be made to repreſent the body of the deceaſed, and the prieſt and deacon were to take their poſts, and ſay the prayers after the ſame manner as if the corpſe were actually preſent.

CASTS. See Casting.

CASU consimili, in law, a writ of entry granted where a tenant, by courteſy or for life, aliens either in fee, in tail, or for the term of another's life. It is brought by him in reverſion againſt the perſon to whom ſuch tenant does ſo alien to the prejudice of the reverſioner in the tenant's lifetime.

Casu-*Proviſo*, in law, a writ of entry founded on the ſtatute of Glouceſter, where a tenant in dower aliens the lands ſhe ſo holds in fee, or for life; and lies for the party in reverſion againſt the alienee.

CASUAL, ſomething that happens fortuitouſly, without any deſign, or any meaſures taken to bring it to paſs. Thus, Casual-*Revenues*, are thoſe which ariſe from forfeitures, confiſcations, deaths, attainders, &c.

Casual-*Theology*, a denomination given to what is more frequently called Casuistry.

CASUIST, a perſon who propoſes to reſolve caſes of conſcience. Eſcobar has made a collection of the opinions of all the caſuiſts before him. M. Le Feore, preceptor of Louis XIII. called the books of the caſuiſts the art of quibbling with God; which does not ſeem far from truth, on account of the multitude of diſtinctions and ſubtleties they abound with. Mayer has publiſhed a bibliotheca of caſuiſts, containing an account of all the writers on caſes of conſcience, ranged under three heads, the firſt comprehending the Lutheran, the ſecond the Calviniſt, and the third the Romiſh caſuiſts.

CASUISTRY, the doctrine and ſcience of conſcience and its caſes, with the rules and principles of reſolving the ſame; drawn partly from natural reaſon or equity; partly from authority of ſcripture, the canon law, councils, fathers, &c. To caſuiſtry belongs the deciſion of all difficulties ariſing about what a man may lawfully do or not do; what is ſin or not ſin; what things a man is obliged to do in order to diſcharge his duty, and what he may let alone without breach of it.

CAT, in zoology. See Felis.

Cat, in ſea-affairs, a ſhip employed in the coal-trade, formed from the Norwegian model. It is diſtinguiſhed by a narrow ſtern, projecting quarters, a deep *waiſte*, and by having ornamental figures on the prow. Theſe veſſels are generally built remarkably ſtrong, and carry from four to ſix hundred tons, or, in the language of their own mariners, from 20 to 30 *keels* of coals.

Cat, is alſo a ſort of ſtrong tackle, or combination of pullies, to hook and draw the anchor perpendicularly up to the *cat-head.* See Cat-*Heads.*

Cat's *Eye,* or *Sun-ſtone* of the Turks, a kind of gem found chiefly in Siberia. Cat's eye is by the Latins called *oculus cati,* and ſometimes *onycopalus,* as having white zones or rings like the onyx; and its colours variable like opal, from which laſt it differs chiefly by its ſuperior hardneſs. It is very hard, and ſemitranſparent, and has different points, from whence the light is reflected with a kind of yellowiſh radiation ſomewhat ſimilar to the eye of a cat, from whence it had its name. The beſt of them are very ſcarce, and jewellers cut them round to the greateſt advantage. One of theſe ſtones, an inch in diameter, was in the poſſeſſion of the duke of Tuſcany.

Cat-*Fiſh,* in ichthyology. See Squalus.

Cat-*Gut,* a denomination given to ſmall ſtrings for fiddles, and other inſtruments, made of the inteſtines of ſheep or lambs, dried and twiſted together, either ſingly, or ſeveral together. Theſe are ſometimes coloured red, ſometimes blue, but are commonly left whitiſh or browniſh, the natural colour of the gut. They are alſo uſed by coach-makers, cutlers, turners, and other artificers. Great quantities are imported into England, and other northern countries, from Lyons and Italy.

Cat *Harpings,* a purchaſe of ropes employed to brace in the ſhrouds of the lower maſts behind their yards, for the double purpoſe of making the ſhrowds more tight, and of affording room to draw in the yards more obliquely, to *trim* the ſails for a ſide-wind, when they are ſaid to be cloſe hauled.

Cat-*Heads,* two ſtrong ſhort beams of timber, which project almoſt horizontally over the ſhip's bows on each ſide of the bow-ſprit; being like two radii which extend from a centre taken in the direction of the bow-ſprit. That part of the cat-head which reſts upon the forecaſtle, is ſecurely bolted to the beams: the other part projects like a crane, as above deſcribed, and carries in its extremity two or three ſmall wheels or *ſheaves* of braſs or ſtrong wood, about which a rope called the *cat-fall* paſſes, and communicates with the cat-block, which alſo contains three ſheaves. The machine formed by this combination of pullies is called the *Cat,* which ſerves to pull the anchor up to the cat-head, without tearing the ſhip's ſides with its flukes. The cat-head alſo ſerves to ſuſpend the anchor clear of the bow, when it is neceſſary to let it go: it is ſupported by a ſort of knee, which is generally ornamented with ſculpture: ſee pate 57. The cat-block is filled with a large and ſtrong hood, which catches the ring of the anchor when it is to be drawn up.

Cat-*Mint.* See Mentha.

Cat-*Salt,* a name given by our ſalt-workers to a very beautifully granulated kind of common ſalt. It is formed out of the bittern, or leach brine, which runs from the ſalt when taken out of the pan. When they draw out the common ſalt from the boiling-pans, they put it into long wooden troughs, with holes bored at the bottom for the brine to drain out; under theſe troughs are placed veſſels to receive this brine, and acroſs them, ſmall ſticks, to which the cat-ſalt affixes itſelf in very large and beautiful cryſtals. This ſalt contains ſome portion of the bitter purging ſalt, is very ſharp and pungent, and is white when powdered, though pellucid in the maſs. It is uſed by ſome for the table, but the greateſt part of what is made of it is uſed by the makers of hard ſoap.

Cat-*Silver.* See Mica.

CATACAUSTIC curves, in the higher geometry, that ſpecies of cauſtic curves which are formed by reflection. See Fluxions.

CATACHRESIS, in rhetoric, a trope which borrows the name of one thing to expreſs another. Thus Milton, deſcribing Raphael's deſcent from the empyreal heaven to paradiſe, ſays,

" Down thither prone in flight
" He ſpeeds, and through the vaſt ethereal ſky
" Sails between worlds and worlds."

CATACOMB, a grotto, or ſubterraneous place for the burial of the dead. Some derive the word *catacomb* from the place where ſhips are laid up, which the modern Latins and Greeks call *cumbæ.* Others ſay, that *cata* was uſed for *ad,* and *catacumbas* for *adtumbas:* accordingly, Dadin ſays, they anciently wrote *catatumbas.* Others derive the word from the Greek κατα, and κυμβος, a hollow, cavity, or the like. Anciently the word *catacomb* was only underſtood of the tombs of St. Peter and St. Paul; and M. Chaſtelain obſerves, that, among the more knowing of the people of Rome, the word *catacomb* is never applied to the ſubterraneous burying-places hereafter mentioned, but only to a chapel in St. Sebaſtian, one of the ſeven ſtational churches; where the ancient Roman kalendars ſay the body of St. Peter was depoſited, under the conſulate of Tuſcus and Baſſus, in 258.

Catacombs of Italy; a vaſt aſſemblage of ſubterraneous ſepulchres about Rome, chiefly at about three miles from that city in the Via Appia; ſuppoſed to be the ſepulchres of the martyrs; and which are viſited accordingly out of devotion, and relics thence taken and diſperſed throughout the catholic countries, after having been firſt baptized by the pope under the name of ſome ſaint. Theſe *catacombs* are ſaid by many to be caves or cells wherein the primitive Chriſtians hid and aſſembled themſelves together, and where they interred ſuch among them as were martyred. Each *catacomb* is three feet broad, and eight or ten high; running in form of an alley or gallery, and communicating with others: in many places they extend within a league of Rome. There is no maſonry or vaulting in them, but each ſupports itſelf: the two ſides, which we may look on as the *parietes* or walls, were the places where the dead were depoſited; which were laid lengthwiſe, three or four rows over one another, in the ſame *catacomb,* parallel to the alley. They were commonly cloſed with large thick tyles, and ſometimes pieces of marble, cemented in a manner inimitable by the moderns. Sometimes, though very rarely, the name of the deceaſed is found on the tyle: frequently a palm is ſeen, painted or engraven, or the cipher Xp, which is commonly read *pro Chriſto.* The opinion held by many Proteſtant authors is, that the *catacombs* are heathen ſepulchres, and the ſame with the puticuli mentioned by Feſtus Pompeius; maintaining, that whereas it was the practice of the ancient Romans to burn their dead, the cuſtom was, to avoid expence, to throw the bodies of their ſlaves to rot in holes in the ground; and that the Roman Chriſtians, obſerving at length the great veneration paid to relics, reſolved to have a ſtock of their own. Entering therefore the *catacombs,* they added what ciphers and inſcriptions they pleaſed; and then ſhut them up again, to be opened on a favourable occaſion. Thoſe in the ſecret, add they, dying or removing, the contrivance was forgot, till chance opened them at laſt. But this opinion has even leſs of probability than the former. Mr. Monro, in the *Philoſophical Tranſactions,* ſuppoſes the *catacombs* to have been originally the common ſepulchres of the firſt Romans, and dug in conſequence of theſe two opinions, *viz.* That ſhades hate the light; and that they love to hover about the places where the bodies are laid.

Though the catacombs of Rome have made the greateſt noiſe of any in the world, there are ſuch belonging to many other cities. Thoſe of Naples, according to biſhop Burnet, are much more noble and ſpacious than the catacombs of Rome. Catacombs have alſo been diſcovered at Syracuſe and Catanea in Sicily, and in the iſland of Malta. The Roman catacombs

take particular names from the churches in their neighbourhood, and ſeem to divide the circumference of the city without the walls between them, extending their galleries every where under, and a vaſt way from it; ſo that all the ground under Rome, and for many miles about it, ſome ſay 20, is hollow. The largeſt, and thoſe commonly ſhown to ſtrangers, are the catacombs of San Sebaſtiano, thoſe of Saint Agneſe, and the others in the fields a little off Saint Agneſe. Women are only allowed to go into the catacombs in the church-yard of the Vatican on Whit-Monday, under pain of excommunication. There are men kept conſtantly at work in the *catacombs*. As ſoon as theſe labourers diſcover a grave with any of the ſuppoſed marks of a ſaint upon it, intimation is given to the cardinal Comerlingo, who immediately ſends men of reputation to the place, where finding the palm, the monogram, the coloured glaſs, &c. the remains of the body are taken up with great reſpect, and tranſlated to Rome. After the labourers have examined a gallery, they ſtop up the entry that leads to it; ſo that moſt of them remain thus cloſed up; only a few being left open to keep up the trade of ſhowing them to ſtrangers. This they ſay is done to prevent people from loſing themſelves in theſe ſubterraneous labyrinths, which indeed has often happened; but more probably to deprive the public of the means of knowing whither and how far the catacombs are carried.

The method of preſerving the dead in catacombs ſeems to have been common to a number of the ancient nations. The catacombs of Egypt are ſtill extant about nine leagues from the city of Grand Cairo, and two miles from the city of Zaccara. They extend from thence to the pyramids of Pharaoh, which are about eight miles diſtant. They lie in a field covered with a fine running ſand, of a yellowiſh colour. The country is dry and hilly; the entrance of the tomb is choaked up with ſand; there are many open, but more that are ſtill concealed. The bodies found in catacombs, eſpecially thoſe of Egypt, are called *mummies*; and as their fleſh was formerly reckoned an efficacious medicine, they were much ſought after. In this work the labourers were often obliged to clear away the ſand for weeks together, without finding what they wanted. Upon coming to a little ſquare opening of about 18 feet in depth, they deſcend into it by holes for the feet, placed at proper intervals; and there they are ſure of finding a mummy. Theſe caves, or *wells* as they call them there, are hollowed out of a white free-ſtone, which is found in all this country a few feet below the covering of ſand. When one gets to the bottom of theſe, which are ſometimes 40 feet below the ſurface, there are ſeveral ſquare openings on each ſide into paſſages of 10 or 15 feet wide; and theſe lead to chambers of 15 or 20 feet ſquare. Theſe are all hewn out in the rock; and in each of the catacombs are to be found ſeveral of theſe apartments communicating with one another. They extend a great way under ground, ſo as to be under the city of Memphis, and in a manner to undermine its environs. In ſome of the chambers the walls are adorned with figures and hieroglyphics; in others the mummies are found in tombs, round the apartment hollowed out in the rock. The Egyptians ſeem to have excelled in the art of embalming and preſerving their dead bodies; as the mummies found in the Egyptian catacombs are in a better ſtate than the bodies found either in the Italian catacombs, or thoſe of any other part of the world. See EMBALMING and MUMMY.

Laying up the bodies in caves, is certainly the original way of diſpoſing of the dead; and appears to have been propagated by the Phœnicians throughout the countries to which they ſent colonies: the interring as we now do in the open air or in temples was firſt introduced by the Chriſtians. When an ancient hero died, or was killed in a foreign expedition, as his body was liable to corruption, and for that reaſon unfit to be tranſported entire, they fell on the expedient of burning, in order to bring home the aſhes, to oblige the *manes* to follow; that ſo his country might not be deſtitute of the benefit of his tutelage. It was thus burning ſeems to have had its original; and by degrees it became common to all who could bear the expences of it, and took place of the ancient burying: thus *catatombs* became diſuſed among the Romans, after they had borrowed the manner of burning from the Greeks, and then none but ſlaves were laid in the ground. See BURIAL, &c.

CATADROMUS, from κατα and δρεμω. *I run*, in antiquity, a ſtretched ſloping rope in the theatres, down which the *funambuli* walked to ſhow their ſkill. Some have taken the word to ſignify the hippodrome or decurſorium wherein the Roman knights uſed to exerciſe themſelves in running and fighting on horſeback. But the moſt natural meaning is that of a rope faſtened at one end to the top of the theatre, and at the other to the bottom, to walk or run down, which was the higheſt glory of the ancient *ſchœnobates* or *funambuli*. Elephants were alſo taught to run down the *catadromus*. Suetonius ſpeaks of the exploit of a Roman knight, who paſſed down the *catadromus* mounted on an elephant's back.

CATAGOGION, a heathen feſtival at Epheſus, celebrated on the 22d of January, in which the devotees ran about the ſtreets, dreſſed in a moſt antic and unſeemly manner, with huge cudgels in their hands, and carrying with them the images of their gods; in which ſtate they raviſhed the women they met with, abuſed and often killed the men, and committed many other diſorders, to which the religion of the day gave a ſanction.

CATAGRAPHA, in antiquity, denote oblique figures or views of men's faces; anſwering to what the moderns call *profiles*. Catagrapha are ſaid to be the invention of Simon Cleonæus, who firſt taught painters to vary the looks of their figures, and ſometimes to direct them upwards, ſometimes downwards, and ſometimes ſideways or backwards.

CATALEPSIS, or CATALEPSY, in medicine, a kind of apoplexy or ſpaſmodic affection, wherein the patient is taken ſpeechleſs, ſenſeleſs, and fixed in the ſame poſture wherein the diſeaſe firſt ſeizes him; his eyes open, without ſeeing or underſtanding any thing around him. See MEDICINE.

CATALOGUE, a liſt or enumeration of the names of ſeveral books, men, or other things, diſpoſed according to a certain order. Catalogues of books are digeſted in different manners, ſome according to the order of the times when the books were printed, as that of Maittaire; others according to their form and ſize, as the common bookſellers' catalogues; others according to the alphabetical order of the authors' names, as Hyde's catalogue of the Bodleian library; others according to the alphabetical order of matters or ſubjects, which are called *real* or *claſſical catalogues*, as thoſe of Lipenius and Draudius; laſtly, others are digeſted in a mixed method, partaking of ſeveral of the former, as De Seine's catalogue of cardinal Sluſius's library, which is firſt divided according to the ſubjects or ſciences, and afterwards the books in each are recited alphabetically.

The moſt applauded of all catalogues is that of Thuanus's library, in which are united the advantages of all the reſt. It was drawn up by the two Putcani in alphabetical order, then digeſted according to the ſciences and ſubjects by Iſm. Bullialdus, and publiſhed by F. Queſnel at Paris in 1679: and reprinted, though incorrectly, at Hamburgh, in 1704. The books are here ranged with juſtneſs under their ſeveral ſciences and ſubjects, regard being ſtill had to the nation, ſect, age, &c. of every writer. Add, that only the beſt and choiceſt books in every ſubject are found here, and the moſt valuable editions. Yet the catalogue of M. le Telliers archbiſhop of Rheims' library, made by M. Clement, is not inferior to any publiſhed

in our age, either on account of the number and choice of the books, or the method of its difpofition. One advantage peculiar to this catalogue is, the multitude of anonymous and pfeudonymous authors detected in it, fcarce to be met with elfewhere. Some even prefer it to Thuanus's catalogue, as containing a greater variety of claffes and books on particular fubjects.

The conditions required in a catalogue are, that it indicate at the fame time the order of the authors and of the fubjects, the form of the book, the number of volumes, the chronological order of the editions, the language each is written in, and its place in the library; fo as that all thefe circumftances may appear at once in the fhorteft, yet exacteft manner poffible. In this view all the catalogues yet made will be found to be defective. An anonymous French writer has laid down a plan of a new catalogue, which fhall unite all the advantages and avoid all the inconveniences of the reft. The Jefuits of Antwerp have given us a catalogue of the popes; which makes what they call their *Propylæum*.

Catalogue *of the Stars*, is a lift of the fixed ftars, difpofed in their conftellations; with the longitudes, latitudes, &c. of each. The firft who undertook to reduce the fixed ftars into a catalogue was Hipparchus Rhodius, about 120 years before Chrift; in which he made ufe of the obfervations of Timocharis and Ariftyllus for about 180 years before him. A great number of philofophers after him undertook the fame tafk, each making a calculation that differed from the other. The laft and greateft catalogue is the Britannic, which was compiled from the obfervations of the accurate Mr. Flamftead; who for a long feries of years devoted himfelf wholly to that object. As there was nothing wanting either in the obferver or apparatus, we may look on this as a perfect work fo far as it goes. It is to be regretted however, that the impreffion had not paffed through his own hands: that now extant, was publifhed by authority, but without the author's confent; it contains 2734 ftars. There was another publifhed in 1725, purfuant to his laft will; containing no lefs than 3000 ftars, with their places rectified for the year 1689: to which is added Mr. Sharp's catalogue of the fouthern ftars not vifible in our hemifphere, adapted to the year 1726. See Astronomy.

CATALONIA, a province of Spain, bounded on the north by the Pyrenean mountains, which divide it from France; by the kingdom of Arragon and Valencia on the weft; and by the Mediterranean fea on the fouth and eaft. It is 155 miles in length, and 100 in breadth. It is watered by a great number of rivers; the principal of which are the Lubregat, the Ter, and the Segra. The air is temperate and healthy; but the land is mountainous, except in a few places. It produces, however, corn, wine, oil, pulfe, flax, and hemp fufficient for the inhabitants. The mountains are covered with large forefts of tall trees, fuch as the oak, the ever-green oak, the beech, the pine, the fir, the chefnut, and many others; with cork-trees, fhrubs, and medicinal plants. There are feveral quarries of marble of all colours, cryftal, alabafter, amethyfts, and lapis lazuli. Gold duft has been found among the fands of one or two of the rivers; and there are mines of tin, iron, lead, alum, vitriol, and falt. They likewife fifh for coral on the eaftern coaft. The inhabitants are hardy, courageous, active, vigorous, and good foldiers, but apt to be difcontented. The miquelets are a fort of foldiers which guard the paffes over the mountains, and ought to protect travellers; but if they are not paid to their minds, they feldom fail to pay themfelves. The river Lubregat divides Catalonia into two parts, the eaft and weft, according to their fituation. This province comprehends 17 vigueries or territories; two of which are in Rouffillon, and belong to the French. The reft are fubject to the Spaniards. The principal towns are Barcelona the capital, Terragona, Tortofa, Lerida, Solfonia, Cardona Vich, Girona, Seu d'Urgel, Pui Cerda, and Cervera. Catalonia was the laft province in Spain which fubmitted to Philip in the fucceffion-war.

CATAMENIA, in medicine. See Menses.

CATAMITE, a boy kept for fodomitical practices.

CATANANCHE, Candia lions-foot; a genus of the polygamia æqualis order, belonging to the fyngenefia clafs of plants; and in the natural method ranking under the 49th order, *Compofitæ*. The receptacle is paleaceous; the calyx imbricated; the pappus furnifhed with awns by a caliculus of five ftiff hairs. There are three fpecies, of which the cerulea is the moft remarkable. This fends out many long, narrow, hairy leaves, which are jagged on their edges like thofe of the buckfhorn plantain, but broader; the jags are deeper, and at greater diftances: thefe lie flat on the ground, turning their points upwards. Between the leaves come out the flower ftalks, which are in number proportionable to the fize of the plants; for, from an old thriving root, there are frequently eight or ten, while young plants do not fend out above two or three. Thefe ftalks rife near two feet high, dividing into many fmall branches upward, garnifhed with leaves like thofe below, but fmaller, and without jags on their edges; each of thefe fmaller branches is terminated by a fingle head of flowers, of a fine blue colour. This is a perennial plant, and may be propagated by feeds or flips. The feeds may be fown in the fpring, on a bed of common earth; and in the autumn following the plants may be removed to the places where they are to remain. The feeds ripen in Auguft. This plant is a pretty ornament in gardens, and is eafily kept within bounds.

CATANEA, or Catania, a city of Sicily, feated on a gulph of the fame name, near the foot of Mount Ætna or Gibel. It was founded by the Chalcidians foon after the fettlement of Syracufe, and enjoyed great tranquillity till Hiero I. expelled the whole body of citizens; and after replenifhing the town with a new ftock of inhabitants, gave it the name of *Ætna*: immediately after his deceafe, it regained its ancient name, and its citizens returned to their abodes. Catania fell into the hands of the Romans, among their earlieft acquifitions in Sicily, and became the refidence of a prætor. To make it worthy of fuch an honour, it was adorned with fumptuous buildings of all kinds, and every convenience was procured to fupply the natural and artificial wants of life. It was deftroyed by Pompey's fon, but reftored with fuperior magnificence by Auguftus. The reign of Decius is famous in the hiftory of this city for the martyrdom of its patronefs St. Agatha. On every emergency her interceffion is implored. She is pioufly believed to have preferved Catania from being overwhelmed by torrents of lava, or fhaken to pieces by earthquakes; yet its ancient edifices are covered by repeated ftreams of volcanic matter; and almoft every houfe, even her own church, has been thrown to the ground. In the reign of William the Good 20,000 Catanians, with their paftor at their head, were deftroyed before the facred veil could be properly placed to check the flames. In the laft century the eruptions and earthquakes raged with redoubled violence, and Catania was twice demolifhed.

The prefent prince of Bifcari has been at infinite pains, and fpent a large fum of money in working down to the ancient town, which, on account of the numerous torrents of lava that have flowed out of Mount Ætna for thefe laft thoufand years, is now to be fought for in dark caverns many feet below the prefent furface of the earth. Mr. Swinburne informs us that he defcended into baths, fepulchres, an amphitheatre, and a theatre, all very much injured by the various cataftrophes that have befallen them. They were erected upon old beds of lava, and even built with fquare pieces of the fame fubftance, which

in no inſtance appears to have been fuſed by the contact of new lavas: the ſciarra or ſtones of cold lava have conſtantly proved as ſtrong a barrier againſt the flowing torrent of fire as any other ſtone could have been, though ſome authors were of opinion that the hot matter would melt the old maſs and incorporate with it.

This city has been frequently defended from the burning ſtreams by the ſolid maſs of its own ramparts, and by the air compreſſed between them and the lava: as appears by the torrent having ſtopped within a ſmall diſtance of the walls, and taken another direction. But when the walls were broken or low, the lava collected itſelf till it roſe to a great height, and then poured over in a curve. A ſimilar inſtance is ſeen at the Torre del Greco near Naples, where the ſtream of liquid fire from Veſuvius divided itſelf into two branches, and left a church untouched in the middle. There is a well at the foot of the old walls of Catania, where the lava, after running along the parapet, and then falling forwards, has produced a very complete lofty arch over the ſpring. The church here is a noble fabric. It is accounted the largeſt in Sicily, though neither a porch nor a cupola has been erected, from a doubt of the ſolidity of the foundations, which are no other than the bed of lava that ran out of Ætna in 1669, and is ſuppoſed to be full of cavities. Catania, according to Mr. Swinburne's account, is reviving with great ſplendour; and has already much more the aſpect of a metropolis and royal reſidence than even Palermo. E. long. 15. 19. N. lat. 37. 30.

CATANZARO, a city in the kingdom of Naples, the capital of Calabria Ulterior, with a biſhop's ſee. It is the uſual reſidence of the governor of the province, and is ſeated on a mountain, in E. long. 18. 20. N. lat. 38. 58.

CATAPHONICS, the ſcience which conſiders the properties of reflected ſounds. See ACOUSTICS.

CATAPHORA, in medicine, the ſame as COMA.

CATAPHRACTA, from κατα, and φρασσω, *I fortify* or *arm*, in the ancient military art, a piece of heavy defenſive armour, formed of cloth or leather, fortified with iron ſcales or links, wherewith ſometimes only the breaſt, ſometimes the whole body, and ſometimes the horſe too, were covered. It was in uſe among the Sarmatians, Perſians, and other Barbarians. The Romans alſo adopted it early for their foot; and, according to Vegetius, kept to it till the time of Gratian, when the military diſcipline growing remiſs, and field exerciſes and labour diſcontinued, the Roman foot thought the cataphracta, as well as the helmet, too great a load to bear, and therefore threw both by, chooſing rather to march againſt the enemy bare-breaſted; by which, in the war with the Goths, multitudes were deſtroyed.

CATAPHRACTÆ *Naves*, ſhips armed and covered in fight, ſo that they could not be eaſily damaged by the enemy. They were covered over with boards or planks, on which the ſoldiers were placed to defend them; the rowers ſitting underneath, thus ſcreened from the enemy's weapons.

CATAPHRACTUS, denotes a thing defended or covered on all ſides with armour.

CATAPHRACTUS, or *Cataphractarus*, more particularly denotes a horſeman, or even horſe, armed with a cataphracta. The *cataphractæ equites* were a ſort of cuiraſſiers, not only fortified with armour themſelves, but having their horſes guarded with ſolid plates of braſs or other metal, uſually lined with ſkins, and wrought into plumes or other forms. Their uſe was to bear down all before them, to break in upon the enemy's ranks, and ſpread terror and havoc wherever they came, as being themſelves invulnerable and ſecure from danger. But their diſadvantage was their unwieldineſs, by which if once unhorſed or on the ground, they were unable to riſe, and thus fell a prey to the enemy.

CATAPHRYGIANS, a ſect in the ſecond century, ſo called as being of the country of Phrygia. They were orthodox in every thing, except in this, that they took Montanus for a prophet, and Priſcilla and Maximilla for true propheteſſes, to be conſulted in every thing relating to religion; as ſuppoſing the Holy Spirit had abandoned the church. See MONTANIST.

CATAPLASMA, a poultice; from καταπλασσω, *illino*, to ſpread like a plaſter. Cataplaſms take different names according to the parts they are applied to, or the effects they are to produce. When muſtard is an ingredient, they are called *ſinapiſms*.

Applications of this kind are ſofter and more eaſy than plaſters or ointments. They are formed of various ſubſtances according to the intention. Poultices of bread and water thickened with a little linſeed meal are the beſt for common purpoſes, but it is a great error to add oil or any other kind of greaſy matter to them. When deſigned to *relax*, or to promote ſuppuration, they ſhould be applied warm. Their warmth, moiſture, and the obſtruction they give to perſpiration, is the method of their anſwering that end; but too great heat prevents the deſign for which they are uſed. They ſhould be renewed as often as they cool or get hard.

CATAPULTA, in antiquity, a military machine contrived to throw arrows, darts, and ſtones upon the enemy. Some of theſe engines were of ſuch force that they would throw ſtones of an hundred weight. Joſephus takes notice of the ſurpriſing effects of theſe engines, and ſays, that the ſtones thrown out of them beat down the battlements, knocked off the angles of the towers, and would level a whole file of men from one end to the other, was the phalanx ever ſo deep. See Pl. 59.

The word is originally Greek, from κατα and πελτη, and, according to Heſychius, denotes a ſpear or dart. Hence it is ſometimes alſo written *catapelta*. The catapeltæ were alſo denominated οξυβολει, becauſe they threw ſharp wooden weapons; whereas thoſe caſt by the balliſtæ were obtuſe, ſuch as ſtones, &c. The largeſt kind of catapulta conſiſted of two huge timbers, like maſts of ſhips placed againſt each other, and bent by an engine for the purpoſe; theſe being ſuddenly unbent again by a ſtroke of a hammer, threw the javelins with incredible force. Its ſtructure, and the manner of working it, are deſcribed by Vitruvius; and a figure of it is alſo given by Perrault. M. Folard aſſerts, that the catapulta made infinitely more diſorder in the ranks, than our cannon loaded with cartridges. The catapulta is ſaid to be the invention of the Syrians. Some authors make it the ſame with the balliſta. See BALLISTA.

CATARACT, in hydrography, a precipice in the channel of a river, cauſed by rocks or other obſtacles ſtopping the courſe of the ſtream, from whence the water falls with a greater noiſe and impetuoſity. The word comes from καταρασσω, "I tumble down with violence;" compounded of κατα, "down," and ρασσω, *dejicio*, "I throw down." Such are the cataracts of the Nile, the Danube, Rhine, &c. In that of Niagara, the perpendicular fall of the water is 137 feet: and in that of Piſtill Rhaiadr, in North Wales, the fall of water is near 240 feet from the mountain to the lower pool. Strabo calls that a *cataract* which we call a *caſcade*; and what we call a *cataract*, the ancients uſually called a *catadupa*. Herminius has an expreſs diſſertation, "De admirandis mundi Cataractis ſupra et ſubterraneis;" where he uſes the word in a new ſenſe; ſignifying, by cataract, any violent motion of the elements.

CATARACT, in medicine and ſurgery, an opacity of the cryſtalline humour of the eye or its capſula, by which viſion is either impeded, or totally deſtroyed. See SURGERY.

CATARO, a town of Dalmatia, and capital of the territory of the ſame name, with a ſtrong caſtle, and a biſhop's ſee. It

is subject to Venice, and seated on a gulph of the same name. E. long. 19. 19. N. lat. 42. 25.

CATARACTES, in ornithology, the trivial name of a species of LARUS.

CATARRH, in medicine, an inordinate secretion of fluids from the mucous glands of the nose and fauces, arising from the mucous membrane becoming inflamed. Persons so affected are said to have taken *Cold*. See MEDICINE.

CATASTASIS, in poetry, the third part of the ancient drama; being that wherein the intrigue, or action, set forth in the epitasis, is supported, carried on, and heightened till it be ripe for unravelling in the catastrophe. Scaliger defines it, the full growth of the fable, while things are at a stand in that confusion to which the poet has brought them.

CATASTROPHE, in dramatic poetry, the fourth and last part of the ancient drama; or that immediately succeeding the catastasis: or, according to others, the third only; the whole drama being divided into protasis, epitasis, and catastrophe; or, in the terms of Aristotle, prologue, epilogue, and exode. The catastrophe clears up every thing, and is nothing else but the discovery or winding up of the plot. It has its peculiar place: for it ought entirely to be contained, not only in the last act, but in the very conclusion of it; and when the plot is finished, the play should be so also. The catastrophe ought to turn upon a single point, or start up on a sudden. The great art in the catastrophe is, that the clearing up of all difficulties may appear wonderful, and yet easy, simple, and natural. It is a very preposterous artifice of some writers to show the catastrophe in the very title of the play. Mr. Dryden thinks that a catastrophe resulting from a mere change in the sentiments and resolutions of a person, without any other machinery, may be so managed as to be exceedingly beautiful. It is a dispute among the critics, whether the catastrophe should always fall out favourably on the side of virtue or not. The reasons on the negative side seem the strongest. Aristotle prefers a shocking catastrophe to a happy one. The catastrophe is either simple or complex. The first is that in which there is no change in the state of the principal persons, nor any discovery or unravelling, the plot being only a mere passage out of agitation into quiet repose. In the second, the principal persons undergo a change of fortune, in the manner already defined.

CATCH, in the musical sense of the word, a fugue in the unison, wherein, to humour some conceit in the words, the melody is broken, and the sense interrupted in one part, and caught again or supported by another; as in the catch in Shakspeare's play of the Twelfth-Night, where there is a catch sung by three persons, in which the humour is, that each who sings, calls and is called *knave* in turn: or, as defined by Mr. Jackson, "a catch is a piece for three or more voices, one of which leads, and the others follow in the same notes. It must be so contrived, that rests (which are made for that purpose) in the music of one line, be filled up with a word or two from another line; these form a cross purpose, or catch, from whence the name."

CATCH-*Fly*, in botany. See LYCHNIS.

CATCH-*Pole*, (quasi, one that *catches* by the *pole*), a term used, by way of reproach, for the bailiff's follower or assistant.

CATCH-*Word*, among printers, that placed at the bottom of each page, being always the first word of the following page. Catch-words are little used at present.

CATECHESIS, in a general sense, denotes an instruction given any person in the first rudiments of an art or science; but more particularly of the Christian religion. In the ancient church, catechesis was an instruction given *viva voce*, either to children, or adult heathens, preparatory to their receiving of baptism. In this sense, *catechesis* stands contradistinguished from *mystagogica*, which were a higher part of instruction given to those already initiated, and containing the mysteries of faith. Those who give such instructions are called *catechists*; and those who receive them, *catechumens*.

CATECHETIC, or CATECHETICAL, something that relates to oral instruction in the rudiments of Christianity. Catechetic schools were buildings appointed for the office of the catechist, adjoining to the church, and called *catechumena*: such was that in which Origen and many other famous men read catechetical lectures at Alexandria. See CATECHUMEN.

CATECHISM, in its primary sense, an instruction, or institution, in the principles of the Christian religion, delivered *viva voce*, and so as to require frequent repetitions, from the disciple or hearer, of what has been said. The word is formed from κατηχεω, a compound of κατα and ηχος, q. d. *circumsono*, alluding to the noise or din made in this sort of exercise, or to the zeal and earnestness wherewith things are to be inculcated over and over on the learners. Anciently the candidates for baptism were only to be instructed in the secrets of their religion by tradition *viva voce*, without writing; as had also been the case among the Egyptian priests, and the British and Gaulish druids, who only communicated the mysteries of their theology by word of mouth.

CATECHISM is more frequently used in modern times for an elementary book, wherein the principal articles of religion are summarily delivered in the way of question and answer.

CATECHIST, κατηχιστης, *catecheta*, he that catechises, *i. e.* he that instructs novices in the principles of religion.

CATECHIST more particularly denotes a person appointed by the church to instruct those intended for baptism, by word of mouth, in the fundamental articles of the Christian faith. The catechists of churches were ministers usually distinct from the bishops and presbyters, and had their auditories or *catechumena* apart. Their business was to instruct the catechumens, and prepare them for the reception of baptism. But the catechists did not constitute any distinct order of the clergy, but were chosen out of any other order. The bishop himself sometimes performed the office; at other times presbyters, or even readers or deacons, were the catechists. Origen seems to have had no higher degree in the church than reader, when he was made catechist at Alexandria, being only 18 years of age, and consequently incapable of the deaconship.

CATECHU, in the materia medica. See ARECA and MIMOSA.

CATECHUMEN, a candidate for baptism, or one who prepares himself for the receiving thereof. The catechumens, in church-history, were the lowest order of Christians in the primitive church. They had some title to the common name of Christian, being a degree above pagans and heretics, though not consummated by baptism. They were admitted to the state of catechumens by the imposition of hands, and the sign of the cross. The children of believing parents were admitted catechumens, as soon as ever they were capable of instruction: but at what age those of heathen parents might be admitted, is not so clear. As to the time of their continuance in this state, there were no general rules fixed about it; but the practice varied according to the difference of times and places, and the readiness and proficiency of the catechumens themselves. There were four orders or degrees of catechumens; the first were those instructed privately without the church, and kept at a distance for some time from the privilege of entering the church, to make them the more eager and desirous of it. The next degree were the *audientes*, so called from their being admitted to hear sermons, and the scriptures read in the church, but were not allowed to partake of the prayers. The third sort of catechumens were the *genu-flectentes*, so called because they received imposi-

tion of hands kneeling. The fourth order was the *competentes & electi*, denoting the immediate candidates for baptifm, or fuch as were appointed to be baptifed the next approaching feftival; before which, ftrict examination was made into their proficiency under the feveral ftages of catechetical exercifes. After examination, they were exercifed for twenty days together, and were obliged to fafting and confeffion: fome days before baptifm they went veiled; and it was cuftomary to touch their ears, faying, *Ephatha*, i. e. Be opened; as alfo to anoint their eyes with clay; both ceremonies being in imitation of our Saviour's practice, and intended to reprefent to the catechumens their condition both before and after their admiffion into the Chriftian church.

CATEGORICAL, in a general fenfe, is applied to thofe things ranged under a CATEGORY.

CATEGORICAL alfo imports a thing to be abfolute, and not relative; in which fenfe it ftands oppofed to *hypothetical*. We fay, a *categorical* propofition, a *categorical* fyllogifm, &c. A *categorical* anfwer denotes an exprefs and pertinent anfwer made to any queftion or objection propofed.

CATEGORY, in logic, a feries or order of all the predicates or attributes contained under any genus. The fchool philofophers diftribute all the objects of our thoughts and ideas into certain *genera* or claffes, not fo much, fay they, to learn what they do not know, as to communicate a diftinct notion of what they do know; and thefe claffes the Greeks called *categories*, and the Latins *predicaments*. Ariftotle made ten categories; of which, quantity, quality, relation, action, paffion, time, place, fituation, and habit, comprife all accidents, and are ufually expreffed by the following technical diftich:

Arbor, fex, fervos, ardore, refrigerat, uftos,
Rure cras ftabo, nec tunicatus ero.

CATEK. See BENGAL.

CATENARIA, in the higher geometry, the name of a curve-line formed by a rope hanging freely from two points of fufpenfion, whether the points be horizontal or not. See FLUXIONS.

CATERPILLAR, in zoology, the name of all winged infects when in their reptile or worm-ftate. See ERUCA. *A Method of deftroying Caterpillars on Trees*, is a great defideratum. The following has been recommended as very effectual: Take a chafing-difh with lighted charcoal, and, placing it under the branches that are loaded with caterpillars, fprinkle a little of the brimftone upon the coals. The vapour of it, which is mortal to thefe infects, will not only deftroy all that are on the tree, but prevent it from being infefted with them afterwards. This method has been fuccefsfully tried in France. In the *Journal Oeconomique*, the following is faid to be infallible againft the caterpillars feeding on cabbage, and perhaps may be equally ferviceable againft thofe that infeft other vegetables: Sow with hemp all the borders of the ground where you mean to plant your cabbages; and, although the neighbourhood is infefted with caterpillars, the fpace inclofed by the hemp will be perfectly free, and not one of them will approach it.

CATERPILLAR-*Eaters*, a name given by fome authors to a fpecies of worms bred in the body of the caterpillar, and which eat its flefh: thefe are owing to a certain kind of fly that lodges her eggs in the body of this animal, and they, after their proper changes, become flies like their parents.

Mr. Reaumur has given us, in his hiftory of infects, fome very curious particulars in regard to thefe little worms. Every one of them, he obferves, fpins itfelf a very beautiful cafe of a cylindric figure, made of a very ftrong fort of filk; thefe are the cafes in which this animal fpends its ftate of chryfalis; and they have a mark by which they may be known from all other animal productions of this kind, which is, that they have always a broad ftripe or band furrounding their middle, which is black when the reft of the cafe is white, and white when that is black. Mr. Reaumur has had the pains and patience to find out the reafon of this fingularity, which is this: the whole fhell is fpun of a filk produced out of the creature's body; this at firft runs all white, and towards the end of the fpinning turns black. The outfide of the cafe muft neceffarily be formed firft, as the creature works from within: confequently this is truly white all over, but it is tranfparent, and fhows the laft fpun or black filk through it. It might be fuppofed that the whole infide of the fhell fhould be black; but this is not the cafe: the whole is fafhioned before this black filk comes; and this is employed by the creature, not to line the whole, but to fortify certain parts only; and therefore is all applied either to the middle, or to the two ends omitting the middle; and fo gives either a black band in the middle, or a blacknefs at both ends, leaving the white in the middle to appear. It is not unfrequent to find a fort of fmall cafes, lying about garden-walks, which move of themfelves; when thefe are opened, they are found to contain a fmall living worm. This is one of the fpecies of thefe caterpillar-eaters; which, as foon as it comes out of the body of that animal, fpins itfelf a cafe for its transformation long before that happens, and lives in it without food till that change comes on; and it becomes a fly like that to which it owed its birth.

CATERVA, in ancient military writers, a term ufed in fpeaking of the Gaulifh or Celtiberian armies, denoting a body of 6000 armed men. The word *caterva*, or *catervarius*, is alfo frequently ufed by ancient writers to denote a party or corps of foldiers in diforder or difarray: by which it ftands diftinguifhed from cohort or turma, which were in good order.

CATESBÆA, the LILY-THORN; a genus of the monogynia order, belonging to the tetrandria clafs of plants; and in the natural method ranking under the 28th order, *Luridæ*. The corolla is monopetalous, funnel-fhaped, very long above the receptacle of the fruit; the ftamina are within its throat: the fruit a polyfpermous berry. There is only one fpecies, viz. the fpinofa, which was difcovered in the ifland of Providence by Mr. Catefby, who gathered the feeds, and brought them to England. It rifes to the height of ten or twelve feet, and is covered with a pale ruffet bark; the branches come out alternately, and are garnifhed with fmall leaves refembling thofe of the box-tree, coming out in clufters all round the branches at certain diftances: the flowers hang downward, and come out from the fide of the branches: they are tubulous and near fix inches long, very narrow at their bafe, but widening upwards towards the top, where it is divided into four parts which fpread open, and are reflected backward. They are of a dull yellow colour. This plant is propagated by feeds, which muft be procured from the country where it grows. The feeds muft be fown in a hot-bed, and are to be treated in the fame manner as other tender exotics.

CATHÆRETICS, in furgery, medicines of a cauftic nature, ferving to eat off excrefcences.

CATHARINE, *Knights of St.* CATHARINE *of Mount Sinai*, an ancient military order, erected for the affiftance and protection of pilgrims going to pay their devotions to the body of St. Catharine, a virgin of Alexandria, diftinguifhed for her learning, and faid to have fuffered martyrdom under Maximin. The body of the martyr having been difcovered on Mount Sinai, caufed a great concourfe of pilgrims; and travelling being very dangerous, by reafon of the Arabs, an order of knighthood was erected in 1063, on the model of that of the holy fepulchre, and under the patronage of St. Catharine: the knights of which obliged themfelves by oath to guard the body of the faint, keep the roads fecure, obferve the rules of St. Bafil, and

obey their grand-mafter. Their habit was white, and on it were reprefented the inftruments of martyrdom whereby the faint had fuffered; viz. a half-wheel armed with fpikes, and traverfed with a fword ftained with blood.

CATHARINE, *Fraternity of St. Catharine at Sienna*, a fort of religious fociety inftituted in that city, in honour of St. Catharine, a faint famous for her revelations, and for her marriage with Jefus Chrift, whofe wedding-ring is ftill preferved as a valuable relick. This fraternity yearly endows a certain number of deftitute virgins, and has the privilege of redeeming annually two criminals condemned for murder, and the fame number of debtors, by paying their debts.

CATHARTICS, in medicine, remedies which promote evacuation by ftool. See MATERIA MEDICA.

CATHECU, in botany. See ARECA.

CATHEDRA, in a general fenfe, a chair. The word is more particularly ufed for a profeffor's chair, and a preacher's pulpit.

CATHEDRA is alfo ufed for the bifhop's fee, or throne in a church.

CATHEDRAL, a church wherein is a bifhop's fee or feat. See CHURCH and BISHOP. The word comes from the Greek καθεδρα, "chair," of καθεζομαι, *fedeo*, "I fit." The denomination *cathedral* feems to have taken its rife from the manner of fitting in the ancient churches, or affemblies of primitive Chriftians: in thefe the council, i. e. the elders and priefts, was called *Prefbyterium*; at their head was the bifhop, who held the place of chairman, *Cathedralis* or *Cathedraticus*; and the prefbyters, who fat on either fide, were alfo called by the ancient fathers, *Affeffores Epifcoporum*. The epifcopal authority did not refide in the bifhop alone; but in all the prefbyters, whereof the bifhop was refident. A *cathedral* therefore, originally, was different from what it is now; the Chriftians, till the time of Conftantine, having no liberty to build any temple: by their churches they only meant their affemblies; and by *cathedrals*, nothing more than confiftories.

CATHERINE PARR. See PARR.

CATHERINE (*Order of St.*), in modern hiftory, belongs to ladies of the firft quality in the Ruffian court. It was inftituted in 1714 by Catherine wife of Peter the Great, in memory of his fignal efcape from the Turks in 1711. The emblems of this order are a red crofs, fupported by a figure of St. Catherine, and faftened to a fcarlet ftring edged with filver, on which are infcribed the name of St. Catherine, and the motto, *Pro fide et patria*.

CATHERLOUGH, a town of Ireland, in the county of Catherlough, and province of Leinfter; feated on the river Barrow, 16 miles N. E. of Kilkenny. W. long. 7. 1. N. lat. 52. 45.

CATHERLOUGH, a county of Ireland, about 28 miles in length, and eight in breadth; bounded on the eaft by Wicklow and Wexford, on the weft by Queen's-county, on the north by Kildare, and on the fouth and fouth-weft by Wexford. It contains 5600 houfes, 42 parifhes, five baronies or boroughs, and fends fix members to parliament, viz. two for the county, two for Catherlough, and two for Old Leighlen.

CATHETER, in furgery, a kind of tube, ufually made of filver, to be introduced into the bladder, in order to difcharge the urine when fuppreffed. A better fort of catheter is now made of elaftic gum. See SURGERY.

CATHETUS, in geometry, a line or radius falling perpendicularly on another line or furface; thus the catheti of a right-angled triangle are the two fides that include the right angle.

CATHETUS *of incidence*, in catoptrics, a right line drawn from a point of the object, perpendicular to the reflecting line.

CATHETUS *of Reflection* or *of the Eye*, a right line drawn from the eye perpendicular to the reflecting plane.

CATHETUS *of Obliquation*, a right line drawn perpendicular to the fpeculum, in the point of incidence or reflection.

CATHETUS, in architecture, a perpendicular line, fuppofed to pafs through the middle of a cylindrical body, as a balluster, column, &c.

CATHOLIC, in a general fenfe, denotes any thing that is univerfal or general.

CATHOLIC *Church*. The rife of herefies induced the primitive Chriftian church to affume to itfelf the appellation of *catholic*, being a characteriftic to diftinguifh itfelf from all fects, who, though they had party names, fometimes fheltered themfelves under the name of Chriftians. The Romifh church diftinguifhes itfelf now by the name of *catholic*, in oppofition to all thofe who have feparated from her communion, and whom fhe confiders as heretics and fchifmatics, and herfelf only as the true and Chriftian church. In the ftrict fenfe of the word, there is no catholic church in being, that is, no univerfal Chriftian communion.

CATHOLIC *King*, is a title which has been long hereditary to the king of Spain. Mariana pretends, that Reccarede firft received this title after he had deftroyed Arianifm in his kingdom, and that it is found in the council of Toledo for the year 589. Vafeé afcribes the origin of it to Alphonfus in 738. Some allege that it has been ufed only fince the time of Ferdinand and Ifabella. Colombiere fays, it was given them on occafion of the expulfion of the Moors. The Bollandifts pretend it had been borne by their predeceffors the Vifigoth kings of Spain; and that Alexander VI. only renewed it to Ferdinand and Ifabella. Others fay that Philip de Valois firft bore the title; which was given him after his death by the ecclefiaftics, on account of his favouring their interefts. In fome epiftles of the ancient popes, the title *catholic* is given to the kings of France and of Jerufalem, as well as to feveral patriarchs and primates.

CATHOLICON, in pharmacy: this name was formerly given to a kind of foft purgative electuary, which was fuppofed an univerfal medicine.

CATILINE (Lucius), a Roman of a noble family, who having fpent his whole fortune in debauchery, formed the defign of oppreffing his country, deftroying the fenate, feizing the public treafury, fetting Rome on fire, and ufurping a fovereign power over his fellow-citizens. In order to fucceed in this defign, he drew fome young noblemen into his plot; whom he prevailed upon, it is faid, to drink human blood as a pledge of their union. His confpiracy, however, was difcovered by the vigilance of Cicero, who was then conful. Upon which, retiring from Rome, he put himfelf at the head of an army, with feveral of the confpirators, and fought with incredible valour againft Petreius, lieutenant to Anthony, who was colleague with Cicero in the confulfhip; but was defeated and killed in battle. Salluft has given an excellent hiftory of this confpiracy.

CATO (Marcus Portius), the Cenfor, one of the greateft men among the ancients, was born at Tufculum in the year of Rome 519, about the 232d before Chrift. He began to bear arms at 17; and, on all occafions, fhowed extraordinary courage. He was a man of great fobriety, and reckoned no bodily exercife unworthy of him. He had but one horfe for himfelf and his baggage, and he looked after and dreffed it himfelf. At his return from his campaigns, he betook himfelf to plough his ground; not that he was without flaves to do it, but it was his inclination. He dreffed alfo like his flaves, fat down at the fame table with them, and partook of the fame fare. He did not in the mean while neglect to cultivate his mind, efpecially in regard to the art of fpeaking; and he employed his talents, which were very great, in generoufly pleading caufes in

the neighbouring cities without fee or reward. Valerius Flaccus, who had a country-feat near Cato, conceiving an efteem for him, perfuaded him to come to Rome; where Cato, by his own merit, and the influence of fo powerful a patron, was foon taken notice of, and promoted. He was firft of all elected tribune of the foldiers for the province of Sicily. He was next made queftor in Africa under Scipio. Having in this laft office reproved him for his profufenefs to his foldiers, the general anfwered, that "he did not want fo exact a queftor, but would make war at what expence he pleafed; nor was he to give an account to the Roman people of the money he fpent, but of his enterprifes, and the execution of them." Cato, provoked at this anfwer, left Sicily, and returned to Rome. Afterwards he was made prætor, and fulfilled the duties of his office with the ftricteft juftice. He conquered Sardinia, governed with admirable moderation, and was created conful. Being tribune in the war of Syria, he gave diftinguifhed proofs of his valour againft Antiochus the Great; and at his return ftood candidate for the office of cenfor. But the nobles, who not only envied him as a *new* man, but dreaded his feverity, fet up againft him feven powerful competitors, in fpite of whom however he was fuccefsful. Cato's merit, upon the whole, was fuperior to that of any of the great men who ftood againft him. He was temperate, brave, and indefatigable; frugal of the public money, and not to be corrupted. There is fcarce any talent requifite for public or private life which he had not received from nature, or acquired by induftry. Yet, with all thefe accomplifhments, he had very great faults. His ambition being poifoned with envy, difturbed both his own peace and that of the whole city as long as he lived. Though he would not take bribes, he was unmerciful and unconfcionable in amaffing wealth by all fuch means as the law did not punifh. Notwithftanding this, it is certain, that the people in general were pleafed with his conduct; infomuch that they ordered a ftatue to be erected to his honour in the temple of *Health*, with an infcription that mentioned nothing of his victories or triumph, but imported only that by his wife ordinances in his cenforfhip he had reformed the manners of the republic. Cato was the occafion of the third Punic war; for being difpatched to Africa to terminate a difference between the Carthaginians and the king of Numidia, on his return to Rome he reported, that Carthage was grown exceffively rich and populous, and he warmly exhorted the fenate to deftroy a city and republic, during the exiftence of which, Rome could never be fafe. Having brought from Africa fome very large figs, he fhowed them to the confcript fathers in one of the lappets of his gown. "The country (fays he) where this fine fruit grows, is but a three days voyage from Rome." We are told, that from this time he never fpoke in the fenate upon any fubject, without concluding with thefe words, "I am alfo of opinion, that Carthage ought to be deftroyed." But though dignified and fevere, Cato had neverthelefs fome difpofition to mirth, and fome intervals of good humour. He dropped now and then fome words that were not unpleafant, and we may judge of the reft (fays Balzac) by this: "He had married a very handfome wife, and hiftory tells us that fhe was extremely afraid of the thunder, and loved her hufband well. Thefe two paffions prompted her to the fame thing; fhe always pitched upon her hufband as a fanctuary againft thunder, and threw herfelf into his arms at the firft noife fhe fancied fhe heard in the fky. Cato, who was well pleafed with the ftorm, and very willing to be careffed, could not conceal his joy. He revealed that domeftic fecret to his friends; and told them one day, fpeaking of his wife, "that fhe had found out a way to make him love bad weather; and that he never was fo happy as when Jupiter was angry." It is worth obferving, that this was during his cenforfhip; when he degraded the fenator Manlius, who would probably have been conful the year after, only for giving a kifs to his wife in the day-time, and in the prefence of his daughter. Cato died in the year of Rome 604, aged 85. He wrote, 1. A Roman Hiftory. 2. Concerning the art of war. 3. Of rhetoric. 4. A treatife of hufbandry. Of thefe, the laft only is extant.

Cato (Marcus Portius), commonly called Cato *Minor*, or Cato of *Utica*, was great-grandfon of Cato *the Cenfor*. It is faid, that from his infancy he difcovered an inflexibility of mind, and a difpofition to go through whatever he undertook, even though the tafk was ill fuited to his ftrength. He was rough towards thofe that flattered him, and quite intractable when threatened; was rarely feen to laugh, or even to fmile; was not eafily provoked to anger, but, if once incenfed, hard to be pacified. Sylla having had a friendfhip for the father of Cato, fent often for him and his brother, and talked familiarly with them. Cato, who was then about 14 years of age, feeing the heads of great men brought there, and obferving the fighs of thofe that were prefent, afked his preceptor, "Why does no body kill this man?" "Becaufe," faid the other, "he is more feared than he is hated." The boy replied, "Why then did you not give me a fword when you brought me hither, that I might have ftabbed him, and freed my country from this flavery?"

He learned the principles of the Stoic philofophy, which fo well fuited his character, under Antipater of Tyre, and applied himfelf diligently to the ftudy of it. Eloquence he likewife ftudied, as a neceffary means to defend the caufe of juftice, and he made a very confiderable proficiency in that fcience. To increafe his bodily ftrength, he inured himfelf to fuffer the extremes of heat and cold; and ufed to make journeys on foot and bare-headed in all feafons. When he was fick, patience and abftinence were his only remedies: he fhut himfelf up, and would fee nobody till he was well. Though remarkably fober in the beginning of his life, making it a rule to drink but once after fupper, and then retire, he infenfibly contracted a habit of drinking more freely, and of fitting at table till morning. He affected fingularity, and, in things indifferent, to act directly contrary to the tafte and fafhions of the age. Magnanimity and conftancy are generally afcribed to him; and Seneca would fain make that haughtinefs and contempt for others, which in Cato accompanied thofe virtues, a matter of praife. Cato, fays Seneca, having received a blow in the face, neither took revenge nor was angry; he did not even *pardon the affront*, but *denied that he had received it*. His virtue raifed him fo high, that injury could not reach him. He ferved as a volunteer under Gallius in the war of Spartacus; and when military rewards were offered him by the commander, he refufed them, becaufe he thought he had no right to them. Some years after, he went a legionary tribune into Macedonia under the prætor Rubrius; in which ftation he appeared, in his drefs, and during a march, more like a private foldier than an officer: but the dignity of his manners, the elevation of his fentiments, and the fuperiority of his views, fet him far above thofe who bore the titles of generals and proconfuls. It is faid, that Cato's defign in all his behaviour was to engage the foldiers to the love of virtue; whofe affections he engaged thereby to himfelf, without his having any fuch intention.

One thing by which Cato extremely pleafed the people, was his making the affaffins to whom Sylla had given confiderable rewards out of the treafury for murdering the profcribed, difgorge their gains. Plutarch tells us, that Cato was fo exact in difcharging the duties of a fenator, as to be always the firft who came to the houfe, and the laft who left it; and that he never quitted Rome during thofe days when the fenate was to fit. Nor did he fail to be prefent at every affembly of the people, that he might awe thofe who, by an ill-judged facility, beftowed

the public money in largeſſes, and frequently, through mere favour, granted remiſſion of debts due to the ſtate. At firſt his auſterity and ſtiffneſs diſpleaſed his colleagues: but afterwards they were glad to have his name to oppoſe to all the unjuſt ſolicitations, againſt which they would have found it difficult to defend themſelves. Cato very readily took upon him the taſk of refuſing.

Cato, to keep out a very bad man, put in for the tribunate. He afterwards laboured to bring about an agreement between Cæſar and Pompey; but, ſeeing it in vain, he ſided with the latter. When Pompey was ſlain he fled to Utica; and, being purſued by Cæſar, adviſed his friends to be gone, and throw themſelves on Cæſar's clemency. His ſon, however, remained with him; and Statilius, a young man, remarkable for his hatred to Cæſar. The execution of the purpoſe which Cato had formed with regard to himſelf, has furniſhed Mr. Addiſon with the materials of a very beautiful and well known Tragedy. Notwithſtanding the interference of his friends, and particularly of his ſon, who by every method endeavoured to diſſuade him from the reſolution he had taken to diſpatch himſelf rather than fall into Cæſar's hands; this, after ſome deliberation, and after having twice read Plato's dialogue on the immortality of the ſoul, he executed, in the forty-eighth year of his age. By this raſh act, independent of all moral or religious conſiderations, he carried his patriotiſm to the higheſt degree of political phrenſy; for Cato, dead, could be of no uſe to his country; but had he preſerved his life, his counſel might have moderated Cæſar's ambition, and (as Monteſquieu obſerves) have given a different turn to public affairs.

CATOCHE, or Catochus, a diſeaſe, by which the patient is rendered in an inſtant as fixed as a ſtatue, without the power of motion, and continues in the ſame poſture he was in at the moment of being ſeized. It is a diſeaſe of the nervous ſyſtem ſimilar to that called Catalepſy. See Medicine.

CATOPTRICS.

CATOPTRICS is that part of optics which explains the properties of reflected light, and particularly that which is reflected from mirrors.—As this and the other branches of Optics are fully treated under the collective word, we ſhall, in the preſent article, *1ſt*, Juſt give a ſummary of the principles of the branch, in a few plain aphoriſms, with ſome preliminary definitions; and *2dly*, Inſert a ſet of entertaining experiments founded upon them.

Definitions.—1. Every poliſhed body that reflects the rays of light is called a mirror, whether its ſurface be plane, ſpherical, conical, cylindric, or of any other form whatever.—2. Of mirrors there are three principally uſed in optical experiments: The plane mirror G H I, Pl. 69. fig. 1. the ſpherical convex mirror, G H I, fig. 2. and the ſpherical concave mirror, G H I, fig. 3.—3. The point K, fig. 2, 3. round which the reflecting ſurface of a ſpherical mirror is deſcribed, is called its centre. The line KH, drawn from its centre perpendicular to its two ſurfaces, is the axis of the mirror; and the point H, to which that line is drawn, is its vortex.—4. The diſtance between the lines AG and BG, fig. 1. is called the angle of incidence, and the diſtance between BG and CG is the angle of reflection.

Aphorisms.—1. In a *plain mirror*, the image DF, fig. 1. will appear as far behind the mirror, as the object AC is before it. 2. The image will appear of the ſame ſize, and in the ſame poſition as the object. 3. Every ſuch mirror will reflect the image of an object of twice its own length and breadth. 4. If the object be an opaque body, and its rays fall on the mirror nearly in direct lines, there will be only one image viſible, which will be reflected by the inner ſurface of the glaſs. But, 5. If the object be a luminous body, and its rays fall very obliquely on the mirror, there will appear, to an eye placed in a proper poſition, ſeveral images; the firſt of which, reflected from the outer ſurface of the glaſs, will not be ſo bright as the ſecond, reflected from the inner ſurface. The following images, that are produced by the repeated reflections of the rays between the two ſurfaces of the glaſs, will be in proportion leſs vivid, to the eighth or tenth, which will be ſcarce viſible:

In a *ſpherical convex mirror*, 1. the image D F, fig. 2. will always appear behind it. 2. The image will be in the ſame poſition as the object. 3. It will be leſs than the object. 4. It will be curved, but not, as the mirror, ſpherical. 5. Parallel rays falling on this mirror will have the focus or image at half the diſtance of the centre K, from the mirror. 6. In converging rays, the diſtance of the object muſt be equal to half the diſtance of the centre, to make the image appear behind the mirror. 7. Diverging rays will have their image at leſs than half the diſtance of the centre. If the object be placed in the centre of the mirror, its image will appear at one-eighth of that diſtance behind it.

In a *ſpherical concave mirror*, 1. that point where the image appears of the ſame dimenſions as the object, is the centre of that mirror. 2. Parallel rays will have their focus at one half the diſtance of the centre. 3. Converging rays will form an image before the mirror. 4. In diverging rays, if the object be at leſs than one half the diſtance of the centre, the image will be behind the mirror, erect, curved, and magnified, as DEF, fig. 3. but if the diſtance of the object be greater, the image will be before the mirror, inverted and diminiſhed, as DEF, fig. 4.—5. The ſun's rays falling on a concave mirror, and being parallel, will be collected in a focus at half the diſtance of its centre, where their heat will be augmented in proportion of the ſurface of the mirror to that of the focal ſpot. 6. If a luminous body be placed in the focus of a concave mirror, its rays being reflected in parallel lines will ſtrongly enlighten a ſpace of the ſame dimenſion with the mirror, at a great diſtance. If the luminous object be placed nearer than the focus, its rays will diverge, and conſequently enlighten a larger ſpace. It is on this principle that reverberators are conſtructed.—In all *plane* and *ſpherical mirrors* the angle of incidence is equal to the angle of reflection.

Catoptrical Illusions.—1. Of all our ſenſes the ſight is certainly ſubject to the greateſt deception, and hence the great variety of phenomena which are capable of being exhibited in catoptrics.—Take a glaſs bottle A fig. 14, and fill it with water to the point B; leave the upper part BC empty, and cork

it in the common manner. Place this bottle oppofite a concave mirror, and beyond its focus, that it may appear reverfed, and before the mirror (fee aphorifm 4. of a fpherical concave mirror), place yourfelf ftill further diftant from the bottle, and it will appear to you in the fituation, *a*, *b*, *c*, fig. 15. Now it is remarkable in this apparent bottle, that the water, which, according to all the laws of catoptrics, and all the experiments made on other objects, fhould appear at *a b*, appears on the contrary at *b c*, and confequently the part *a b* appears empty.

If the bottle be inverted and placed before the mirror, as in fig. 16, its image will appear in its natural, erect pofition; and the water, which is in reality at BC, will appear at *a b*. If while the bottle is inverted it be uncorked, and the water run gently out, it will appear, that while the part BC is emptying, that of *a b* in the image is filling: and what is likewife very remarkable, as foon as the bottle is empty the illufion ceafes, the image alfo appearing entirely empty. If the bottle likewife be quite full, there is no illufion. If while the bottle is held inverted, and partly empty, fome drops of water fall from the bottom A towards BC, it feems in the image as if there were formed at the bottom of the part *a b*, bubbles of air that rofe from *a* to *b*; which is the part that feems full of water. All thefe phenomena conftantly appear.

The remarkable circumftances in this experiment are, firft, not only to fee an object where it is not, but alfo where its image is not; and fecondly, that of two objects which are really in the fame place, as the furface of the bottle and the water it contains, the one is feen at one place, and the other at another; and to fee the bottle in the place of its image, and the water where neither it nor its image are.

2. Conftruct a box AB fig. 5. of about a foot long, eight inches wide, and fix high; or what other dimenfion you fhall think fit, provided it does not greatly vary from thefe proportions. On the infide of this box, againft each of its oppofite ends A and B, place a mirror of the fame fize. Take off the quickfilver from the mirror that you place at B, for about an inch and an half, at the part C, where you are to make a hole in the box of the fame fize, by which you may eafily view its infide. Cover the top of the box with a frame, in which muft be placed a tranfparent glafs, covered with gauze, on the fide next the inner part of the box. Let there be two grooves at the parts E and F to receive the two painted fcenes hereafter mentioned. On two pieces of cut pafteboard let there be fkilfully painted on both fides (fee fig. 6. and 7.) any fubject you think proper; as woods, gardens, &c. and on two other pafteboards, the fame fubjects on one fide only; obferving that there ought to be on one of them fome object relative to the fubject placed at A, that the mirror placed at D may not reflect the hole at C on the oppofite fide. Place the two boards painted on both fides in the grooves E and F; and thofe that are painted on one fide only, againft the oppofite mirrors C and D; and then cover the box with its tranfparent top. This box fhould be placed in a ftrong light to have a good effect.—When the eye is placed at C, and views the objects on the infide of the box, of which fome, as we have faid, are painted on both fides, they are fucceffively reflected from one mirror to the other; and if, for example, the painting confifts of trees, they will appear like a very long vifta, of which the eye cannot difcern the end: for each of the mirrors repeating the objects, continually more faintly, contribute greatly to augment the illufion.

3. Take a fquare box ABCD, fig. 8. of about fix inches long, and twelve high; cover the infide of it with four plane mirrors, which muft be placed perpendicular to the bottom of the box CHFD. Place certain objects in relief on the bottom of this box; fuppofe, for example, a piece of fortification (as fig. 9.) with tents, foldiers, &c. or any other fubject that you judge will produce an agreeable effect by its difpofition when repeatedly reflected by the mirrors. On the top of this box place a frame of glafs, in form of the bottom part of a pyramid, whofe bafe AGEB is equal to the fize of the box: its top ILN, muft form a fquare of fix inches, and fhould not be more than four or five inches higher than the box. Cover the four fides of this frame with a gauze, that the infide may not be vifible but at the top ILN, which fhould be covered with a tranfparent glafs.

When you look into this box through the glafs ILN, the mirrors that are diametrically oppofite each other, mutually reflecting the figures inclofed, the eye beholds a boundlefs extent, completely covered with thefe objects; and if they are properly difpofed, the illufion will occafion no fmall furprife, and afford great entertainment.

It fhould be obferved, that the nearer the opening ILN is to the top of the box, the greater will be the apparent extent of the fubject. The fame will happen if the four mirrors placed on the fides of the box be more elevated. The objects, by either of thefe difpofitions, will appear to be repeated 9, 25, 49 times, &c. by taking always the fquare of the odd numbers of the arithmetical progreffion 3, 5, 7, 9, &c. as is very eafy to conceive, if we remember that the fubject inclofed in the box is always in the centre of a fquare, compofed of feveral others, equal to that which forms the bottom of the box.

Other pieces of the fame kind (viewed from above) may be contrived, in which mirrors may be placed perpendicular on a triangular, pentagon, or hexagon plane. All thefe different difpofitions, properly directed, as well with regard to the choice as pofition of the objects, will conftantly produce very remarkable and pleafing illufions. If inftead of placing the mirrors perpendicular, they were to incline equally, fo as to form part of a reverfed pyramid, the fubject placed in the box would then have the appearance of a very extenfive globular or many-fided figure.

4. On the hexagonal or fix-fided plane ABCDEF, fig. 10. draw fix femi-diameters GA, GB, GC, GD, GE, GF; and on each of thefe place perpendicularly two plain mirrors, which muft join exactly at the centre G, and which placed back to back muft be as thin as poffible. Decorate the exterior boundary of this piece (which is at the extremity of the angles of the hexagon) with fix columns, that at the fame time ferve to fupport the mirrors, by grooves formed on their inner fides. (See the profile H). Add to thefe columns their entablatures, and cover the edifice as you think proper. In each one of thefe fix triangular fpaces, contained between two mirrors, place little figures of pafteboard, in relief, reprefenting fuch objects as when feen in an hexagonal form will produce an agreeable effect. To thefe add fmall figures of enamel; and take particular care to conceal, by fome object that has relation to the fubject, the place where the mirrors join, which, as we have faid before, all meet in the common centre G.—When you look into any one of the fix openings of this palace, the objects there contained being repeated fix times, will feem entirely to fill up the whole of the building. This illufion will appear very remarkable; efpecially if the objects made choice of are properly adapted to the effect that is to be produced by the mirrors.

Note, If you place between two of thefe mirrors part of a fortification, as a curtain and two demi-baftions, you will fee an entire citadel, with its fix baftions. Or if you place part of a ball-room, ornamented with chandeliers and figures in enamel, all thofe objects being here multiplied, will afford a very pleafing profpect.

5. Within the cafe ABCD, place four mirrors, O, P, Q, R, fig. 11. fo difpofed that they may each of them make an angle

of 45 degrees, that is, that they may be half way inclined from the perpendicular, as in the figure. In each of the two extremities AB, make a circular aperture, in one of which fix the tube GL, in the other the tube MF, and obſerve that in each of theſe is to be inſerted another tube, as H and I *. Furniſh the firſt of theſe tubes with an object-glaſs at G, and a concave eye-glaſs at F. You are to obſerve, that in regulating the focus of theſe glaſſes, with regard to the length of the tube, you are to ſuppoſe it equal to the line G, or viſual pointed ray, which entering at the aperture G, is reflected by the four mirrors, and goes out at the other aperture F, where the ocular glaſs is placed. Put any glaſs you will into the two ends of the moveable tubes H and I; and laſtly place the machine on a ſtand E, moveable at the point S, that it may be elevated or depreſſed at pleaſure.

When the eye is placed at F, and you look through the tube, the rays of light that proceed from the object T, paſſing through the glaſs G, are ſucceſſively reflected by the mirrors, O, P, Q, and R, to the eye at F, and there paint the object T, in its proper ſituation, and theſe rays appear to proceed directly from that object. The two moveable tubes H and I, at the extremities of each of which a glaſs is placed, ſerve only the more to diſguiſe the illuſion, for they have no communication with the interior part of the machine. This inſtrument being moveable on the ſtand E, may be directed to any object; and if furniſhed with proper glaſſes will anſwer the purpoſe of a common perſpective. The two moveable tubes H and I being brought together, the machine is directed towards any object, and deſiring a perſon to look in at the end F, you aſk him if he ſee diſtinctly that object. You then ſeparate the two moveablet ubes, and, leaving a ſpace between them ſufficient to place your hand, or any other ſolid body, you tell him that the machine has the power of making objects viſible through the moſt opaque body; and as a proof you deſire him then to look at the ſame object, when, to his great ſurpriſe, he will ſee it as diſtinct as when there was no ſolid body placed between the tubes.—This experiment is the more extraordinary, as it is very difficult to conceive how the effect is produced. The two arms of the caſe appearing to be made to ſupport the perſpective glaſs, and to whatever object it is directed, the effect is ſtill the ſame.

6. In the partition AB, fig. 12. make two apertures, CD, and EF, of a foot high, and ten inches wide, and about a foot diſtant from each other. Let them be at the common height of a man's head; and in each of them place a tranſparent glaſs, ſurrounded with a frame, like a common mirror. Behind this partition place two mirrors H and I, inclined to it in an angle of forty-five degrees; that is, half-way between a line drawn perpendicular to the ground and its ſurface: let them be both 18 inches ſquare: let all the ſpace between them be incloſed by boards or paſteboard painted black, and well cloſed, that no light may enter: let there be alſo two curtains to cover them, which may be drawn aſide at pleaſure. When a perſon looks into one of theſe ſuppoſed mirrors, inſtead of ſeeing his own face, he will perceive the object that is in front of the other: ſo that if two perſons preſent themſelves at the ſame time before theſe mirrors, inſtead of each one ſeeing himſelf, they will reciprocally ſee each other.—*Note*, There ſhould be a ſconce with a candle placed on each ſide of the two glaſſes in the wainſcot, to enlighten the faces of the perſons who look in them, otherwiſe this experiment will have no remarkable effect.

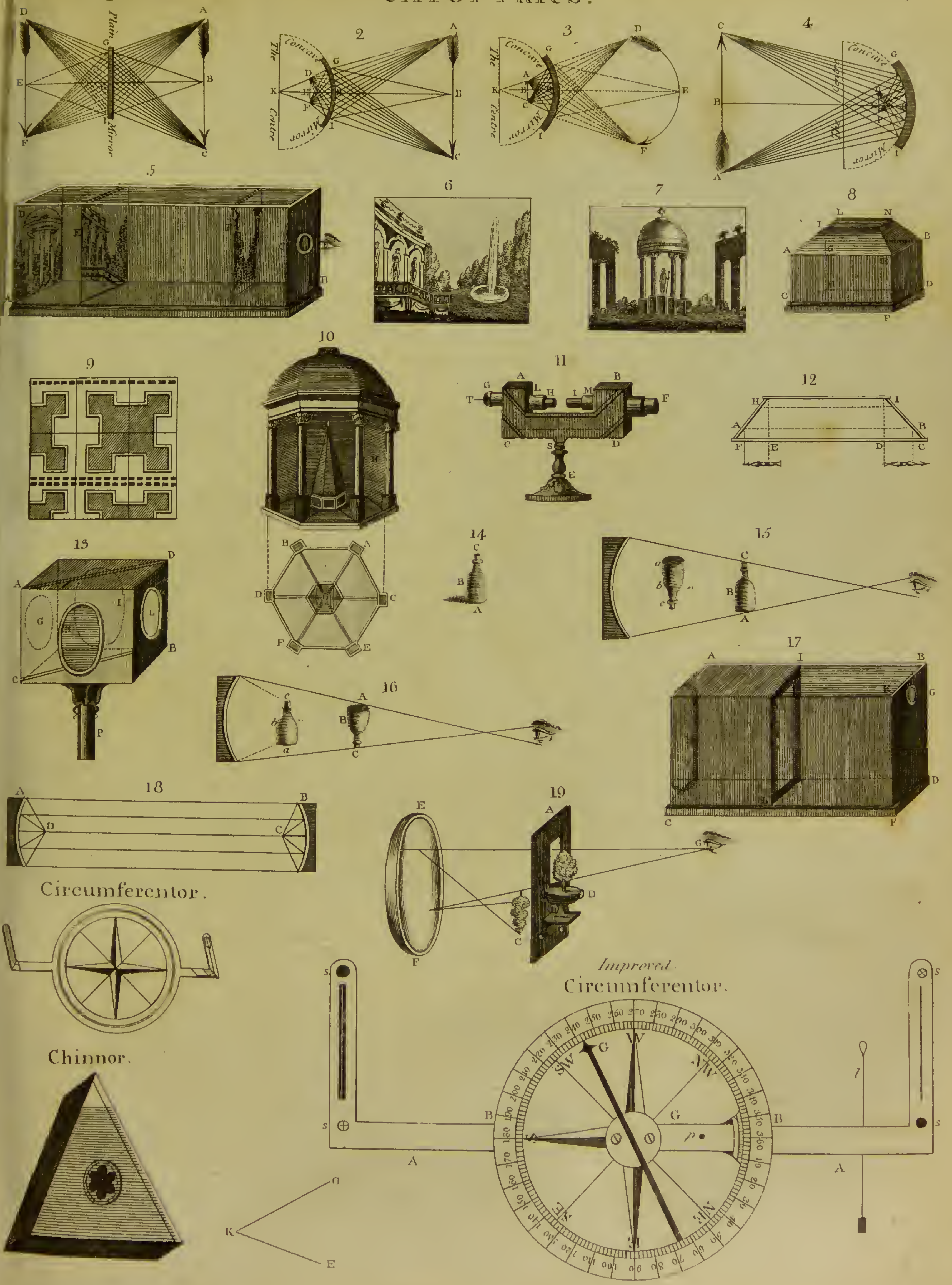
This experiment may be conſiderably improved by placing the two glaſſes in the partition in adjoining rooms; and a number of perſons being previouſly placed in one room, when a ſtranger enters the other, you may tell him his face is dirty; and deſire him to look in the glaſs, which he will naturally do; and on ſeeing a ſtrange face he will draw back: but returning to it, and ſeeing another, another, and another, like the phantom kings in Macbeth, what his ſurpriſe will be is not eaſy to expreſs. After this, a real mirror may be privately let down on the back of the glaſs; and if he can be prevailed to look in it once more, he will then, to his further aſtoniſhment, ſee his own face; and may be told, perhaps perſuaded, that all he ſaw before was mere imagination. How many tricks, leſs artful than this, have paſſed in former times for ſorcery; and paſs at this time, in ſome countries, for apparitions?

7. Make a box of wood, of a cubical figure, ABCD fig. 13, of about 15 inches every way. Let it be fixed on the pedeſtal P, at the uſual height of a man's head. In each ſide of this box let there be an opening of an oval form, of ten inches high, and ſeven wide. In this box place two mirrors A, D, with their backs againſt each other; let them croſs the box in a diagonal line, and in a vertical poſition. Decorate the openings in the ſides of this box with four oval frames and tranſparent glaſſes, and cover each of them with a curtain ſo contrived that they may all draw up together. Place four perſons in front of the four ſides, and at equal diſtances from the box, and then draw up the curtains that they may ſee themſelves in the mirrors; when each of them, inſtead of his own figure, will ſee that of the perſon who is next him, and who, at the ſame time, will ſeem to him to be placed on the oppoſite ſide. Their confuſion will be the greater, as it will be very difficult for them to diſcover the mirrors concealed in the box. The reaſon of this phænomenon is evident; for though the rays of light may be turned aſide by a mirror, yet, as we have before ſaid, they always appear to proceed in right lines.

8. Provide a box ABCD fig. 17, of about two feet long, 15 inches wide, and 12 inches high. At the end AC place a concave mirror, the focus of whoſe parallel rays is at 18 inches from the reflecting ſurface. At IL place a paſteboard blacked, in which a hole is cut ſufficiently large to ſee on the mirror H the object placed at BEFD. Cover the top of the box, from A to I, cloſe, that the mirror H may be entirely darkened. The other part IB, muſt be covered with a glaſs, under which is placed a gauze. Make an aperture at G, near the top of the ſide E B; beneath which, on the inſide, place, in ſucceſſion, paintings of different ſubjects, as viſtas, landſcapes, &c. ſo that they may be in front of the mirror H. Let the box be ſo placed that the object may be ſtrongly illuminated by the ſun, or by wax lights placed under the encloſed part of the box AI. By this ſimple conſtruction the objects placed at GD will be thrown into their natural perſpective; and if the ſubjects be properly choſen, the appearance will be altogether as pleaſing as in optical machines of a much more complicated form.—*Note*, A glaſs mirror ſhould be always here uſed, as thoſe of metal do not repreſent the objects with equal vivacity, and are beſide ſubject to tarniſh. It is alſo neceſſary that the box be ſufficiently large, that you may not be obliged to uſe a mirror whoſe focus is too ſhort; for in that caſe, the

* Theſe four tubes muſt terminate in the ſubſtance of the caſe, and not enter the inſide, that they may not hinder the effect of the mirrors. The fourfold reflection of the rays of light from the mirrors, darkens in ſome degree the brightneſs of the object; ſome light is alſo loſt by the magnifying power of the perſpective: if, therefore, inſtead of the object-glaſs at G, and concave eye-glaſs at F, plain glaſſes be ſubſtituted; the magnifying power of the perſpective will be taken away, and the object will appear brighter.

CATOPTRICS.



Barlow sculp.

right lines near the border of the picture will appear bent in the mirror, which will have a difagreeable effect, and cannot be avoided.

9. The rays of a luminous body placed in the focus of a concave mirror being reflected in parallel lines, if a fecond mirror be placed diametrically oppofite the firft, it will, by collecting thofe rays in its focus, fet fire to a combuftible body. Place two concave mirrors, A and B fig. 18, at about 12 or 15 feet diftance from each other, and let the axis of each of them be in the fame line. In the focus C of one of them place a live coal, and in the focus D of the other fome gunpowder with a pair of double bellows, which make a continual blaft, keep conftantly blowing the coal, and notwithftanding the diftance between them, the powder will inftantly take fire. It is not neceffary that thefe mirrors be of metal or brafs, thofe made of wood or pafteboard, gilded, will produce the explofion, which has fometimes taken effect at the diftance of 50 feet, when mirrors of 18 inches or two feet diameter have been ufed.

10. Behind the partition AB fig. 19, place, in a pofition fomething oblique, the concave mirror EF, which muft be at leaft ten inches in diameter, and its diftance from the partition equal to three fourths of the diftance of its centre. In the partition make an opening of feven or eight inches, either fquare or circular: it muft face the mirror, and be of the fame height with it. Behind this partition place a ftrong light, fo difpofed that it may not be feen at the opening, and may illumine an object placed at C, without throwing any light on the mirror. Beneath the aperture in the partition place the object C, that you intend fhall appear on the outfide of the partition, in an inverted pofition; and which we will fuppofe to be a flower. Before the partition, and beneath the aperture, place a little flower pot D, the top of which fhould be even with the bottom of the aperture, that the eye, placed at G, may fee the flower in the fame pofition as if its ftalk came out of the pot. Take care to paint the fpace between the back part of the partition and the mirror black, to prevent any reflections of light from being thrown on the mirror; in a word, fo difpofe the whole that it may be as little enlightened as poffible.

When a perfon is placed at the point G, he will perceive the flower that is behind the partition, at the top of the pot at D, but on putting out his hand to pluck it, he will find that he attempts to grafp a fhadow. If in the opening of the partition a large double convex lens of a fhort focus be placed, or, which is not quite fo well, a bottle of clear water, the image of the flower reflected thereon will appear much more vivid and diftinct.

The phænomena that may be produced by means of concave mirrors are highly curious and aftonifhing. By their help, fpectres of various kinds may be exhibited. Suppofe, for example, a perfon with a drawn fword places himfelf before a large concave mirror, but farther from it than its focus; he will then fee an inverted image of himfelf in the air, between him and the mirror, of a lefs fize than himfelf. If he fteadily prefent the fword towards the centre of the mirror, an image of the fword will come out therefrom towards the fword in his hand, point to point, as it were to fence with him; and by pufhing the fword nearer, the image will appear to come nearer him, and almoft to touch his breaft, having a ftriking effect upon him. If the mirror be turned 45 degrees, or one eighth round, the reflected image will go out perpendicular to the direction of the fword prefented, and apparently come to another perfon placed in the direction of the motion of the image. If that perfon is unacquainted with the experiment, and does not fee the original fword, he will be much furprifed and alarmed. This experiment may be another way diverfified, by telling any perfon, that at fuch an hour, and in fuch a place, he fhould fee the apparition of an abfent or deceafed friend (of whofe portrait you are in poffeffion). In order to produce this phantom, inftead of the hole in the partition AB in the laft figure, there muft be a door which opens into an apartment to which there is a confiderable defcent. Under that door you are to place the portrait, which muft be inverted and ftrongly illuminated, that it may be clearly reflected by the mirror, which muft be large and well polifhed. Then having introduced the incredulous fpectator at another door, and placed him in the proper point of view, you fuddenly throw open the door at AB, when, to his great aftonifhment, he will immediately fee the apparition of his friend. It will be objected, perhaps, that this is not a perfect apparition, becaufe it is only vifible at one point of view, and by one perfon. Some very curious deceptions effected merely by the concave mirror have lately been exhibited in London.

Sometimes glafs mirrors are ground concave in one direction only, as it is faid longitudinally; this is in fact a concave portion of a cylinder, the breadth of which may be confidered that of the mirror. A perfon looking at his face in this mirror, in the direction of its concavity, will fee it curioufly diftorted in a very lengthened appearance; and by turning the cylindrical mirror a quarter round, his vifage will appear diftorted another way, by an apparent increafe in width only. Another curious and fingular property attends this fort of mirrors: If in a very near fituation before it, you put your finger on the right hand fide of your nofe, it will appear the fame in the mirror; but if in a diftant fituation, fomewhat beyond the centre of concavity, you again look at your face in the mirror, your finger will appear to be removed to the other or left-hand fide of your nofe. This, though fomething extraordinary, will in its caufe appear very evident from flightly confidering the properties of fpherical concave mirrors.

CATOPTROMANCY, Κατοπτρομαντεια, a kind of divination among the ancients; fo called, becaufe confifting in the application of a mirror. The word is formed from κατοπτρον, *fpeculum*, "mirror," and μαντεια, *divinatio*, "divination." Paufanias fays, it was in ufe among the Achaians; where thofe who were fick, and in danger of death, let down a mirror, or looking-glafs faftened by a thread, into a fountain before the temple of Ceres; then, looking in the glafs, if they faw a ghaftly disfigured face, they took it as a fure fign of death: on the contrary, if the flefh appeared frefh and healthy, it was a token of recovery. Sometimes glaffes were ufed without water, and the images of things future reprefented in them. See Gastromancy.

CATROU (Francis), a famous Jefuit, born at Paris in 1659. He was engaged for 12 years in the *Journal de Trevoux*, and applied himfelf at the fame time to other works, which diftinguifhed him among the learned. He wrote a general Hiftory of the Mogul empire, and a Roman hiftory, in which he was affifted by Father Rouille a brother Jefuit. Catrou died in 1773; and this laft hiftory was continued by Rouille, who died in 1740.

CATTERTHUN, a remarkable Caledonian poft, a few

miles north of the town of Brechin in the county of Angus in Scotland. The meaning of the word *Catter-thun* is *Camp town*; and Mr. Pennant thinks that theſe might probably be the poſts occupied by the Caledonians before their engagement at the foot of the Grampian Mountains with the celebrated Agricola.

CATTI, a people of Germany, very widely ſpread, on the eaſt reaching to the river Sala, on the north to Weſtphalia; occupying, beſides Heſſe, the Watterau, and part of the tract on the Rhine, and on the banks of the river Lohne. The Hercynian foreſt began and ended in their country.

CATTIVELLAUNI, anciently a people of Britain, ſeated in the country which is now divided into the counties of Hertford, Bedford, and Bucks. The name of this ancient Britiſh people is written in ſeveral different ways by Greek and Roman authors, being ſometimes called Catti, Caſſii, Catticuclani, Cattidudnani, Catticludani, &c.

CATTLE, a collective word, which ſignifies thoſe four-footed animals, which ſerve either for tilling the ground, or for food to men. They are diſtinguiſhed into large, or black cattle; and into ſmall cattle: of the former are horſes, bulls, oxen, cows, and even calves and heifers; amongſt the latter are rams, ewes, ſheep, lambs, goats, kids, &c. Cattle are the chief ſtock of a farm: they who deal in cattle are ſtyled graziers.

CATULLUS (Caius Valerius), a Latin poet, born at Verona, in the year of Rome 666. The harmony of his numbers acquired him the eſteem and friendſhip of Cicero and other great men of his time. Many of his poems, however, abound with groſs obſcenities. He wrote ſatirical verſes againſt Cæſar, under the name of Marmoro. He ſpent his whole life in a ſtate of poverty; and died in the flower of his age, and the height of his reputation. Joſeph Scaliger, Paſſerat, Muret, and Iſaac Voſſius, have written learned notes on this poet.

CATZ (James), a great civilian, politician, and Dutch poet, was born at Browerſhaven, in Zealand, in the year 1577. After having made ſeveral voyages, he fixed at Middleburg; and acquired by his pleadings ſuch reputation, that the city of Dort choſe him for its penſionary; as did alſo, ſome time after, that of Middleburg. In 1634 he was nominated penſionary of Holland and Weſt Frieſland; and in 1648 he was elected keeper of the ſeal of the ſame ſtate, and ſtadtholder of the fiefs: but ſome time after, he reſigned theſe employments, to enjoy the repoſe which his advanced age demanded. As the poſt of grand penſionary had been fatal to almoſt all thoſe who had enjoyed it from the beginning of the republic till that time, Catz delivered up his charge on his knees, before the whole aſſembly of the ſtates, weeping for joy, and thanking God for having preſerved him from the inconveniences that ſeemed attached to the duties of that office. But though he was reſolved to ſpend the reſt of his days in repoſe, the love of his country engaged him to comply with the deſires of the ſtate, who importuned him to go on an embaſſy to England, in the delicate conjuncture in which the republic found itſelf during the protectorate of Cromwell. At his return, he retired to his fine country-ſeat at Sorgvliet, where he lived in tranquillity till the year 1660, in which he died. He wrote a great number of poems in Dutch; moſt of which are on moral ſubjects, and highly eſteemed.

CATZENELLIBOGEN, a town of Germany, in the lower part of the upper circle of the Rhine, with a ſtrong caſtle. It is the capital of a county of the ſame name, E. long. 7. 38. N. lat. 50. 20.

CAVA, in anatomy, the name of a vein, the largeſt in the body, terminating in the right ventricle of the heart. See ANATOMY, page 195.

CAVA, a conſiderable and populous town of Italy, in the kingdom of Naples, and in the Hither Principato, with a biſhop's ſee. It is ſituated at the foot of Mount Metelian, in E. long. 15. 5. N. lat. 40. 40.

CAVAILLON, a town of France, in Venaiſſin, with a late epiſcopal ſee, then ſubject to the pope. It is ſeated on the river Durance, 20 miles S. E. of Avignon. Long. 5. 17. E. Lat. 43. 34. N.

CAVALCADE, a formal pompous march or proceſſion of horſemen, equipages, &c. by way of parade, or ceremony, as a grace to a triumph, public entry, or the like.

CAVALCADOUR, or CAVALCADEUR, anciently denoted a riding maſter; but at preſent is diſuſed in that ſenſe, and only employed to denote a ſort of equerries or officers who have the direction of princes ſtables. The French had, *ecuyer cavalcadeur* of the king, the duke of Orleans, &c. Menage writes it *cavalcadour*, and derives it from the Spaniſh *cavalgador*, a horſeman.

CAVALCANTE (Guido), a nobleman of Florence in the 13th century, who having followed the party of the Guelſes, experienced the changeableneſs of fortune. He ſhowed great ſtrength of mind in his misfortunes, and never neglected to improve his talents. He wrote a treatiſe in Italian concerning ſtyle, and ſome verſes which are eſteemed. His poem on the love of the world has been commented on by ſeveral learned men.

CAVALIER, a horſeman, or perſon mounted on horſeback; eſpecially if he be armed, and have alſo a military appearance. Anciently, the word was reſtrained to a knight, or *miles*. The French ſtill uſe *chevalier* in the ſame ſenſe.

CAVALIER, in fortification, an elevation of earth of different ſhapes, ſituated ordinarily in the gorge of a baſtion, bordered with a parapet, and cut into a number of embraſures, according to the capacity of the cavalier. Cavaliers are a double defence for the faces of the oppoſite baſtion: they defend the ditch, break the beſiegers galleries, command the traverſes in dry moats, ſcour the ſaliant angle of the counterſcarp, where the beſiegers have their counter-batteries, and enfilade the enemy's trenches, or oblige them to multiply their parallels: they are likewiſe very ſerviceable in defending the breach and the retrenchments of the beſieged, and can very much incommode the intrenchments which the enemy make, being lodged in the baſtion.

CAVALIER, in the manege, one that underſtands horſes, and is practiſed in the art of riding them.

CAVALIERI (Bonaventure), an eminent mathematician in the 17th century, a native of Milan, and a friar of the order of the Jeſuati of St. Jerome, was profeſſor of mathematics at Bologna, where he publiſhed ſeveral mathematical books, particularly the *Method of Indiviſibles*. He was a ſcholar of Galileo. His *Directorium generale Uranometricum* contains great variety of moſt uſeful practices in trigonometry and aſtronomy. His trigonometrical tables in that work are excellent.

CAVALRY, a body of ſoldiers that charge on horſeback. The word comes from the French, *cavalerie*, and that from the corrupt Latin, *caballus*, a horſe. The Roman cavalry conſiſted wholly of thoſe called *equites*, or knights, who were a diſtinct order in the diſtribution of citizens. The Grecian cavalry were divided into *cataphractæ* and *non cataphractæ*, i. e. into heavy and light armed. Of all the Greeks, the Theſſalians excelled moſt in cavalry. The Lacedemonians, inhabiting a mountainous country, were but meanly furniſhed with cavalry, till, carrying their arms into other countries, they found great occaſion for horſes to ſupport and cover their foot. The Athenian cavalry, for a conſiderable time, conſiſted only of 96 horſemen: after expelling the Perſians out of Greece, they increaſed in number to 300; and afterwards to 1200, which was the

higheſt pitch of the Athenian cavalry. The Turkiſh cavalry conſiſts partly of Spahis, and partly of horſemen raiſed and maintained by the Zaims and Timariots. The chief uſe of the cavalry is to make frequent excurſions to diſturb the enemy, intercept his convoys, and deſtroy the country: in battle to ſupport and cover the foot, and to break through and diſorder the enemy; alſo to ſecure the retreat of the foot. Formerly, the manner of fighting uſed by cavalry was, after firing their piſtols or carabines, to wheel off, to give opportunity for loading again. Guſtavus Adolphus is ſaid to have firſt taught the cavalry to charge through, to march ſtraight up to the enemy, with the ſword drawn in the bridle-hand, and each man having fired his piece, at the proper diſtance, to betake himſelf to his ſword, and charge the enemy as was found moſt advantageous.

CAVAN, a town of Ireland, and capital of a county of the ſame name, in the province of Ulſter, ſituated in W. long. 7. 32. N. lat. 54. 0.

Cavan, a county of Ireland, 47 miles in length, and 23 in breadth; is bounded on the eaſt by Monaghan, and on the ſouth by Longford, Weſt-meath, and Eaſt-meath. It has but two towns of any note, viz. Cavan and Kilmore. It ſends five members to parliament; two for the county, two for Cavan, and one for Kilmore. It contains upwards of 8000 houſes, 37 pariſhes, ſeven baronies, and two boroughs.

CAUCASUS, the name of a very high mountain of Aſia, being one of that great ridge which runs between the Black and Caſpian ſeas. Sir John Charindin deſcribes this as the higheſt mountain, and the moſt difficult to paſs, of any he had ſeen. It is 36 leagues over, and the ſummit eight leagues in breadth. The top is perpetually covered with ſnow, yet extremely fruitful; abounding in honey, corn, fruits, hogs, and large cattle. The inhabitants are for the moſt part Chriſtians of the Georgian Church. They have fine complections, and the women are very beautiful.

CAUDEBEC, a rich, populous, and trading town of France, in the department of Lower Seine and late province of Normandy, at the foot of a mountain, near the Seine, 18 miles N. W. of Rouen. Long. 1. 26. E. Lat. 49. 31. N.

CAUDEX, by Malpighi and other botaniſts, is uſed to ſignify the ſtem or trunk of a tree; by Linnæus, the ſtock or body of the root, part of which aſcends, part deſcends. The aſcending part raiſes itſelf gradually above ground, ſerving frequently for a trunk, and correſponds in ſome meaſure to the *caudex* of former writers. The deſcending part ſtrikes gradually downward into the ground, and puts forth radicles or ſmall fibres, which are the principal and eſſential part of every root. The deſcending caudex therefore correſponds to the radix of other botaniſts. Agreeably to this idea, Linnæus conſiders trees and ſhrubs as roots above ground; an opinion which is well confirmed by a well known fact, that trees, when inverted, put forth leaves from the deſcending caudex, and radicles or roots from the aſcending. For the varieties in the deſcending caudex, ſee the article Radix.

CAVE, any large ſubterraneous hollow. Theſe were undoubtedly the primitive habitations, before men began to build edifices above ground. The primitive method of burial was alſo to repoſit the bodies in caves, which ſeems to have been the origin of catacombs. They long continued the proper habitations of ſhepherds. Among the Romans, *caves (antra)* uſed to be conſecrated to nymphs, who were worſhipped in caves, as other gods were in temples. The Perſians alſo worſhipped their god Mithras in a natural cave conſecrated for the purpoſe by Zoroaſter. The cave of the nymph Egeria is ſtill ſhown at Rome. Kircher, after Gaffarellus, enumerates many ſpecies of caves: as divine, natural, &c.—Of natural caves ſome are poſſeſſed of a medicinal virtue, as the Grotto de Serpente; others are poiſonous or mephitical; ſome are replete with metalline exhalations, and others with waters. *Divine* caves were thoſe ſaid to affect the human mind and paſſions in various ways, and even to inſpire with a knowledge of future events. Such were the ſacred caverns at Delphi which inſpired the Pythia; the Sibyl's cave at Cumæ, ſtill ſhown near the lake Avernus; the cave of Trophonius, &c.

Cave (Dr. William), a learned Engliſh divine, born in 1637, educated in St. John's college, Cambridge; and ſucceſſively miniſter of Haſeley in Oxfordſhire, All-hallows the Great in London, and of Iſlington. He became chaplain to Charles II.. and in 1684 was inſtalled a canon of Windſor. He compiled *the Lives of the Primitive Fathers in the three firſt centuries of the church*, which is eſteemed a very uſeful work; and *Hiſtoria Literaria*, &c. in which he gives an exact account of all who had written for or againſt Chriſtianity, from the time of Chriſt to the 14th century: which works produced a warm controverſy between Dr. Cave and M. Le Clerc, who was then writing his *Bibliotheque Univerſelle* in Holland, and who charged the doctor with partiality. Dr. Cave died in 1713.

Cave (Edward), born at Newton in Warwickſhire, Feb. 29, 1691, and celebrated for having planned, and brought to perfection, "The Gentleman's Magazine;" which has now ſubſiſted 65 years, and is ſtill (1796) one of the moſt judicious pamphlets of the kind which literary hiſtory has upon record. Mr. Cave died Jan. 10, 1754. The periodical performances before the year 1731, in which year the Gentleman's Magazine firſt appeared, were almoſt wholly confined to political tranſactions, and to foreign and domeſtic occurrences. But the monthly magazines have opened a way for every kind of inquiry and information. The intelligence and diſcuſſion contained in them are very extenſive and various; and they have been the means of diffuſing a general habit of reading through the nation, which, in a certain degree, hath enlarged the public underſtanding. Many young authors, who have afterwards riſen to conſiderable eminence in the literary world, have here made their firſt attempts in compoſition. Here too are preſerved a multitude of curious and uſeful hints, obſervations, and facts, which otherwiſe might never have appeared; or, if they had appeared in a more evaneſcent form, would have incurred the danger of being loſt.

CAVEARE. See Caviare.

CAVEAT, in law, a kind of proceſs in the ſpiritual courts, to ſtop the proving of a will, the granting letters of adminiſtration, &c. to the prejudice of another. It is alſo uſed to ſtop the inſtitution of a clerk to a benefice.

CAVEATING, in fencing, is the ſhifting the ſword from one ſide of that of your adverſary to the other.

CAVEDO, in commerce, a Portugueſe long meaſure, equal to $27\frac{5}{10}\frac{4}{10}$ Engliſh inches.

CAVENDISH (Thomas), of Suffolk, the ſecond Engliſhman that ſailed round the globe, was deſcended from a noble family in Devonſhire. Having diſſipated his fortune, he reſolved to repair it at the expence of the Spaniards. He ſailed from Plymouth with two ſmall ſhips in July 1586; paſſed through the ſtraits of Magellan; took many rich prizes along the coaſts of Chili and Peru; and near California poſſeſſed himſelf of the St. Ann, an Acapulco ſhip, with a cargo of immenſe value. He completed the circumnavigation of the globe, and returned home in 1588. His acquired riches however did not laſt long; he reduced himſelf, in 1591, to the expedient of another voyage; which was far from being ſo ſucceſsful as the former; he went no farther than the ſtraits of Magellan, where the weather obliging him to return, he died of grief on the coaſt of Brazil.

Cavendish (Sir William), born about 1505. Cardinal Wolſey took him into his ſplendid family; which conſiſted of one earl, nine barons, and about a thouſand knights, gentle-

men, and inferior officers. He ferved the cardinal as gentleman ufher, and was admitted into more intimacy with him than any other fervant, and therefore would not defert him in his fall; but was one of the few who ftuck clofe to him when he had neither office nor falary to beftow. This fingular fidelity, joined to his abilities, recommended him to his fovereign; who received him into his own family and fervice. He afterwards held high offices of ftate under Edward VI. and Mary I. and died 1557. Sir William Cavendifh wrote the life of his old mafter cardinal Wolfey; and therein gives him a very high character, affirming that, in his judgment, he never faw the kingdom in better obedience and quiet than during the time of his authority, or juftice better adminiftered.

Cavendish (William), duke of Newcaftle, born 1592. He rendered great fervices in a military capacity to Charles I. and II. and, after the reftoration, retired to indulge his natural difpofition in literary purfuits. He wrote the celebrated "Treatife on Horfemanfhip;" of which a moft excellent edition was, a few years ago, printed in this kingdom. His poems, except thofe preferved among the poetry of his duchefs, are loft: and four comedies; "The Country Captain;" "Variety," "The Humorons Lovers," and "The Triumphant Widow, or Medley of Humours." "The Humorous Lovers" was acted with great applaufe in 1677; and Shadwell tranfcribed great part of "The Triumphant Widow" into his "Bury Fair." He died on Chriftmas day 1676. His fecond wife, Margaret, daughter of Thomas Lucas, of Colchefter, Efq. was a woman of great wit, and fome learning; for, befides the life of the duke and her own, fhe wrote a great number of folio volumes; and publifhed twenty-fix plays; in feveral of which there are fcenes and fongs written by the duke.

Cavendish (William), the firft duke of Devonfhire, and one of the moft diftinguifhed patriots in the Britifh annals, was born in 1640. In 1677, being then member for Derby, he vigoroufly oppofed the venal meafures of the court; and, the following year, was one of the committee appointed to draw up articles of impeachment againft the lord-treafurer Danby. In 1679, being re-elected to ferve for Derby in a new parliament, Charles II. thought fit to make him a privy counfellor; but he foon withdrew from the board, with his friend lord Ruffel, when he found that popifh intereft prevailed. He nobly appeared at lord Ruffel's trial, in defence of that great man, at a time when it was fcarce more criminal to be an accomplice than a witnefs for him. The fame fortitude, activity, and love of his country, animated this illuftrious patriot to oppofe the arbitrary proceedings of James II. His laft public fervice was in the union with Scotland, for concluding of which he was appointed a commiffioner by queen Anne. He died in 1707.

CAVETTO, in architecture, a hollow member, or round concave moulding, containing a quadrant of a circle, and having a quite contrary effect to that of a quarter round: it is ufed as an ornament in cornices.

CAVEZON, in the manege, a fort of nofe-band, either of iron, leather, or wood, fometimes flat, and at other times hollow or twifted, put upon the nofe of a horfe to wring it, and to forward the fuppling and breaking of the horfe.

CAVIARE, a kind of food lately introduced into Britain. It is made of the hard roes of fturgeon, formed into fmall cakes, about an inch thick and three or four inches broad. The method of making it is, by taking out of the fpawn all the fibres or ftrings, then wafhing it in white wine or vinegar, and fpreading it on a table. It is then falted and preffed in a fine bag; after which it is cafed up in a veffel with a hole at the bottom, that if any moifture is left it may run out. This kind of food is in great requeft among the Mufcovites, on account of their three lents, which they keep with a fuperftitious exactnefs; wherefore the Italians fettled at Mofcow drive a very great trade in this commodity throughout that empire, there being a prodigious quantity of fturgeon taken at the mouth of the Wolga and other rivers which fall into the Cafpian fea. A pretty large quantity of the commodity is alfo confumed in Italy and France. They get the caviare from Archangel, but commonly buy it at fecond hand of the Englifh and Dutch. According to Savary, the beft caviare brought from Mufcovy is prepared from the belluga, a fifh eight or ten feet long, caught in the Cafpian fea, which is much preferable to that made of the fpawn of fturgeon. A kind of caviare, or rather faufage, is alfo made from the fpawn of fome other fifhes; particularly a fort of mullet caught in the Mediterranean. See Mugil and Botargo.

Infect Caviare. See Axayacatl.

CAVIDOS. See Cabidos.

CAVIL, (*cavillatio*) is defined by fome a fallacious kind of reafon, carrying fome refemblance of truth, which a perfon, knowing its falfehood, advances in difpute for the fake of victory. The art of framing fophifms or fallacies is called by Boethius *cavillatoria*.

CAUK, or Cawk. See Terra Ponderosa, and Chemistry.

CAUKING, or Caulking, *of a fhip*, is driving a quantity of oakum, or old ropes untwifted and drawn afunder, into the feams of the planks, or into the intervals where the planks are joined together in the fhip's decks or fides, in order to prevent the entrance of water. After the oakum is driven very hard into thefe feams, it is covered with hot melted pitch or rofin, to keep the water from rotting it. Among the ancients, the firft who made ufe of pitch in caulking, were the inhabitants of Phæacia, afterwards called Corfica. Wax and rofin appear to have been commonly ufed previous to that period; and the Poles at this time ufe a fort of unctuous clay for the fame purpofe, on their navigable rivers.

Caulking *Irons*, are iron chiffels for that purpofe. Some of thefe irons are broad, fome round, and others grooved. After the feams are ftopped with oakum, it is done over with a mixture of tallow, pitch, and tar, as low as the fhip draws water.

CAUL, in anatomy, the popular name for the *Omentum*. See Anatomy.

Caul is likewife a thin membrane encompaffing the heads of fome children when born. It is only a portion of the membranes of the fœtus; which ufually break, but fometimes pafs forwards along with the child. It is an idle fuperftition with failors' wives, that the poffeffing one of thefe will preferve their hufbands from being fhipwrecked.

CAULIFLOWERS, in gardening, a much efteemed fpecies of cabbage. See Brassica.

CAURIS, in natural hiftory, a name given by fome to the genus of fhells called, by the generality of writers, *porcellana* and *concha venerea*. It is from a falfe pronunciation of this word *cauris* that we call thefe fhells *gowries*. See Porcelain-*Shell*.

CAURSINES (*Caurfini*), were Italians that came into England about the year 1235, terming themfelves *the Pope's merchants*, but driving no other trade than letting out money; and having great banks in England, they differed little from Jews, fave (as hiftory fays) they were rather more mercilefs to their debtors. Some will have them called *Courfines*, quafi *Caufa Urfini*, bearifh and cruel in their caufes; others *Caorfini* or *Corfini*, as coming from the ifle of Corfica; but Cowel fays, they have their name from *Caorfium, Caorfi*, a town in Lombardy, where they firft practifed their arts of ufury and extortion; from whence fpreading themfelves, they carried their

infamous trade through moſt parts of Europe, and were a common plague to every nation where they came. The then biſhop of London excommunicated them; and king Henry III. baniſhed them from this kingdom in the year 1240. But, being the pope's ſolicitors and money-changers, they were permitted to return in the year 1250; though in a very ſhort time they were again driven out of the kingdom on account of their intolerable exactions.

CAUSA MATRIMONII PRÆLOCUTI, in common law, a writ that lies where a woman gives land to a man in fee to the intent he ſhall marry her, and he refuſes to do it in a reaſonable time, being thereunto required by the woman; and in ſuch caſe, for not performing the condition, the entry of the woman into the lands again has been adjudged lawful. The huſband and wife may ſue this writ againſt another who ought to have married her.

CAUSALITY, among metaphyſicians, the action or power of a cauſe in producing its effect.

CAUSALTY, among miners, denotes the lighter, ſulphureous, earthy parts of ores, carried off in the operation of waſhing. This, in the mines, they throw in heaps upon banks, which in ſix or ſeven years they find it worth their while to work over again.

CAUSE, that from whence any thing proceeds, or by virtue of which any thing is done: it ſtands oppoſed to effect. We get the ideas of cauſe and effect from our obſervation of the viciſſitude of things, while we perceive ſome qualities or ſubſtances begin to exiſt, and that they receive their exiſtence from the due application and operation of other beings. That which produces, is the cauſe; and that which is produced, the effect: thus, fluidity in wax is the effect of a certain degree of heat, which we obſerve to be conſtantly produced by the application of ſuch heat.

Ariſtotle, and the ſchoolmen after him, diſtinguiſhed four kinds of cauſes; the efficient, the material, the formal, and the final. This, like many of Ariſtotle's diſtinctions, is only a diſtinction of the various meanings of an ambiguous word: for the efficient, the matter, the form, and the end, have nothing common in their nature, by which they may be accounted ſpecies of the ſame *genus*; but the Greek word, which we tranſlate *cauſe*, had theſe four different meanings in Ariſtotle's days, and we have added other meanings. We do not indeed call the matter or the form of a thing its cauſe; but we have final cauſes, inſtrumental cauſes, occaſional cauſes, and many others. Thus the word cauſe has been ſo hackneyed, and made to have ſo many different meanings in the writings of philoſophers, and in the diſcourſe of the vulgar, that its original and proper meaning is loſt in the crowd.

With regard to the phenomena of nature, the important end of knowing their cauſes, beſides gratifying our curioſity, is, that we may know when to expect them, or how to bring them about. This is very often of real importance in life; and this purpoſe is ſerved, by knowing what, by the courſe of nature, goes before them and is connected with them; and this, therefore, we call the *cauſe* of ſuch a phenomenon. If a magnet be brought near to a mariner's compaſs, the needle, which was before at reſt, immediately begins to move, and bends its courſe towards the magnet, or perhaps the contrary way. If an unlearned ſailor is aſked the cauſe of this motion of the needle, he is at no loſs for an anſwer. He tells you it is the magnet: and the proof is clear; for, remove the magnet, and the effect ceaſes; bring it near, and the effect is again produced. It is, therefore, evident to ſenſe, that the magnet is the cauſe of this effect.

A Carteſian philoſopher enters deeper into the cauſe of this phenomenon. He obſerves, that the magnet does not touch the needle, and therefore can give it no impulſe. He pities the ignorance of the ſailor. The effect is produced, ſays he, by magnetic effluvia, or ſubtile matter, which paſſes from the magnet to the needle, and forces it from its place. He can even ſhow you, in a figure, where theſe magnetic effluvia iſſue from the magnet, what round they take, and what way they return home again. And thus he thinks he comprehends perfectly how, and by what cauſe, the motion of the needle is produced. A Newtonian philoſopher inquires what proof can be offered for the exiſtence of magnetic effluvia, and can find none. He therefore holds it as a fiction, an hypotheſis; and he has learned that hypotheſes ought to have no place in the philoſophy of nature. He confeſſes his ignorance of the real cauſe of this motion, and thinks that his buſineſs as a philoſopher is only to find from experiment the laws by which it is regulated in all caſes. Theſe three perſons differ much in their ſentiments with regard to the real cauſe of this phenomenon; and the man who knows moſt is he who is ſenſible that he knows nothing of the matter. Yet all the three ſpeak the ſame language, and acknowledge that the cauſe of this motion is the attractive or repulſive power of the magnet.

What has been ſaid of this, may be applied to every phenomenon that falls within the compaſs of natural philoſophy. We deceive ourſelves, if we conceive that we can point out the real efficient cauſe of any one of them. The grandeſt diſcovery ever made in natural philoſophy, was that of the law of gravitation, which opens ſuch a view of our planetary ſyſtem, that it looks like ſomething divine. But the author of this diſcovery was perfectly aware that he diſcovered no real cauſe, but only the law or rule according to which the unknown cauſe operates. Natural philoſophers, who think accurately, have a preciſe meaning to the terms they uſe in the ſcience; and when they pretend to ſhew the cauſe of any phenomenon of nature, they mean by the cauſe, a law of nature of which that phenomenon is a neceſſary conſequence.

The whole object of natural philoſophy, as Newton expreſſly teaches, is reducible to theſe two heads: firſt, by juſt induction from experiment and obſervation, to diſcover the laws of nature; and then to apply thoſe laws to the ſolution of the phenomena of nature. This was all that this great philoſopher attempted, and all that he thought attainable. And this indeed he attained in a great meaſure, with regard to the motions of our planetary ſyſtem, and with regard to the rays of light. But ſuppoſing that all the phenomena which fall within the reach of our ſenſes were accounted for from general laws of nature juſtly deduced from experience; that is, ſuppoſing natural philoſophy brought to its utmoſt perfection; it does not diſcover the efficient cauſe of any one phenomenon in nature. The laws of nature are the rules according to which the effects are produced; but there muſt be a cauſe which operates according to theſe rules. The rules of navigation never navigated a ſhip. The rules of architecture never built a houſe.

Natural philoſophers, by great attention to the courſe of nature, have diſcovered many of her laws, and have very happily applied them to account for many phenomena: but they have never diſcovered the efficient cauſe of any one phenomenon; nor do thoſe who have diſtinct notions of the principles of the ſcience make any ſuch pretence. Upon the theatre of nature we ſee innumerable effects which require an agent endowed with active power; but the agent is behind the ſcene. Whether it be the Supreme Cauſe alone, or a ſubordinate cauſe or cauſes; and if ſubordinate cauſes be employed by the Almighty, what their nature, their number, and their different offices may be; are things hid, for wiſe reaſons, without doubt, from the human eye.

CAUSE, among civilians, the ſame with action. See ACTION.

CAUSE, among phyſicians. The cauſe of a diſeaſe is de-

fined by Galen to be that during the preſence of which we are ill, and which being removed the diſorder immediately ceaſes. The doctrine of the cauſes of diſeaſes is called ETIOLOGY. Phyſicians divide cauſes into remote and proximate.

The *Remote* CAUSE is that which renders the body ſuſceptible of a diſeaſe. The *Proximate* CAUSE is that which being preſent, the diſeaſe is alſo preſent; but which would have no effect without the preſence of the remote or *prediſpoſing* cauſe. Thus contagion will only act on thoſe in whoſe bodies the prediſpoſing cauſe exiſts.

CAUSEWAY, or CAUSEY, a maſſive conſtruction of ſtone, ſtakes, faſcines; or an elevation of fat, viſcous earth, well beaten; ſerving either as a road in wet marſhy places, or as a mole to retain the waters of a pond, or prevent a river from overflowing the lower grounds. See ROAD. The word comes from the French *Chauſſee*, anciently written *Chaulſee*; and that from the Latin *Calceata*, or *Calcata*; according to Somner and Spelman, *à calcando*. Bergier rather takes the word to have had its riſe *à peditum calceis, quibus teruntur*. Some derive it from the Latin *calx*, or French *chaux*, as ſuppoſing it primarily to denote a way paved with chalk-ſtones.

CAUSEWAY, *calcetum*, or *calcea*, more uſually denotes a common hard raiſed way, maintained and repaired with ſtones and rubbiſh.

Devil's CAUSEWAY, a famous work of this kind, which ranges through the county of Northumberland, commonly ſuppoſed to be Roman, though Mr. Horſley ſuſpects it to be of later times.

Giant's CAUSEWAY, is a denomination given to a huge pile of ſtony columns in the diſtrict of Coleraine in Ireland. See GIANT's *Cauſeway* and BASALTES.

CAUSSIN (Nicholas), ſurnamed the Juſt, a French Jeſuit, was born at Troyes in Champagne, in the year 1580; and entered into the Jeſuits order when he was 26 years of age. He taught rhetoric in ſeveral of their colleges, and afterwards began to preach, by which he gained very great reputation. He increaſed this reputation by publiſhing books, and in time was preferred to be confeſſor to the king. But he did not diſcharge this office to the fatisfaction of Cardinal Richelieu, though he diſcharged it to the ſatisfaction of every honeſt man; and therefore, it is not to be wondered at, that he at length came to be removed. He died in the Jeſuits convent at Paris in 1651. None of his works did him more honour than that which he entitled *La Cour Sainte*. It has been printed a great many times; and tranſlated into Latin, Italian, Spaniſh, Portugueſe, German, and Engliſh. He publiſhed ſeveral other books both in Latin and French.

CAUSTICITY, a quality belonging to ſeveral ſubſtances, by the acrimony of which the parts of living animals may be corroded and deſtroyed. Bodies which have this quality, when taken internally, are poiſons becauſe they deſtroy the ſubſtance of the ſtomach. Arſenic is one of the moſt powerful ſubſtances poſſeſſing this quality.

CAUSTICS, in ſurgery, are of various ſorts and degrees of activity. The ſtrongeſt that is commonly uſed, is the *Kali purum*. See PHARMACY and SURGERY.

CAUSTIC *Curve*, in the higher geometry, a curve formed by the concourſe or coincidence of the rays of light reflected from ſome other curve.

CAUSUS, a ſpecies of continual fever, accompanied with a remarkable degree of general inflammation.

CAUTERIZATION, the act of burning or ſearing ſome morbid part, by the application of fire either actual or potential. In ſome places they cauterize with burning tow, in others with cotton or moxa, in others with live coals; ſome uſe Spaniſh wax, others pyramidal pieces of linen, others gold or ſilver. Severinus recommends flame blown through a pipe; but what is uſually preferred among us is a hot iron. Cauterizing irons are of various figures; ſome flat, others round, ſome curved, &c. of all which we find drawing in Albucaſis, Scultetus, Ferrara, and others. Sometimes the hot iron is tranſmitted through a copper cannula, for the greater ſafety of the adjoining parts. The degree and manner of cauterizing are varied according to the nature of the diſeaſe and the part affected. It is moſtly uſed to quicken the ſeparation of diſeaſed pieces of bone.

CAUTERY, in ſurgery, a medicine for burning, eating, or corroding any ſolid part of the body. Cauteries are diſtinguiſhed into two claſſes; actual and potential: by actual cauteries are underſtood red hot inſtruments, uſually of iron; and by potential cauteries are underſtood certain kinds of cauſtic medicines. See PHARMACY.

CAUTION, in the civil and Scots law, denotes much the ſame with what, in the law of England, is called BAIL.

CAUTIONER, in Scots law, that perſon who becomes bound for another to the performance of any deed or obligation.

CAWK. See CAUK.

CAXA, a little coin made of lead mixed with ſome ſcoria of copper, ſtruck in China, but current chiefly at Bantam in the iſland of Java, and ſome of the neighbouring iſlands. See (the *Table* ſubjoined to) MONEY.

CAXAMALCA, the name of a town and diſtrict of Peru in South America, where there was a moſt ſumptuous palace belonging to the Incas, and a magnificent temple dedicated to the ſun.

CAXTON (William), a mercer of London, eminent by the works he publiſhed, and for being *reputed* the firſt who introduced and practiſed the art of printing in England: as to which, ſee the article PRINTING.

CAYENNE, a rich town and iſland of South America, capital of the French ſettlements there, bounded on the N. by the Dutch colony of Surinam. It lies at the mouth of the river Amazon; and the French have given it the title of Equinoctial France, from its ſituation nearly under the line. It is 45 miles in circumference, and the anchorage for veſſels is between Cape Ceperou in the iſland, and that of Corbin in Terra Firma. The French ſettled here in 1635; but leaving it in 1654, the Engliſh ſtaid here till 1664, when the French took poſſeſſion of it again. The Dutch became maſters of it in 1676, but the French drove them away the year following. The greateſt heats begin toward the end of June, and terminate at the end of November, and this is the dry ſeaſon; but from December till the end of June it rains more or leſs: however, on account of their eaſterly winds, the air is healthy. Sugar and coffee are the principal commodities. Long. 52. 15. W. Lat. 4. 56. N.

CAYLUS (Count de), a French writer, born at Paris in 1692. He entered young into military ſervice, and diſtinguiſhed himſelf in Catalonia, and at the ſiege of Fribourg. After the peace of Raſtad, he went to Italy; then to the Levant; and viſited the famous temple of Diana at Epheſus. He returned to France in 1717, but made ſome voyages afterward. at laſt being ſettled, he cultivated muſic and painting; and alſo compoſed ſome works, the chief of which is, "Recueil d'Antiquités Egyptiennes, Etruſques, Grecques, Romaines, & Gauloiſes," 7 tom. 4to. 1752-67. He died however in 1765, before the laſt part of the work was publiſhed. He was a great friend and protector of learning and the ſciences.

CAZEROM, or CAZERON, a city of Aſia in Perſia, ſituated in E. long. 70. N. Lat. 29. 15.

CAZIC, or CAZIQUE, a title given by the Spaniards to the petty kings, princes, and chiefs, of the ſeveral countries of America, excepting thoſe of Peru, which are called *curacas*. The French call them *caſiques*, a denomination which they al-

ways give to the Tartarian hordes. The cazics, in fome places, do the office of phyficians, and in others of priefts, as well as of captains. The dignity of cazic among the Chiites, a people of South America, does not defcend to children, but muft be acquired by valour and merit. One of the prerogatives annexed to it is, that the cazic may have three wives, while the other people are allowed only one. Mexico comprehended a great number of provinces and iflands, which were governed by lords called *caziques*, dependent on and tributary to the emperor. Thirty of thefe vaffals are faid to have been fo powerful, that they were able, each of them, to bring an army of 100,000 men into the field.

CAZIMIR, a handfome town of Poland, in the palatinate of Lublin, fituated on a hill covered with trees, in E. long. 3. 10. N. lat. 51. 5.

CEA, Ceos, or Cos; one of the Greek iflands.

CEANOTHUS, New-Jersey Tea, in botany; a genus of the monogynia order, belonging to the pentandria clafs of plants; and in the natural method ranking under the 43d order, *Dumofæ*. There are five petals, pouched and arched. The fruit is a dry, trilocular and trifpermous berry. There are three fpecies, of which the moft remarkable is the Americanus, a native of moft parts of North America, from whence great plenty of the feeds have been imported into Europe. In England, this plant feldom rifes more than three feet high. The ftem, which is of a pale-brown colour, fends out branches from the bottom. Thefe are thin, flexible, and of a reddifh colour, which may have occafioned this tree to go by the name of *Red Twig*. The leaves which ornament thefe branches ftand on reddifh pedicles, about half an inch in length. They are oval, ferrated, pointed, about two inches and a half long, are proportionably broad, and have three nerves running lengthwife. From the footftalk to the point they are of a light green colour, grow irregularly on the branches, and not oppofite by pairs, as has been afferted. They are late in the fpring before they fhoot. The flowers grow at the ends of the twigs in clufters: they are of a white colour, and when in blow give the fhrub a moft beautiful appearance. Indeed, it feems to be almoft covered with them, as there is ufually a clufter at the end of nearly every twig; and the leaves which appear among them ferve as ornaments only, like myrtle in a diftant nofegay: nature, however, has denied them fmell. This tree will be in blow in July; and the flowers are fucceeded by fmall brownifh fruit, in which the feeds will fometimes ripen in England. This plant is propagated by layering; or from feeds fown in pots of compoft, confifting of two parts clean earth well tempered and one part fand, about a quarter of an inch deep; being equally careful to defend the young feedlings from an extremity of cold in winter, as from the parching drought of the fummer months. The beft time of layering them is in the fummer, juft before they begin to flower: at that time lay the tender twigs of the fpring fhoot in the earth, and nip off the end which would produce the flowers. By the autumn twelvemonth fome of them will be rooted. At the ftools, however, the plants fhould remain until the fpring, when they fhould be taken off, and the beft rooted and the ftrongeft may be planted in the nurfery-way, or in a dry foil and well fheltered place, where they are to remain; while the bad rooted ones and the weakeft fhould be planted in pots; and if thefe are plunged into a moderate warmth of dung, it will promote their growth, and make them good plants before autumn. In the winter they fhould be guarded againft the frofts; and in the fpring they may be planted out where they are to remain.

CEBES, of Thebes, a Socratic philofopher, author of the admired *Table of Cebes*: or "Dialogues on the Birth, Life, and Death of Mankind." He flourifhed about 405 years before Chrift.

CECIL (William), lord Burleigh, fon of Richard Cecil, groom of the robes, and yeoman of the wardrobes, was born at Bourn in Lincolnfhire, in 1521; and having been educated at the grammar-fchool there, went to St. John's college in Cambridge; where in his 20th year he married a fifter to Sir John Cheek, tutor to Edward VI. He removed from Cambridge to Gray's Inn, being defigned for the bar; and when his firft wife died, he married a daughter of Sir Anthony Cook, Edward's fchool-mafter. This lady was well verfed in the Greek and Latin tongues, and both of his wives were defcended from two of the greateft fcholars of the age. His relation to thefe gentlemen rather advanced than hindered his learning; and he applied himfelf to the law with fuch induftry, that he foon became eminent in his profeffion.

When the duke of Somerfet was chofen protector to his nephew Edward, he took Cecil into his family, and made him mafter of requefts, the firft who bore that title in England; in the 2d year of that king, he was cuftos brevium of the court of common pleas; in the 3d, cuftos rotulorum of Lincolnfhire; in the 5th, one of the principal fecretaries of ftate. He was alfo knighted, fworn of the privy council, and made chancellor of the garter. By fome writers he is charged with ingratitude to his munificent patron, and faid to have been concerned in his fall. The duke of Somerfet fent for him, before he was apprehended, and told him, he doubted of fome ill meaning againft him. Cecil replied, if he were not in fault, he might truft to his innocence: if he were, he had nothing to fay, but to lament him.

When the king died, he was one of the privy counfellors who declared for lady Jane Grey; yet queen Mary never refented it, farther than by difmiffing him from his offices; and, towards the end of her reign, fhe often confulted him. He kept fair with her minifters, and was much refpected by cardinal Pole, bifhop Tonftall, and Sir William Peters, zealous papifts, for his great wifdom. Elizabeth, on her acceffion, added to her catholic counfellors eight proteftants. Among thefe was Sir William Cecil, whom fhe admitted again to his place of fecretary of ftate, and made him mafter of the court of wards. He was foon after unanimoufly chofen by the univerfity of Cambridge to be their chancellor, which office had been vacant ever fince the death of cardinal Pole. He was a member of the firft parliament the queen held, and of all the following parliaments till 1571, when he was created baron of Burleigh.

When age and diftempers began to wafte him, he defired of her majefty to lay down his offices: on which fhe vifited and comforted him, and continued to do fo during his laft ficknefs. But his difeafe, old age, was fuch as no remedies could cure; and, Auguft 1598, he quietly departed this life, in his 78th year. As to his writings, he is reckoned, by Hollinfhed, amongft the hiftorians of the Englifh nation. He wrote two poems in Latin, on the death of Margaret Nevil, lady of the bed-chamber to queen Catharine. They were printed among the "Carmina Suffolc. fratrum, in 1552," 4to. A Latin poem in memory of Thomas Chaloner, knight. A preface to queen Catharine's book, entitled, "Lamentation of a Sinner, 1548," 12mo. "Precepts or Directions for the well-ordering and carriage of a Man's Life, 1637." Harl. Cat. vol. ii. p. 755. "Meditations on the Death of his Lady." "A Meditation on the State of England, during the Reign of Queen Elizabeth."

CECILIA (St.), the patronefs of mufic, has been honoured as a martyr ever fince the fifth century. Her ftory, as delivered by the notaries of the Roman church, and from them tranfcribed into the Golden Legend and other books of the like kind, fays, that fhe was a Roman lady born of noble parents, about the year 225: that, notwithftanding fhe had been converted

to Chriſtianity, her parents married her to a young pagan nobleman named Valerianus; who going to bed to her on the wedding night, *as the cuſtom is*, ſays the book, was given to underſtand by his ſpouſe, that ſhe was nightly viſited by an angel, and that he muſt forbear to approach her, otherwiſe the angel would deſtroy him. Valerianus, ſomewhat troubled at theſe words, deſired that he might ſee his rival the angel; but his ſpouſe told him that was impoſſible, unleſs he would conſent to be baptized and become a Chriſtian. This he conſented to: after which, returning to his wife, he found her in her cloſet at prayer, and by her ſide, in the ſhape of a beautiful young man, the angel clothed with brightneſs. After ſome converſation with the angel, Valerianus told him that he had a brother named Tiburtius, whom he greatly wiſhed to ſee a partaker of the grace which he himſelf had received. The angel told him that his deſire was granted, and that they ſhould be both crowned with martyrdom in a ſhort time. Upon this the angel vaniſhed, and was not long in ſhowing himſelf as good as his word; Tiburtius was converted, and both he and his brother Valerianus were beheaded. Cecilia was offered her life upon condition that ſhe would ſacrifice to the deities of the Romans; but refuſing, ſhe was ſcalded to death: or, as others ſay, ſtifled in a dry bath, i. e. an incloſure, from whence the air was excluded, having a ſlow fire underneath it; which kind of death was ſometimes inflicted by the Romans upon women of quality who were criminals. Upon the ſpot where her houſe ſtood, is a church ſaid to have been built by pope Urban I. who adminiſtered baptiſm to her huſband and his brother: it is the church of St. Cecilia at Traſtevere; within is a moſt curious painting of the ſaint, as alſo a ſtately monument with a cumbent ſtatue of her with her face downwards. There is a tradition of St. Cecilia, that ſhe excelled in muſic; and that the angel who was thus enamoured of her, was drawn from the celeſtial regions by the charms of her melody: this has been deemed authority ſufficient for making her the patroneſs of muſic and muſicians. The legend of St. Cecilia has given frequent occaſion to painters and ſculptors to exerciſe their genius in repreſentations of her, playing on the organ, and ſometimes on the harp. Raphael has painted her ſinging with a regal in her hands; and Domenichino and Mignard, ſinging and playing on the harp.

CECROPS, the founder and firſt king of Athens, about the time of Moſes the lawgiver of the Hebrews. He was the firſt who eſtabliſhed civil government, religious rites, and marriage among the Greeks; and died after a reign of 50 years.

CEDAR, in botany. See JUNIPERUS, and PINUS. The ſpecies of cedar famous for its duration, is that popularly called by us the cedar of Lebanon (Pinus cedrus), by the ancients *cedrus magna*, or the great cedar; alſo *cedrelate*, Κεδρελατη. See the article PINUS.

CEDRENUS (George), a Grecian monk, lived in the 11th age, and wrote "Annals, or an abridged Hiſtory, from the Beginning of the World to the Reign of Iſaac Comnenus emperor of Conſtantinople, who ſucceeded Michael IV. in 1057." This work is no more than an extract from ſeveral hiſtorians. There is an edition of it, printed at Paris in 1647, with the Latin verſion of Xylander, and the notes of father Goar a Dominican.

CEDRUS, the CEDAR-TREE, MAHOGANY, &c. See JUNIPERUS, PINUS, and SWIETENIA.

CEILING, in architecture, the top or roof of a lower room; or a covering of plaſter over laths nailed on the bottom of the joiſts that bear the upper room; or where there is no upper room, on joiſts for the purpoſe; hence called *ceiling-joiſts*. The word *ceiling* anſwers pretty accurately to the Latin *lacunar*, "every thing over head." Plaſtered ceilings are much uſed in Britain, more than in any other country: nor are they without their advantages, as they make the room lightſome; are good in caſe of fire; ſtop the paſſage of the duſt; leſſen the noiſe over head; and, in ſummer, make the air cooler.

CEILING, in ſea language, denotes the inſide planks of a ſhip.

CEIMELIA, from κειμαι, to be *laid up*, in antiquity, denotes choice or precious pieces of furniture or ornaments, reſerved or laid up for extraordinary occaſions and uſes; in which ſenſe, ſacred garments, veſſels, and the like, are reputed of the ceimelia of a church. Medals, antique ſtones, figures, manuſcripts, records, &c. are the ceimelia of men of letters.

CEIMELIARCHIUM, the repoſitory or place where ceimelia are preſerved.

CEIMELIOPHYLAX, (from κειμηλιον and φυλαττω, *I keep*), the keeper or curator of a collection of ceimelia; ſometimes alſo denominated *ceimeliarcha*. The ceimeliarcha, or ceimeliophylax, was an officer in the ancient churches or monaſteries, anſwering to what was otherwiſe denominated *chartophylax*, and *cuſtos archivorum*.

CELANDINE, in botany. See CHELIDONIUM.

CELANO, a town of Italy, in the kingdom of Naples, in Farther Abruzzo. It is ſeated a mile from the lake Celano, anciently called FUCINUS. E. long. 13. 39. N. lat 41. 56.

CELARENT, among logicians, a mode of ſyllogiſm, wherein the major and concluſion are univerſal negative propoſitions, and the minor an univerſal affirmative: Thus,

cE None whoſe underſtanding is limited can be omniſcient.
lA Every man's underſtanding is limited.
rEnt. Therefore no man is omniſcient.

CELASTRUS, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 43d order, *Dumoſæ*. The corolla is pentapetalous and patent; the capſule quinquangular and trilocular; the ſeeds veiled. There are 11 *ſpecies*; two of which are enured to our climate. 1. The *bullatus*, an uncertain deciduous ſhrub, is a native of Virginia. It is about four feet in growth, riſing from the ground with ſeveral ſtalks, which divide into many branches, and are covered with a browniſh bark. The leaves are of a fine green colour, and grow alternately on the branches. They are of an oval figure, and have their edges undivided. The flowers are produced in July, at the ends of the branches, in looſe ſpikes. They are of a white colour, and in their native ſoil are ſucceeded by very ornamental ſcarlet fruit; but with us this ſeldom happens. It is eaſily propagated from ſeeds ſown, about an inch deep, in beds of good freſh mould made fine. They ſeldom come up until the ſecond, and ſometimes not before the third ſpring. It is alſo propagated by layers; which work muſt be performed on the young wood, in the autumn, by a ſlit at the joint. Theſe layers may be expected to ſtrike root by the autumn following; when they may be taken up and planted in the nurſery-ground. This ſhrub muſt have a well-ſheltered ſituation, otherwiſe the leaves are apt to fall off at the approach of froſty weather; and Millar ſays, that growing naturally in moiſt places, it will not thrive well in a dry ſoil. 2. The *ſcandens*, or baſtard euonymus, with woody, twining ſtalks, riſing by the help of neighbouring trees or buſhes to the height of 12 feet. The leaves are oblong, ſerrated, of a pleaſant green colour, pale, and veined underneath, and grow alternately on the branches. The flowers are produced in ſmall bunches, from the ſides of the branches, near the ends. They are of a greeniſh colour, appear in June; and are ſucceeded by roundiſh, red, three-cornered capſules, containing ripe ſeeds, in the autumn. This ſpecies is exceeding hardy, and makes a

beautiful appearance among other trees in the autumn, by their beautiful red berries, which much resemble those of the Spindle tree, and will be produced in vast profusion on the tops of other trees, to the height of which these plants by their twisting property aspire. They should not be planted near weak or tender trees, to climb on; for they embrace the stalks so close as to bring on death to any but the hardiest trees and shrubs. It is propagated, 1. By laying down the young shoots in the spring. By the autumn they will have struck root, and may then be taken off and set in the places where they are designed to remain. 2. By seeds; which should be soon sown after they are ripe, otherwise they will be two and sometimes three years before they come up. When they make their appearance, nothing more need be done than keeping them clear from weeds all summer and the winter following; and in the spring the strongest plants may be drawn out, and set in the nursery for a year, and then removed to the places where they are designed to remain; whilst the weakest, being left in the seed-bed one year more, may undergo the same discipline. In Senegal the negroes use the powder of the root as a specific against gonorrhœas, which it is said to cure in eight or sometimes in three days. An infusion of the bark of a species of staff-tree, which grows in the Isle of France, is said to possess the same virtues.

CELEBES, an island of Asia, in the Indian Ocean, likewise called Macassar, to the S. of the Philippines, to the E. of Borneo, and to the W. of the Moluccas. The heat would be insupportable but for the N. winds, and the rains, which constantly fall five days before and after the full moons, and during two months that the sun is nearly vertical. The fruits are ripe at all times of the year, and there are a great number of monkies. The natives are Mahometans, and the best soldiers in these parts. The Dutch have strong forts here, by which they keep the natives in awe. The inhabitants go almost naked. They are of an olive colour, and the women are well shaped and tolerably handsome; but both sexes are of a low stature. The long. of the N. W. point is 121. 0. E. lat. 1. 22. N. See Macassar.

CELERES, in Roman antiquity, a regiment of body-guards belonging to the Roman kings, established by Romulus, and composed of 300 young men, chosen out of the most illustrious Roman families, and approved by the suffrages of the curiæ of the people, each of which furnished ten. The name comes from *celer*, "quick, ready;" and was given them because of their promptness to obey the king. The celeres always attended near the king's person, to guard him; to be ready to carry his orders, and to execute them. In war they made the van-guard in the engagement, which they always began first; in retreats, they made the rear-guard. Though the celeres were a body of horse, yet they usually dismounted, and fought on foot; their commander was called tribune, or prefect of the celeres. They were divided into three troops, of 100 each, commanded by a captain called centurio: their tribune was the second person in the kingdom. Plutarch says, Numa broke the celeres; if this be true, they were soon re-established; for we find them under most of the succeeding kings: witness the great Brutus, who expelled the Tarquins, and who was the tribune of the celeres.

CELERI, in botany, the English name of a variety of the Apium Graveolens. The seed of celeri should be sown at two or three different times, the better to continue it for use through the whole season without running up to seed. The first sowing should be in the beginning of March, upon a gentle hot-bed: the second may be at the end of the same month, which ought to be in an open spot of light earth, where it may enjoy the benefit of the sun; the third time of sowing should be in the latter end of April, or beginning of May, on a moist soil; and if exposed to the morning sun only, it will be so much the better, but it should not be under the drip of trees. The middle of May, some of the plants of the first sowing will be fit to transplant for blanching. This vegetable and its subsequent management are so very generally known as to need no particular mention in this place.

Celeri, *wild, (Apium antarcticum)* was found in considerable quantities by Mr. Banks and Dr. Solander, on the coast of Terra del Fuego. It is like the garden celeri in the colour and disposition of the flowers, but the leaves are of a deeper green. The taste is between that of celeri and parsley. It is a very useful ingredient in the soup for seamen, because of its antiscorbutic quality.

CELERITY, in mechanics, the swiftness of any body in motion. It is also defined to be an affection of motion, by which any moveable body runs through a given space in a given time.

CELESTINS, a religious order so called from their founder Peter de Meuron, afterwards raised to the pontificate under the name of Celestin V. This Peter, who was born at Ifernia, in the kingdom of Naples, in 1215, of but mean parents, formed a kind of community of his followers and admirers in the year 1254; and these being approved by Pope Urban IV. in 1264, were erected into a distinct order, called the *hermits of St. Damien*. Peter de Meuron governed them till 1286, when his love of retirement induced him to quit the charge. In July 1294, the great reputation of his sanctity raised him, though much against his will, to the pontificate, on which he took the name of Celestin V. and his order that of *Celestins*. This order passed into several provinces of Germany. They have about 96 convents in Italy, and 21 in France, under the title of priories. The Celestins rise two hours after midnight, to say matins. They eat no flesh at any time, except when they are sick. They fast every Wednesday and Friday, from Easter to the feast of the exaltation of the holy cross; and, from that feast to Easter, every day. Their habit consists of a white gown, a capuche, and a black scapulary. In the choir, and when they go out of the monastery, they wear a black cowl with the capuche, and their shirts are of serge.

CELETES, or Celetæ, (rom κελης, *a race-horse*) in antiquity, denote single or saddle-horses; by way of contradistinction from those yoked or harnessed together, called *bigarii, quadrigarii*, &c. The same denomination is also given to the cavaliers or riders on horseback; and hence some deduce celeres, the name of Romulus's guard.

CELEUSMA, or Celeuma, in antiquity, the shout or cry of the seamen, whereby they animated each other in their work of rowing. The word is formed from κελευειν, *to call, to give the signal*.

Celeusma was also a kind of song or formula, rehearsed or played by the master, or others, to direct the strokes and movements of the mariners, as well as to encourage them to labour more cheerfully.

CELEUSTES, in ancient navigation, the boatswain or officer appointed to give the rowers the signal, when they were to pull, and when to stop. He was also denominated *epopeus*, and by the Romans *portisculus*; sometimes simply *hortator*.

CELIBACY, the state of unmarried persons. Scaliger derives the word from the Greek κοιτη, "bed," and λειπω, *linquo*, "I leave:" others say it is formed from *cœli beatitudo*; q. d. *the blessedness of heaven*. The ancient Romans used all means imaginable to discourage celibacy. Nothing was more usual than for the censors to impose a fine on bachelors. Dionysius Halicarnassensis mentions an ancient constitution whereby all persons of full age were obliged to marry. But the first law of that kind, of which we have any certainty, is that under Augustus, called *lex Julia de maritandis ordinibus*. It was afterwards denominated *Papia Poppæa*, and more usually *Julia*

Papia, in regard of fome new fanction and amendments made to it under the confuls Papius and Popæus. By this law, certain prerogatives were given to perfons who had many children, and penalties impofed on thofe who lived a fingle life, as that they fhould be incapable of receiving legacies, and not exceeding a certain proportion.

CELIBATE, the fame with celibacy; but it is chiefly ufed in fpeaking of the fingle life of the Popifh clergy, or the obligation they are under to abftain from marriage. In this fenfe we fay the law of *celibate*. Monks and religious take a vow of celibate; and what is more, of chaftity. The church of Rome impofes an univerfal celibacy on all its clergy, from the pope to the loweft deacon and fubdeacon. The advocates for this ufage pretend, that a vow of perpetual celibacy was required in the ancient church as a condition of ordination, even from the earlieft apoftolic ages. But the contrary is evident from numerous examples of bifhops and archbifhops, who lived in a ftate of matrimony, without any prejudice to their ordination or their function. It is generally agreed that moft of the apoftles were married. Some fay all of them, except St. Paul and St. John. Others fay St. Paul himfelf was married, becaufe he writes to his *yoke-fellow*, whom they interpret his wife. Be this as it will, in the next ages after the apoftles, we have accounts of certain married bifhops, prefbyters, and deacons, without any reproof or mark of difhonour fet on them. The celibacy of the clergy, however, appears of an ancient ftanding, if not of command and neceffity, yet as of counfel and choice. But as it is clearly neither of divine nor apoftolical inftitution, it is at firft hard to conceive from what motive the court of Rome perfifted fo very obftinately to impofe this injunction on the clergy. But we are to obferve that this was a leading ftep to the execution of the project formed of making the clergy independent of princes, and rendering them a feparate body to be governed by their own laws. In effect, while priefts had children, it was very difficult to prevent their dependence on princes, whofe favours have fuch an influence on private men; but having none, they were more at liberty to adhere to the Pope.

CELIDOGRAPHIA, the defcription of the fpots which appear on the furfaces of the fun and planets. See ASTRONOMY.

CELL, CELLA, in ancient writers, denotes a place or apartment ufually under ground, and vaulted, in which were ftored up fome fort of neceffaries, as wine, honey, and the like; and according to which it was called *Cella Vinaria, Olearia, Mellaria*, &c. The word is formed from the Latin *celare*, to conceal.

CELLA was alfo ufed for the lodge or habitation of a common proftitute, as being anciently under ground, hence alfo denominated *fornix*.

> *Intravit calidum veteri centone lupanar,*
> *Et cellam vacuam.* Juv. Sat. vi. ver. 121.

On which place an ancient fcholiaft remarks, that the names of the whores were written on the doors of their feveral cells; by which we learn the meaning of *infcripta cella* in Martial, lib. xi. ep. 46.

CELLA was alfo applied to the bed-chambers of domeftics and fervants; probably as being low and narrow. Cicero, inveighing againft the luxury of Anthony, fays, the beds in the very cellæ of his fervants were fpread with pompous purple coverlets.

CELLA is alfo applied to the members or apartments of baths. Of thefe there were three principal, called *frigidaria, tepidaria*, and *caldaria*; to which may be added a fourth, called *cella affa*, and fometimes *fudatoria*.

CELLA likewife fignified the *adyta*, or inmoft and moft retired parts of temples, wherein the images of the gods to whom the edifices were confecrated were preferved. In this fenfe we meet with *cella Jovis, cella Concordiæ*, &c.

CELL is alfo ufed for a leffer or fubordinate fort of minifter dependent on a great one, by which it was erected, and continues ftill to be governed. The great abbeys in England had moft of them *cells* in places diftant from the mother abbey, to which they were accountable, and from which they received their fuperiors. The alien priories in England were cells to abbeys in Normandy, France, Italy, &c. The name *cell* was alfo given to rich and confiderable monafteries not dependent on any other.

CELL fignifies alfo a little apartment or chamber, fuch as thofe wherein the ancient monks, folitaries, and hermits, lived in retirement. Some derive the word from the Hebrew כלא, i. e. a *prifon*, or place where any thing is fhut up. The fame name is ftill retained in certain monafteries. The dormitory is frequently divided into fo many cells or lodges. The Carthufians have each a feparate houfe, which ferves them as a cell. The hall wherein the Roman conclave is held, is divided, by partitions, into cells, for the feveral cardinals to lodge in.

CELL is alfo a name given to the little divifions in honeycombs, which are always regular hexagons. See BEE.

CELL, in botany, is applied to the hollow places between the partitions in the pods, hufks, and other feed-veffels of plants: according as there is one, two, three, &c. of thefe cells, the veffel is faid to be unilocular, bilocular, trilocular, &c.

CELLS, in anatomy, little bags, or bladders, in which the fluids are lodged; called *loculi, cellulæ*, &c. Thus the *cellulæ adipofæ* are the little cells containing the fat.

CELLAR *(Cellarium)*, in ancient writers, denotes the fame with *cella*, viz. a confervatory of eatables, or drinkables. Cellar differs from vault, as the latter is fuppofed to be deeper, the former being frequently little below the furface of the ground. In this fenfe, *cellarium* only differed from *penus*, as the former was only a ftore-houfe for feveral days, the latter for a long time. Thus it is, the bactroperatæ, a fort of ancient Cynics, are faid by St. Jerome to carry cellar about with them.

Cellarium alfo denoted an allowance of bread, wine, oil, or other provifion, furnifhed out of the cella, to the ufe of the governor of the province and his officers, &c. in which fenfe, the word amounts to much the fame with *annona*.

CELLARS, in modern building, are the loweft rooms in a houfe, the ceilings of which ufually lie level with the furface of the ground on which the houfe is built; or they are fituated under the pavement before the houfe, efpecially in ftreets and fquares. Cellars, and other places vaulted under ground, were called by the Greeks *hypogæa*: the Italians ftill call them *fundi delle cafe*.

CELLARER, or CELLERER, *Cellerarius* or *Cellarius*, an officer in monafteries, to whom belong the care and procuring provifions for the convent. The denomination is faid to be borrowed from the Roman law, where *cellarius* denotes an examiner of accounts and expences. The *cellerarius* was one of the four *obedientiarii*, or great officers of monafteries: under his ordering was the *piftrinum* or bakehoufe, and the *bracinum*, or brewhoufe. In the richer houfes there were particular lands fet apart for the maintenance of his office, called in ancient writings *ad cibum monachorum*. The *cellerarius* was a great man in the convent. His whole office in ancient times had a refpect to that origin: he was to fee his lord's corn got in, and laid up in granaries; and his appointment confifted in a certain proportion thereof, ufually fixed at a thirteenth part of the whole, together with a furred gown. The office of cellarer then only differed in name from thofe of bailiff and minftrel; excepting that the cellarer had the receipt of his lord's rents through the whole extent of his jurifdiction.

CELLARER was alfo an officer in chapters, to whom belonged

the care of the temporals, and particularly the diſtributing of bread, wine, and money, to canons, on account of their attendance in the choir. In ſome places he was called *cellarer*, in others *burſer*, and in others *currier*.

CELLARIUS (Chriſtopher), was born in 1638, at Smalcade in Franconia, of which town his father was miniſter. He was ſucceſſively rector of the colleges at Weymar, Zeits, and Mertbourg: and the king of Pruſſia having founded an univerſity at Halle in 1693, he was prevailed on to be profeſſor of eloquence and hiſtory there, where he compoſed the greateſt part of his works. His great application to ſtudy haſtened the infirmities of old age; for it is ſaid he would ſpend whole days and nights together at his books, without any attention to his health, or even the calls of nature. His works relate to grammar, geography, hiſtory, and the oriental languages; and the number of them is amazing. He died in 1707.

CELLINI (Benvenuto), an eminent ſtatuary, who was bred a jeweller and goldſmith, but ſeems to have had an extraordinary genius for the fine arts in general. He was cotemporary with Michael Angelo, and Julio Romano, and was employed by popes, kings, and other princely patrons of ſciences and arts, ſo highly cultivated in the days of Leo X. and Charles V. ſome of his productions being eſteemed moſt exquiſite. He lived to a very conſiderable old age; and his life, almoſt to the laſt, was a continued ſcene of adventure, perſecution, and misfortune, truly wonderful. He wrote his own hiſtory, which was not, however, publiſhed till the year 1730, probably on account of the exceſſive freedom with which he therein treated many diſtinguiſhed perſonages of Italy and other countries. It was tranſlated into Engliſh by Dr. Nugent in 1771, to which the reader is referred, as it will not admit of an abridgment ſuitable to our plan.

CELLULAR, in a general ſenſe, is applied to any thing conſiſting of ſingle cells.

CELLULAR *Membrane*. See ANATOMY, p. 186.

CELOSIA, COCKS-COMB; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 54th order, *Miſcellaneæ*. The calyx is triphyllous; the corolla is five-petalled in appearance; the ſtamina are conjoined at the baſe to the plaited nectarium; the capſule gaping horizontally. There are eight ſpecies, of which the moſt worthy of notice is the *criſtata*, or common cocks-comb, ſo called, on account of its creſted head of flowers, reſembling a cock's comb; of theſe there are a great variety of ſpecies. The principal colours of their flowers are red, purple, yellow, and white: but there are ſome whoſe heads are variegated with two or three colours. The heads are ſometimes divided like a plume of feathers, and are of a beautiful ſcarlet colour. Theſe plants are very tender exotics, and require a great deal of care to cultivate them in this country. Three hot-beds muſt be prepared; a ſmall one in March, on which to raiſe the plants an inch or two in height; a ſecond in April, of larger dimenſions, in which to tranſplant them when proper; and a third in May for a large frame, to receive them tranſplanted into pots, to remain till the end of June or beginning of July to grow to full ſize. All of theſe hot-beds muſt be covered with frames and glaſſes, and have five or ſix inches depth of fine rich light earth for the reception of the ſeed and plants; and in the ſecond and third hot-bed, the frames muſt occaſionally be raiſed or augmented, according as the plants ſhall riſe in height.

CELSIA, in botany; a genus of the angioſpermia order, belonging to the tetradynamia claſs of plants; and in the natural method ranking under the 28th order, *Luridæ*. The calyx is quinquepartite; the corolla wheel-ſhaped; the filaments bearded or woolly; the capſule bilocular.

CELSUS (Aurelius Cornelius), a celebrated phyſician of the firſt century, who wrote eight books on medicine, in elegant Latin. He was the Hippocrates of the Latins; and Quintilian gives him a high character. The great Boerhaave tells us, that Celſus is one of the beſt authors of antiquity for letting us into the true meaning and opinions of Hippocrates; and that without him, the writings of this father of phyſic would be often unintelligible and often miſunderſtood. He ſhows us alſo how the ancients cured diſeaſes by friction, bathing, &c. His eight books *de Medicina* have been ſeveral times printed. The Elzevir edition, in the year 1650, by Vander Linden, is the beſt, as being entirely corrected from his manuſcripts.

CELSUS, an Epicurean philoſopher, in the ſecond century. He wrote a work againſt the Chriſtians, entitled, *The true Diſcourſe*; to which Origen, at the deſire of Ambroſe his friend, wrote a learned anſwer. To this philoſopher Lucian dedicated his *Pſeudomanies*.

CELTÆ, or CELTES, an ancient nation, by which moſt of the countries of Europe are thought to have been peopled. The compilers of the Univerſal Hiſtory are of opinion that they are deſcended from Gomer the eldeſt ſon of Japhet, the ſon of Noah. They think that Gomer ſettled in the province of Phrygia in Aſia; Aſhkenaz his eldeſt ſon, or Togarmah his youngeſt, or both, in Armenia, and Riphath the ſecond ſon in Cappadocia. When they ſpread themſelves wider, they ſeem to have moved regularly in columns without interfering with or diſturbing their neighbours. The deſcendants of Gomer, or the Celtæ, took the left hand, inſenſibly ſpreading themſelves weſtward towards Poland, Hungary, Germany, France, and Spain; while the deſcendants of Magog, Gomer's brother, moving eaſtward, peopled Tartary. In this large European tract, the Celtes began to appear a powerful nation under a regular monarchy, or rather under ſeveral conſiderable kingdoms. Mention is made of them indeed in ſo many parts of Europe, by ancient geographers and hiſtorians, that Ortelius took *Celtica* to be a general name for the continent of Europe, and made a map of it bearing this title. In thoſe parts of Aſia, which they poſſeſſed, as well as in the different parts of Europe, the Celtes went by various names. In Leſſer Aſia they were known by the names of *Titans* and *Sacks*; in the northern parts of Europe, by thoſe of *Cymmerians*, *Cymbrians*, &c. and in the ſouthern parts they were called *Celtes*, *Gauls*, or *Galatians*. With reſpect to the government of the Celtes we are entirely in the dark. All we know is, that the curates, and afterwards druids and bards, were the interpreters of their laws; judged all cauſes whether criminal or civil; and their ſentence was reckoned ſo ſacred, that whoever refuſed to abide by it, was by them excluded from aſſiſting at their ſacred rites; after which no man dared converſe with him; ſo that this puniſhment was reckoned the moſt ſevere of all, even ſeverer than death itſelf.

CELTES, certain ancient inſtruments of a wedge-like form, of which ſeveral have been diſcovered in different parts of Great Britain. Antiquarians have generally attributed them to the Celtæ; but, not agreeing as to their uſe, diſtinguiſhed them by the above unmeaning appellation. But Mr. Whitaker makes it probable, that they were Britiſh battle-axes. See BATTLE-*Ax*.

CELTIS, in botany; a genus of the monœcia order, belonging to the polygamia claſs of plants; and in the natural method ranking under the 53d order, *Scabridæ*. It is an hermaphrodite plant: The female calyx is quinquepartite; there is no corolla; there are five ſtamina, and two ſtyles. The fruit is a monoſpermous plum. In the male, there is no calyx: the corolla is hexapetalous; there are ſix ſtamina, and an embryo of a piſtillum. There are three *ſpecies*, all of them deciduous, viz. 1. The *Auſtralis* or Southern Celtis, a decidu-

ens tree, native of Africa and the South of Europe. 2. The *Occidentalis* or Weftern Celtis, a native of Virginia. And, 3. The *Orientalis* or Eaftern Celtis, a native of Armenia. The two firft fpecies grow with large, fair, ftraight ftems; their branches are numerous and diffufe; their bark is of a darkifh grey colour; their leaves are of a pleafant green; three or four inches long, deeply ferrated, and in a narrow point, nearly refembling the leaves of the common flinging nettle, and continue on the trees till late in the autumn; fo that one may eafily conceive what an agreeable variety thefe trees would make. Add to this, their fhade is admirable: the leaves are late in the fpring before they fhow themfelves; but they make amends for this, by retaining their verdure till near the clofe of autumn, and then do not refemble moft deciduous trees, whofe leaves fhew their approaching fail by the change of their colour; but continue to exhibit themfelves of a pleafant green even to the laft. Hanbury fpeaks highly of the celtis as a timber tree: he fays, "The wood of the Lote-tree is extremely durable. In Italy they make their flutes, pipes, and other wind inftruments of it. With us the coach-makers ufe it for the frames of their vehicles." Millar mentions alfo the wood of the Occidentalis being ufed by the coach-makers. The third fpecies will grow to about twelve feet; and the branches are numerous, fmooth, and of a greenifh colour. The leaves are fmaller than thofe of the other forts, though they are of a thicker texture, and of a lighter green. The flowers come out from the wings of the leaves, on flender footftalks: they are yellowifh, appear early in the fpring, and are fucceeded by large yellow fruit. All the fpecies are propagated from feeds, which ripen in England, if they have a favourable autumn; but the foreign feeds are the moft certain of producing a crop. Thefe feeds fhould be fown foon after they are ripe, either in boxes, or in a fine warm border of rich earth, a quarter of an inch deep. When by proper management they have fhot to a good height, and have acquired fo much hardinefs as to need no other care than to be kept clear of weeds for two or three years, they may be planted out in places where they are to remain, or fet in the nurfery, to be trained up for large ftandards. The beft feafon for planting out thefe ftandard trees is the latter end of October, or beginning of November; and in performing that operation, the ufual rules muft be carefully obferved. The foil for the lote-tree fhould be light, and in good heart; and the fituation ought to be well defended, the young fhoots being very liable to be deftroyed by the winter's frofts.

CEMENT, in a general fenfe, any glutinous fubftance capable of uniting and keeping things together in clofe cohefion. In this fenfe the word *cement* comprehends mortar, folder, glue, &c. but has been generally reftrained to the compofitions ufed for holding together broken glaffes, china, and earthenware. For this purpofe the juice of garlic is recommended as exceedingly proper, being both very ftrong, and, if the operation is performed with care, leaving little or no mark. Quicklime and the white of an egg mixed together and expeditioufly ufed, are alfo very proper for this purpofe. Dr. Lewis recommends a mixture of quicklime and cheefe in the following manner "Sweet cheefe fhaved thin, and ftirred with boiling hot water, changes into a tenacious flime, which does not mingle with the water. Worked with frefh parcels of hot water, and then mixed upon a hot ftone with a proper quantity of unflaked lime, into the confiftence of a pafte, it proves a ftrong and durable cement for wood, ftone, earthen-ware, and glafs. When thoroughly dry, which will be in two or three days, it is not in the leaft acted upon by water. Cheefe barely beat with quick-lime, as directed by fome of the chemifts for luting cracked glaffes, is not near fo efficacious." A compofition of the drying oil of linfeed and white-lead is alfo ufed for the fame purpofes, but is greatly inferior.

Cement in building, is ufed to denote any kind of mortar of a ftronger kind than ordinary. The cement commonly ufed is of two kinds; hot, and cold. The hot cement is made of rofin, bees-wax, brick-duft, and chalk boiled together. The bricks to be cemented are heated, and rubbed one upon another, with cement between them. The cold cement is that above defcribed for cementing china, &c. which is fometimes, though rarely, employed in building.

The ruins of the ancient Roman buildings are found to cohere fo ftrongly, that moft people have imagined the ancients were acquainted with fome kind of mortar, which, in comparifon of ours, might juftly be called *cement*; and that to our want of knowledge of the materials they ufed, is owing the great inferiority of modern buildings in their durability. In 1770, one M. Lorriot, a Frenchman, pretended to have difcovered the fecret of the ancient cement, which, according to him, was no more than a mixture of powdered *quick-lime* with lime which had been long flaked and kept under water. The flaked lime was firft to be made up with fand, earth, brick-duft, &c. into mortar after the common method, and then about a third part of quick-lime in powder was added to the mixture. This produced an almoft inftantaneous petrification, fomething like what is called the *fetting* of alabafter, but in a much ftronger degree; and was poffeffed of many wonderful qualities needlefs here to relate, feeing it has never been known to fucceed with any other perfon who tried it. According to Mr. Anderfon, the hardnefs of lime, or its becoming a cement, depends entirely on the formation and perfection of its cryftals, and alfo on the hardnefs of the fubftances which are entangled among them. The additional matter employed in making mortar, fuch as fand, brick-duft, &c. ferve only for a purpofe fimilar to what is anfwered by fticks put into a veffel full of any faline folution, namely, to afford the cryftals an opportunity of faftening themfelves upon it. If therefore the matter interpofed between the cryftals of the lime is of a friable, brittle nature, fuch as brick-duft or chalk, the mortar will be of a weak and imperfect kind; but when the particles are hard, angular, and very difficult to be broken, fuch as thofe of river or pit-fand, the mortar turns out exceedingly good and ftrong. Sea-fand is found to be an improper material for mortar, which is afcribed to its being lefs angular than the other kinds. That the cryftallization may be the more perfect, a large quantity of water is required, and alfo that the ingredients be perfectly mixed together, and the drying effected in as flow a manner as poffible. An attention to thefe circumftances, the author above-mentioned thinks, would make the buildings of the moderns equally durable with thofe of the ancients; and from what remains of the ancient Roman works, he thinks a very ftrong proof of his hypothefis might be adduced. The great thicknefs of their walls neceffarily required a vaft length of time to dry. The middle of them was compofed of pebbles thrown in at random, and which have evidently had mortar fo thin as to be *poured* in among them. By this means a great quantity of the lime would be diffolved, and the cryftallization performed in the moft perfect manner; and the indefatigable pains and perfeverance for which the Romans were fo remarkable in all their undertakings, leave no room to doubt that they would take care to have the ingredients mixed together as well as poffible. The confequence of all this is, that the buildings formed in this manner are all as firm as if cut out of a folid rock; the mortar being as hard, or harder than the ftones themfelves.

Notwithftanding the bad fuccefs of thofe who have attempted to repeat M. Lorriot's experiments, Dr. Black, however, informs us, that a cement of this kind is practicable. It is done, he fays, by powdering the lime while hot from the kiln, and throwing it into a thin pafte of fand and water.

which, not flaking immediately, absorbs the water from the mortar by degrees, and forms a very hard mass. "It is plain (he adds) that the strength of this mortar depends on using the lime hot or fresh from the kiln." By mixing together gypsum and quick-lime, and then adding water, we may form a cement of tolerable hardness, and which apparently might be used to advantage in making troughs for holding water, or lining small canals for it to run in. Mr. Wiegleb says, that a good mortar or cement, which will not crack, may be obtained by mixing three parts of this magma of slaked lime with one of powdered gypsum; but adds, that it is used only in a dry situation. A mixture of tarras with slaked lime acquires in time a stony hardness, and may be used for preventing water from entering. Dr. Williams's patent mortar consists of 4 lb. of the fresh curd of cheese, 12 lb. of slaked lime in fine powder, 84 lb. of sharp sand, and 10 lb. of water. See MORTAR and STUCCO.

CEMENT, among engravers, jewellers, &c. is the same with the hot cement used in building; and is used for keeping the metals to be engraven firm to the block, and also for filling up what is to be chisseled.

CEMENT, in chemistry, is used to signify all those powders and pastes with which any body is surrounded in pots or crucibles, and which are capable by the help of fire of producing changes upon that body. They are made of various materials; and are used for different purposes, as for parting gold from silver, converting iron into steel, copper into brass: and by cementation more considerable changes can be effected upon bodies, than by applying to them liquids of any kind; because the active matters are then in a state of vapour, and assisted by a very considerable degree of heat. The earthen pots used in the cementation of metals, are called *Cement-pots*.

CEMETERY, Κοιμητηριον, from κοιμαω to *sleep*: a place set apart or consecrated for the burial of the dead. Anciently none were buried in churches or church-yards: it was even unlawful to enter cities, and the cemeteries were without the walls. Among the primitive Christians these were held in great veneration. It even appears from Eusebius and Tertullian, that, in the early ages, they assembled for divine worship in the cemeteries. Valerian seems to have confiscated the cemeteries and other places of divine worship, but they were restored again by Gallienus. As the martyrs were buried in these places, the Christians chose them for building churches on, when Constantine established their religion; and hence some derive the rule which still obtains in the church of Rome, never to consecrate an altar without putting under it the relics of some saint. The practice of consecrating cemeteries is of some antiquity. The bishop walked round it in procession, with the crozier or pastoral staff in his hand, the holy water pot being carried before, out of which the aspersions were made.

CENCHRUS, in botany; a genus of the monœcia order, belonging to the polygamia class of plants; and in the natural method ranking under the 4th order, *Gramina*. The involucrum is laciniated, and echinated, or beset with small prickles, and biflorous. The calyx is a biflorous glume, with one floret male, and the other hermaphrodite. The hermaphrodite corolla is a pointless glume; there are three stamina; one seed: the male corolla a pointless glume; with three stamina.

CENEGILD, in the Saxon antiquities, an expiatory mulct, paid by one who killed a man, to the kindred of the deceased. The word is compounded of the Saxon *cinne*, i. e. *cognatio*, "relation," and *gild*, *solutio*, "payment."

CENOBITE. See COENOBITE.

CENOTAPH, in antiquity, an empty tomb, erected by way of honour to the deceased. It is distinguished from a sepulchre, in which a coffin was deposited. Of these there were two sorts; one for those who had, and another for those who had not been honoured with funeral rites in another place. The sign whereby honorary sepulchres were distinguished from others, was commonly the wreck of a ship, to denote the decease of the person in some foreign country.

CENSER, in antiquity, a vase containing incense to be used in sacrifices. Censer is chiefly used in speaking of the Jewish worship. Among the Greeks and Romans it is more frequently called *thuribulum*, λιβανωτις, and *acerra*. The Jewish censer was a small sort of chaffing-dish, covered with a dome, and suspended by a chain. Josephus tells us, that Solomon made twenty thousand gold censers for the temple of Jerusalem, to offer perfumes in, and fifty thousand others to carry fire in.

CENSIO, in antiquity, the act or office of the censor. See CENSUS. Censio included both the rating or valuing a man's estate, and the imposing mulcts and penalties.

CENSIO-*Hastaria*, a punishment inflicted on a Roman soldier for some offence, as laziness or luxury, whereby his *hasta* or spear was taken from him, and consequently his wages and hopes of preferment stopped.

CENSITUS, a person censed, or entered in the censual tables. See CENSUS. It is also used in the civil law for a servile sort of tenant, who pays capitation to his lord for the lands he holds of him, and is entered as such in the lord's rent-roll. In this sense, the word amounts to the same with *capite census*, or *capite censitus*. See CAPITE *Censi*.

CENSOR, from *censere* to "see" or "perceive," one of the prime magistrates of ancient Rome. Their business was to register the effects of the Roman citizens, to impose taxes in proportion to what each man possessed, and to take cognizance or inspection of the manners of the citizens. In consequence of this last part of their office, they had a power to censure vice or immorality, by inflicting some public mark of ignominy on the offender. They had even a power to create the *princeps senatus*, and to expel from the senate such as they deemed unworthy of that office. This power they sometimes exercised without sufficient grounds; and therefore a law was at length passed, that no senator should be degraded or disgraced in any manner, until he had been formally accused and found guilty by both the censors. It was also a part of the censorian jurisdiction, to fill up the vacancies in the senate, upon any remarkable deficiency in their number; to let out to farm all the lands, revenues, and customs of the republic; and to contract with artificers for the charge of building and repairing all the public works and edifices both in Rome and the colonies of Italy. In all parts of their office, however, they were subject to the jurisdiction of the people; and an appeal always lay from the sentence of the censors to that of an assembly of the people.

The first two censors were created in the year of Rome 311, upon the senate's observing that the consuls were so much taken up with war, as not to have time to look into other matters. The office continued to the time of the emperors, who assumed the censorial power, calling themselves *morum præfecti*; though Vespasian and his sons took the title of censors. Decius attempted to restore the dignity to a particular magistrate. After this we hear no more of it, till Constantine's time, who made his brother censor, and he seems to have been the last that enjoyed the office.

The office of censor was so considerable, that for a long time none aspired to it till they had passed all the rest; so that it was thought surprising that Crassus should be admitted censor, without having been either consul or prætor. At first the censors enjoyed their dignity for five years, but in 420 the dictator Mamertinus made a law restraining it to a year and

an half, which was afterwards obſerved very ſtrictly. At firſt one of the cenſors was elected out of a patrician, and the other out of a plebeian family; and upon the death of either, the other was diſcharged from his office, and two new ones elected, but not till the next luſtrum. In the year of Rome 622, both cenſors were from among the plebeians; and after that time the office was ſhared between the ſenate and the people. After their election in the Comitia Centurialia, the cenſors proceeded to the capitol, where they took an oath not to manage either by ſavour or diſaffection, but to act equitably and impartially throughout the whole courſe of their adminiſtration. The republic of Venice ſtill has a cenſor of the manners of their people, whoſe office laſts ſix months.

Censors *of Books*, are a body of doctors or others, eſtabliſhed in ſome countries where the government is arbitrary, to examine all books before they go to the preſs, and to ſee they contain nothing contrary to the intereſts of the monarch. At Paris, before the liberties of France were eſtabliſhed, the faculty of theology claimed this privilege as granted to them by the pope; but, in 1624, new commiſſions of four doctors were created, by letters-patent, the ſole cenſors of all books, and anſwerable for every thing contained in them. Even in England, we had formerly an officer of this kind, under the title of licenſer of the preſs: but, ſince the revolution, our preſs has been laid under no ſuch dangerous reſtraint.

CENSORINUS, a celebrated writer in the third century, well known by his treatiſe *De Die Natali*. This treatiſe, which was written about the year 238, Gerard Voſſius calls a little book of gold; and declares it to be a moſt learned work of the higheſt uſe and importance to chronologers, ſince it connects and determines, with great exactneſs, ſome of the principal æras in pagan hiſtory. It was printed at Cambridge, with the notes of Lindenbrokius, in 1695.

CENSURE, a judgment which condemns ſome book, perſon, or action, or, more particularly, a reprimand from a ſuperior. Eccleſiaſtical cenſures are penalties, by which, for ſome remarkable miſbehaviour, Chriſtians are deprived of the communion of the church, or prohibited to execute the ſacerdotal office.

CENSUS, in Roman antiquity, an authentic declaration made before the cenſors, by the ſeveral ſubjects of the empire, of their reſpective names and places of abode. This declaration was regiſtered by the cenſors; and contained an enumeration, in writing, of all the eſtates, lands, and inheritances they poſſeſſed; their quantity, quality, place, wives, children, domeſtics, tenants, ſlaves, &c. In the provinces the cenſus ſerved not only to diſcover the ſubſtance of each perſon, but where, and in what manner and proportion, taxes might be beſt impoſed. The cenſus at Rome is commonly thought to have been held every five years; but Dr. Middleton has ſhown that both cenſus and luſtrum were held irregularly and uncertainly at various intervals. The cenſus was an excellent expedient for diſcovering the ſtrength of the ſtate: for by it they diſcovered the number of the citizens, how many were fit for war, and how many for offices of other kinds; how much each was able to pay of taxes, &c. It went through all ranks of people, though under different names: that of the common people was called *cenſus*; that of the knights, *cenſus, recenſio, recognitio*; that of the ſenators, *lectio, relectio*. Hence alſo *cenſus* came to ſignify a perſon who had ſuch a declaration; in which ſenſe it was oppoſed to *incenſus*, a perſon who had not given in his eſtate or name to be regiſtered. The cenſus, according to Salmaſius, was peculiar to the city of Rome. That in the provinces was properly called *profeſſio* and ἀπογραφη. But this diſtinction is not every where obſerved by the ancients themſelves.

Census was alſo uſed for the book or regiſter wherein the profeſſions of the people were entered. In this ſenſe, the cenſus was frequently appealed to as evidence in the courts of juſtice.

Census is alſo uſed to denote a man's whole ſubſtance or eſtate. Thus *Cenſus Senatorius*, denoted the patrimony of a ſenator, which was limited to a certain value; being at firſt rated at 800,000 ſeſterces, but afterwards, under Auguſtus, enlarged to 1,200,000. *Cenſus Equeſter*, was the eſtate or patrimony of a knight, rated at 400,000 ſeſterces, which was required to qualify a perſon for that order, and without which no virtue or merit was available.

Census was alſo uſed for a perſon worth 100,000 ſeſterces, or who was entered as ſuch in the cenſual tables, on his own declaration. In this ſenſe, cenſus amounts to the ſame with *claſſicus*, or a man of the firſt claſs; though Gellius limits the eſtate of thoſe of this claſs to 125,000 aſſes. By the Voconian law, no cenſus was allowed to give by his will above a fourth part of what he was worth to a woman.

Census was alſo uſed to denote a tax or tribute impoſed on perſons, and called alſo capitation. See Capite *Cenſi*.

Census *Dominicatus*, in writers of the lower age, denotes a rent due to the lord.

Census *Duplicatus*, a double rent or tax, paid by vaſſals to their lord on extraordinary or urgent occaſions; as expeditions to the Holy Land, &c.

Census *Eccleſiæ Romanæ*, was an annual contribution voluntarily paid to the ſee of Rome by the ſeveral princes of Europe.

CENT, ſignifies properly an hundred, being an abridgement of the word *centum*; but is often uſed in commerce to expreſs the profit or loſs ariſing from the ſale of any commodity; ſo that when we ſay there is 10 *per cent.* profit, or 10 *per cent.* loſs, upon any merchandize that has been ſold, it is to be underſtood that the ſeller has either gained or loſt ten pounds on every hundred pounds of the price at which he bought that merchandize; which is $\frac{1}{10}$ of profit, or $\frac{1}{10}$ of loſs, upon the total of the ſale.

CENTAUR, in aſtronomy, a part or moiety of a ſouthern conſtellation, in form half-man half-horſe; uſually joined with the wolf. The word comes from κενταυρος, formed of κεντεω *pungo*; and ταυρος, *bull*; q. d. *bull-pricker*. The ſtars of this conſtellation, in Ptolemy's Catalogue, are 37; in Tycho's 4; and in the Britannic Catalogue, with Sharp's Appendix, 35.

CENTAUREA, greater centaury; a genus of the polygamia fruſtanea order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is briſtly, the pappus ſimple, the corollulæ of the radius funnel-ſhaped, longer than thoſe of the diſk, and irregular. There are 61 ſpecies. The root of one of them, called *glaſtifolia*, is an article in the materia medica. It has a rough, ſomewhat acrid taſte, and abounds with a red viſcid juice. Its rough taſte has gained it ſome eſteem as an aſtringent, its acrimony as an aperient, and its glutinous quality as a balſamic: but the preſent practice takes very little notice of it in any intention. Another of the ſpecies is the cyanus or blue bottle, which grows commonly among corn. The expreſſed juice of this flower ſtains linen of a beautiful blue colour, but is not permanent. Mr. Boyle ſays, that the juice of the inner petals, with a little alum, makes a beautiful permanent colour, equal to ultramarine.

Leſſer Centaury. See Gentiana.

CENTAURS, in mythology, a kind of fabulous monſters, half men and half horſes. The poets pretend that the centaurs were the ſons of Ixion and a cloud; the reaſon of which fancy is, that they retired to a caſtle called νεφελη, which ſignifies a *cloud*. This fable is interpreted in a variety of ways; but the

centaurs in reality were a tribe of *Lapithæ*, who inhabited the city Pelethronium adjoining to mount Pelion, and first invented the art of breaking horses, as is intimated by Virgil.

CENTELLA, in botany; a genus of the tetrandria order, belonging to the monœcia class of plants; and in the natural method ranking under the 11th order, *Sarmentaceæ*. The male involucrum is tetraphyllous and quinqueflorous, with four petals; the female involucrum is diphyllous and uniflorous; the petals four; the germen inferior; two styles; and a bilocular seed-case.

CENTENARIUS, or CENTENARIO, in the middle age, an officer who had the government or command, with the administration of justice, in a village. The centenarii, as well as vicarii, were under the jurisdiction and command of the court. We find them among the Franks, Germans, Lombards, Goths, &c.

CENTENARIUS was also used for an officer who had the command of 100 men, most frequently called a CENTURION.

CENTENARIUS, in monasteries, was an officer who had the command of 100 monks.

CENTENINUM OVUM, among naturalists, denotes a sort of hen's egg much smaller than ordinary, vulgarly called a *cock's egg*: from which it has been fabulously held that the cockatrice or basilisk is produced. The name is taken from an opinion, that these are the last eggs which hens lay, having laid 100 before; whence *centeninum*, q. d. the hundredth egg.—These eggs have no yolks, but in other respects differ not from common ones, having the albumen, chalazes, membranes, &c. in common with others. In the place of the yolk is found a little body like a serpent coiled up, which doubtless gave rise to the fable of the basilisk's origin from thence. The cause is with probability ascribed by Hervey to this, that the yolks in the vitellary of the hen are exhausted before the albumina.

CENTER, or CENTRE, in a general sense, signifies a point equally distant from the extremities of a line, figure, or body. The word is formed from the Greek κεντρον, a *point*.

CENTER *of Gravity*, in mechanics, that point about which all the parts of a body do in any situation exactly balance each other.

CENTER *of Motion*, that point which remains at rest, while all the other parts of a body move about it.

CENTER *of a Sphere*, a point in the middle, from which all lines drawn to the surface are equal. Hermes Trismegistus defines God an intellectual sphere, whose center is every where, and circumference no where.

CENTESIMA USURA, that wherein the interest in an hundred months became equal to the principal, *i. e.* where the money is laid out at one *per cent.* per month: answering to what in our style would be called 12 *per cent.* for the Romans reckoned their interest not by the year, but by the month.

CENTESIMATION, a milder kind of military punishment, in cases of desertion, mutiny, and the like, when only every hundredth man is executed.

CENTILOQUIUM, denotes a collection of 100 sentences, opinions, or sayings. The centiloquium of Hermes contains 100 aphorisms, or astrological sentences, supposed to have been written by some Arab, falsely fathered on Hermes Trismegistus. It is only extant in Latin, in which it has several times been printed. The centiloquium of Ptolomy is a famous astrological piece, frequently confounded with the former, consisting likewise of 100 sentences or doctrines, divided into short aphorisms, intitled also in Greek καρπος, as being the fruit or result of the former writings of that celebrated astronomer, *viz.* his *quadripartitum* and *almagestum*; or rather, because that herein is shown the use of astrological calculations.

CENTIPES, in zoology. See SCOLOPENDRA.

CENTIPED WORM, a term used for such worms as have a great many feet, though the number does not amount to 100, as the term seems to import. M. Malouet relates the history of a man, who, for three years, had a violent pain in the lower part of the forehead near the root of the nose; at length he felt an itching, and afterwards something moving within his nostril, which he brought away with his finger; it was a worm of the centiped kind, an inch and an half long, which ran swiftly. It lived five or six days among tobacco. The patient was free of his pain ever after. Mr. Littre mentions a like case in 1708, of a larger centiped voided at the nose, after it had thrown the woman, in whose frontal sinus it was, into convulsions, and had almost deprived her of her reason.

CENTLIVRE (Susanna), a celebrated comic writer, was the daughter of Mr. Freeman of Holbeach, in Lincolnshire; and had such an early turn for poetry, that it is said she wrote a song before she was seven years old. Before she was twelve years of age, she could not only read Moliere in French, but enter into the spirit of all the characters. Her father dying, left her to the care of a step-mother, whose ill treatment induced her to go up to London to seek her fortune. On her journey, and on foot, she was met by the afterwards well known Anthony Hammond, who fell instantly in love with her, and brought her with him to Cambridge. After some months cohabitation, she married a nephew of Sir Stephen Fox. But that gentleman not living with her above a twelvemonth, her wit and beauty soon procured her a second husband, whose name was Carrol, and who was an officer in the army; but he having the misfortune to be killed in a duel about a year and an half after their marriage, she became a second time a widow. For the sake of support she now applied to her pen; her first attempt in tragedy being a play called the *Perjured Husband.* Her natural vivacity leading her afterwards to comedy, we find but one more attempt in the buskin, among 18 dramatic pieces which she afterwards wrote. In 1706 she married Mr. Centlivre, principal cook to her Majesty; and, after passing several years happily, she died at his house in Spring Garden, Charing-Cross, in December 1723. This lady for many years enjoyed the intimacy and esteem of the most eminent wits of her time, viz. Sir Richard Steele, Mr. Rowe, Budgell, Farquhar, Dr. Sewell, &c. and very few authors received more tokens of esteem and patronage from the great. With regard to her merit as a writer, it must be allowed that her plays do not abound with wit, nor her language with energy; but her plots are busy and well conducted, and her characters in general natural and well drawn.

CENTNER, or DOCIMASTIC HUNDRED, in metallurgy and assaying, is a weight divisible, first into an hundred, and thence into a greater number of other smaller parts; but though the word is the same both with the assayers and metallurgists, yet it is to be understood as expressing a very different quantity in their different acceptations of it. The weights of the metallurgists are easily understood, as being of the common proportion: but those of the assayers are a thousand times smaller than these, as the portions of metals or ores examined by the assayers are usually very small.

The metallurgists, who extract metals out of their ores, use a weight divided into an hundred equal parts, each part a pound; the whole they call a *centner* or *hundred weight*; the pound is divided into thirty-two parts, or half ounces; and the half ounce into two quarters of ounces, and these each into two drams. These divisions and denominations of the metallurgists are easily understood; but the same words, though they are equally used by assayers, with them express very different quantities; for as the centner of the metallurgists contains 100lb. the centner of the assayers is really no more than one dram, to which the other parts are proportioned.

As the assayers' weights are divided into such an extreme degree of minuteness, and are so very different from all the common weights, the assayers usually make them themselves in the following manner, out of small silver, or fine solder plates, of such a size, that the mark of their weight, according to the division of the dram, which is the *docimastic* or assaying *centner*, may be put upon them: They first take for a basis one weight, being about two-thirds of a common dram: this they mark 64lb. Then having at hand some granulated lead, washed clean, well dried, and sifted very fine, they put as much of it into one of the small dishes of a fine balance as will equipoise the 64lb. as it is called, just mentioned: then dividing this granulated lead into very nice halves, in the two scales, after taking out the first silver weight, they obtain a perfect equilibrium between the two scales; they then pour the granulated lead out of one dish of the scales, and instead of it put in another silver weight, which they make exactly equiponderant with the lead in the other scale, and mark it 32lb. If this second weight when first put into the scale exceed by much the weight of the lead, they take a little from it by a very fine file; but when it comes very near, they use only a whetstone to wear off an extremely small portion at a time. When it is brought to be perfectly even and equal to the lead, they change the scales to see that no error has been committed, and then go on in the same manner till they have made all the divisions, and all the small weights. Then to have an entire centner or hundred weight, they add to the 64lb. as they call it, a 32lb. and a 4lb. and weighing against them one small weight, they make it equal to them, and mark it 100. This is the docimastical, or assaying centner, and is really one dram.

CENTO, in poetry, a work wholly composed of verses or passages promiscuously taken from other authors, only disposed in a new form and order. Proba Falconia has written the life of Jesus Christ in centos taken from Virgil. Alexander Ross has done the like in his Christados, and Stephen de Pleure the same.

CENTONARII, in antiquity, certain of the Roman army, who provided different sorts of stuff called centones, made use of to quench the fire which the enemy's engines threw into the camp. These centonarii kept with the carpenters and other officers of artillery.

CENTRAL FORCES, the powers which cause a moving body to tend towards, or recede from, the centre of motion. See MECHANICS.

CENTRAL *Rule*, is a rule or method discovered by Mr. Thomas Baker, rector of Nympton in Devonshire, which he published in his Geometrical Key, in the year 1684, for determining the centre of a circle which shall cut a given parabola in as many points as a given equation, to be constructed, has real roots; which he has applied with good success in the construction of all equations as far as the 4th power inclusive.

The *Central Rule* is chiefly founded on this property of the parabola; that if a line be inscribed in the curve perpendicular to any diameter, the rectangle of the segments of this line is equal to the rectangle of the intercepted part of the diameter and the parameter of the axis.

The Central Rule has the advantage over the methods of constructing equations by Des Cartes and De Latteres, which are liable to the trouble of preparing the equations by taking away the second term; whereas Baker's method effects the same thing without any previous preparation whatever. See also Philos. Trans. N° 157.

CENTRIFUGAL FORCE, that force by which all bodies that move round any other body in a curve endeavour to fly off from the axis of their motion in a tangent to the periphery of the curve, and that in every part of it. See MECHANICS.

CENTRIFUGAL *Machine*, a very curious machine, invented by Mr. Erskine, for raising water by means of a centrifugal force combined with the pressure of the atmosphere. It consists of a large tube of copper, &c. in the form of a cross, which is placed perpendicular in the water, and rests at the bottom on a pivot. At the upper part of the tube is an horizontal cog-wheel, which touches the cogs of another in a vertical position; so that by the help of a double winch, the whole machine is moved round with very great velocity. Near the bottom of the perpendicular part of the tube is a valve opening upwards; and near the two extremities, but on the contrary side of the arms, or cross part of the tube, are two other valves opening outwards. These two valves are, by the assistance of springs, kept shut till the machine is put in motion, when the centrifugal velocity of the water forces them open, and discharges itself into a cistern or reservoir placed there for that purpose. On the upper part of the arms are two holes, which are closed by pieces screwing into the metal of the tube. Before the machine can work, those holes must be opened, and water poured in through them, till the whole tube be full: by this means all the air will be forced out of the machine, and the water supported in the tube by means of the valve at the bottom. The tube being thus filled with water, and the holes closed by the screw caps, it is turned round by means of the winch, when the water in the arms of the tube acquires a centrifugal force, opens the valves near the extremities of the arms, and flies out with a velocity nearly equal to that of the extremities of the said arms.

The above description will be very easily understood by the figure we have given in plate 80, which is a perspective view of the centrifugal machine, erected on board a ship. ABC is the copper tube. D, a horizontal cog-wheel, furnished with twelve cogs. E, a vertical cog-wheel, furnished with thirty-six cogs. F, F, the double winch. *a*, the valve near the bottom of the tube. *b*, *b*, the two pivots on which the machine turns. *c*, one of the valves in the cross-piece; the other at *d*, cannot be seen in this figure, being on the other side of the tube. *e*, *e*, the two holes through which the water is poured into the machine. GH, the cistern or reservoir. I, I, part of the ship's deck. The distance between the two valves, *c*, *d*, is six feet. The diameter of these valves is about three inches; and that of the perpendicular tube about seven inches.

If we suppose the men who work the machines can turn the winch round in three seconds, the machine will move round its axis in one second; and consequently each extremity of the arms will move with a velocity of 18.8 feet in a second. Therefore a column of water of three inches diameter will issue through each of the valves with a velocity of 18.8 feet in a second: but the area of the aperture of each of the valves is 7.14 inches; which being multiplied by the velocity in inches = 225.6, gives 1610.784 cubic inches, the quantity of water discharged through one of the apertures in one second; so that the whole quantity discharged in that space of time through both the apertures is = 3221.568 inches; or 193294.08 cubic inches in one minute. But 60812 cubic inches make a tun, beer-measure; consequently, if we suppose the centrifugal machine revolves round its axis in one second, it will raise nearly 3 tuns 44 gallons in one minute: but this velocity is certainly too great, at least to be held for any considerable time; so that, when this, and other deficiencies in the machine are allowed for, two tuns is nearly the quantity that can be raised by it in one minute. It will hardly be necessary to observe, that as the water is forced up the perpendicular tube by the pressure of the atmosphere, this machine cannot raise water above 32 feet high.

An attempt was made to substitute this machine in place of the pumps commonly used on ship-board; but the labour of working was found to be so great as to render the machine in-

ferior to the chain-pump. A confiderable improvement, we apprehend, would be, to load with a weight of lead the ends of the tubes through which the water iffues, which would make the machine turn with a great deal more eafe, as the centrifugal force of the lead would in fome meafure act the part of a fly.

CENTRIPETAL FORCE, that force by which a body is every where impelled, or any how tends, towards fome point as a centre. See MECHANICS.

CENTRISCUS, in ichthyology, a genus of fifhes belonging to the order of amphibia nantes. The head gradually ends in a narrow fnout, the aperture is broad and flat; the belly is carinated, and the belly-fins united. There are two fpecies, viz. 1. The *fcutatus* has its back covered with a fmooth bony fhell, which ends in a fharp fpine, under which is the tail; but the back fins are between the tail and the fpine. It is a native of the Eaft Indies. 2. The *fcolopax* has a rough fcabrous body, and a ftraight extended tail. It has two belly-fins, with four rays in each, and has no teeth. It is found in the Mediterranean.

CENTRONIA, in natural hiftory, a name by which the echini marini have been lately diftinguifhed. Dr. Hill makes them a diftinct clafs of animals living under the defence of fhelly coverings formed of one piece, and furnifhed with a vaft number of fpines moveable at the creature's pleafure.

CENTUMVIRI, in Roman antiquity, judges appointed to decide common caufes among the people. They were chofen three out of each tribe; and though five more than an hundred, were neverthelefs called *centumviri*, from the round number, *centum*, an hundred.

CENTUNCULUS, in botany; a genus of the monogynia order, belonging to the tetrandria clafs of plants; and in the natural method ranking under the 20th order, *Rotaceæ*. The calyx is quadrifid; the corolla quadrifid, and patent; the ftamina are fhort; the capfule is unilocular, cut round or parting horizontally.

CENTURION, among the Romans, an officer in the infantry, who commanded a century, or an hundred men. In order to have a proper notion of the centurions, it muft be remembered, that every one of the thirty *manipuli* in a legion was divided into two *ordines*, or ranks; and confequently the three bodies of the haftati, principes, and triarii, into 20 orders a-piece, as into 10 manipuli. Now, every manipulus was allowed two centurions, or captains, one to each order or century: and, to determine the point of priority between them, they were created at two different elections. The 30 who were made firft always took the precedency of their fellows; and therefore commanded the right-hand orders, as the others did the left. The triarii, or *pilani*, fo called from their weapon the *pilum*, being efteemed the moft honourable, had their centurions elected firft, next to them the principes, and afterwards the haftati; whence they were called *primus et fecundus pilus*, *primus et fecundus princeps*, *primus et fecundus haftatus*; and fo on. Here it may be obferved, that *primi ordines* is fometimes ufed in hiftorians for the centurions of thefe orders; and the centurions are fometimes ftyled *principes ordinum*, and *principes centurionum*. We may take notice too what a large field there lay for promotion: firft through all the orders of the haftati; then quite through the principes; and afterwards from the laft order of the triarii to the primipilus, the moft honourable of the centurions, and who alfo went under the feveral titles of *dux legionis*, *præfectus legionis*, *primus centurionum*, and *primus centurio*; and was the firft centurion of the triarii in every legion.

CENTURY, in a general fenfe, any thing divided into, or confifting of, an hundred parts.

The marquis of Worcefter publifhed a *Century* of inventions; and Dr. Hook has given a *decimate* of inventions, as part of a *Century*, of which he affirmed himfelf mafter. It is remarkable, that both in the century of the former, and the decimate of the latter, we find the principle on which Savary's fire or fteam engine is founded. See STEAM-*Engine*.

CENTURY, in antiquity. The Roman people, when they were affembled for the electing of magiftrates, enacting of laws, or deliberating upon any public affair, were always divided into centuries, and voted by centuries, in order that their votes might be the more eafily collected, whence thefe affemblies were called *comitia centuriata*. The Roman cohorts were alfo divided into centuries. See CENTURION and COHORT.

CENTURY, in chronology, the fpace of one hundred years. This method of computing by centuries is generally obferved in church hiftory, commencing from the time of our Saviour's incarnation; in which fenfe we fay the firft century, the fecond century, &c.

CENTURIES *of Magdeburg*, a famous ecclefiaftical hiftory, ranged into 13 centuries, carried down to the year 1298, compiled by feveral hundred proteftants of Magdeburg, the chief of whom was Flacius Illyricus.

CENTUSSIS, in Roman antiquity, a coin containing 100 affes.

CENTZONTLI, in ornithology, the Mexican name of the *Turdus polyglottus*. See TURDUS.

CEODES, in botany; a genus of the diœcia order, belonging to the polygamia clafs of plants. There is no calyx; the corolla is monopetalous, with a fhort turbinated tube; the ftamina are ten fubulated filaments: the antheræ roundifh.

CEORLES, the name of one of the claffes or orders into which the people were diftinguifhed among the Anglo-Saxons. The ceorles, who were perfons completely free, and defcended from a long race of freemen, conftituted a middle clafs between the labourers and mechanics (who were generally flaves, or defcended from flaves) on the one hand, and the nobility on the other. They might go where they pleafed, and purfue any way of life that was moft agreeable to their humour; but fo many of them applied to agriculture, and farming the lands of the nobility, that a ceorl was the moft common name for a hufbandman or farmer in the Anglo-Saxon times. Thefe ceorls, however, feem in general to have been a kind of gentlemen farmers; and if any one of them profpered fo well as to acquire the property of five hides of land, upon which he had a church, a kitchen, a bell-houfe, and great gate, he was efteemed a nobleman or thane. If a ceorl applied to learning, and attained to prieft's orders, he was alfo confidered as a thane; his were-gild, or price of his life, was the fame, and his teftimony had the fame weight in a court of juftice. When he applied to trade, and made three voyages beyond fea, in a fhip of his own, and with a cargo belonging to himfelf, he was alfo advanced to the dignity of a thane. But if a ceorl had a greater propenfity to arms than to learning, trade, or agriculture, he then became the fithcunman, or military retainer, to fome potent and warlike earl, and was called the *hufcarle* of fuch an earl. If one of thefe hufcarles acquitted himfelf fo well as to obtain from his patron either five hides of land, or a gilt fword, helmet, and breaft-plate, as a reward of his valour, he was likewife confidered as a thane. Thus the temple of honour ftood open to thefe ceorls, whether they applied themfelves to agriculture, commerce, letters, or arms, which were then the only profeffions efteemed worthy of a freeman.

CEPA, the ONION. See ALLIUM.

CEPHALANTHUS, BUTTON-WOOD; a genus of the monogynia order, belonging to the tetrandria clafs of plants; and in the natural method ranking under the 48th order, *Aggregatæ*. There is no common calyx; the proper one is fuperior, and funnel-fhaped; the receptacle globofe and naked, with one

downy feed. There is only one fpecies, the *Occidentalis*; a deciduous fhrub, native of North America. It grows to about five or fix feet high; and is not a very bufhy plant, as the branches are always placed thinly in proportion to the fize of the leaves, which will grow more than three inches long, and one and a half broad, if the trees are planted in a foil they like. The leaves ftand oppofite by pairs on the twigs, and alfo fometimes by threes, and are of a light-green colour. Their upper furface is fmooth; they have a ftrong nerve running from the footftalk to the point, and feveral others from that on each fide to the borders: thefe, as well as the footftalks, in the autumn, dye to a reddifh colour. The flowers, which are aggregate flowers, properly fo called, are produced at the ends of the branches, in globular heads, in July. The florets which compofe thefe heads are funnel-fhaped, of a yellow colour, and faftened to an axis which is in the middle. The cephalanthus is propagated from feeds, which we receive from America. Thefe fhould be fown as foon as they arrive, and there will be a chance of their coming up the firft fpring; though they often lie till the fpring after before they make their appearance. They may be fown in good garden mould of almoft any foil, if fomewhat moift the better, and fhould be covered about a quarter of an inch deep. This fhrub is alfo propagated by layers. If the young fhoots are laid in autumn, they will have ftruck good root by the autumn following, and may be then taken up, and fet in the places where they are defigned to remain. Cuttings of this tree alfo, planted in the autumn in a rich, light, moift foil, will grow; and by that means alfo plenty of thefe plants may be foon obtained.

CEPHALICS are all remedies adapted for the cure of diforders of the head. Such are thofe fnuffs which produce a difcharge from the mucous membrane of the nofe, &c.

CEPHALIC *Vein*, in anatomy, creeps along the arm between the fkin and the mufcles, and divides into two branches: the external going down to the wrift, then joining the bafilica, and turning up to the back of the hand. The internal branch, together with a fmall one of the bafilica, makes the mediana. The ancients ufed to open this vein for diforders of the head, which gave it its name.

CEPHALONIA, the capital of an ifland of the fame name, fituated in the Mediterranean, near the coaft of Epirus, and fubject to the Venetians. E. long. 21. N. lat. 30. 30.

CEPHEUS, in fabulous hiftory, a king of Arcadia, on whofe head Minerva faftening one of Medufa's hairs, he was rendered invincible.

CEPHEUS, in aftronomy, a conftellation of the northern hemifphere. See ASTRONOMY.

CERAM, an ifland in the Indian ocean, between the Molucca iflands on the north, and thofe of Amboyna and Banda on the fouth, lying between E. long. 126. and 129. in S. lat. 3. It is about 150 miles long, and 60 broad; and here the Dutch have a fortrefs, which keeps the natives in fubjection.

CERAMBYX, in zoology, a genus of infects of the beetle kind, belonging to the order of infecta coleoptera. The antennæ are long and fmall; the breaft is fpinous or gibbous; and the elytra are linear. There are no lefs than 83 fpecies enmmerated by Linnæus, principally diftinguifhed by the figure of the breaft.

CERASTES, in zoology, the trivial name of a fpecies of ANGUIS and COLUBER.

CERASTIUM, MOUSE-EAR; a genus of the pentagynia order, belonging to the decandria clafs of plants; and in the natural method ranking under the 22d order, *Caryophyllæ*. The calyx is pentaphyllous; the petals are bifid; the capfule is unilocular, and opening at the top. There are 16 fpecies, but none of them poffeffed of any remarkable property.

CERASUS, in botany. See PRUNUS.

3

CERATE, in pharmacy, a kind of ointment, applied to ulcers, &c. See PHARMACY.

CERATION, the name given by the ancients to the fmall feeds of Ceratonia, ufed by the Arabian phyficians as a weight to adjuft the dofes of medicines; as the grain weight with us took its rife from a grain of barley.

CERATON, or *ceratium*, was alfo a filver coin, equal to one third of an obolus.

CERATOCARPUS, in botany; a genus of the monandria order, belonging to the monœcia clafs of plants; and in the natural method ranking under the 12th order, *Holoraceæ*. The male calyx is bipartite; there is no corolla: the filament is long: the female calyx is diphyllous, and grown to the germen; there is no corolla; the ftyles are two; the feed is two-horned and compreffed.

CERATONIA, the CAROB TREE, or *St. John's bread*; a genus of the monœcia order belonging to the polygamia clafs of plants; and in the natural method ranking under the 33d order, *Lomentaceæ*. The calyx is hermaphrodite and quinquepartite; there is no corolla: the ftamina are five; the ftyle is filiform; the legumen coriaceous and polyfpermous. It is alfo diœcious, or male and female diftinct on different plants. There is but one fpecies, the filiqua, a native of Spain, of fome parts of Italy, and the Levant. It is an ever-green; and, in the countries where it is native, grows in the hedges. It produces a quantity of long, flat, brown-coloured pods, which are thick, mealy, and of a fweetifh tafte. Thefe pods are many times eaten by the poorer fort of inhabitants when there is a fcarcity of other food; but they are apt to loofen the belly, and caufe gripings of the bowels. They are called *St. John's bread*, from an ill-founded affertion of fome writers on fcripture, that thefe pods were the locufts St. John eat with his honey in the wildernefs. The tree may be propagated in this country from feeds, which fhould be fown in a moderate hot-bed, and the plants inured to open air by degrees.

CERATOPHYLLUM, in botany; a genus of the polyandria order, belonging to the monœcia clafs of plants; and in the natural method ranking under the 15th order, *Inundatæ*. The male calyx is multipartite; no corolla; ftamina from 16 to 20: the female calyx is multipartite; no corolla; one piftil; no ftyle; one naked feed.

CERAUNIA, CERAUNIAS, or CERAUNIUS *Lapis*, in natural hiftory, a fort of flinty-ftone, of no certain colour, but of a pyramidal or wedge-like figure; popularly fuppofed to fall from the clouds in the time of thunder-ftorms, and to be poffeffed of many notable virtues, as promoting fleep, preferving from lightning, &c. The word is from the Greek κεραυνος, *thunderbolt*. The ceraunia is the fame with what is otherwife called the thunder-ftone, or thunder-bolt; and alfo fometimes *fagitta*, or arrow's head, on account of its fhape. The ceraunia are frequently confounded with the ombriæ and brontiæ, as being all fuppofed to have the fame origin. The generality of naturalifts take the ceraunia for a native ftone, formed among the pyrites, of a faline, concrete, mineral juice. Mercatus and Dr. Woodward affert it to be artificial, and to have been fafhioned thus by tools. The ceraunia, according to thefe authors, are the heads of the ancient weapons of war, in ufe before the invention of iron; which, upon the introduction of that metal, growing into difufe, were difperfed in the fields through this and that neighbouring country. Some of them had poffibly ferved in the early ages for axes, others for wedges, others for chiffels; but the greater part for arrow-heads, darts, and lances. The ceraunia is alfo held by Pliny for a white or cryftal-coloured gem, that attracted lightning to itfelf. What this was, is hard to fay. Prudentius alfo fpeaks of a yellow ceraunia; by which he is fuppofed to mean the carbuncle or pyropus.

CERBERA, in botany: a genus of the monogynia order, belonging to the pentandria clafs of plants, and in the natural method ranking under the 30th order, *Contortæ*. The fruit is a monofpermous plum. The moft remarkable fpecies is the *atrovcir*, a native of the warm parts of America. It rifes with an irregular ftem to the height of eight or ten feet, fending out many crooked diffufed branches, which towards their tops are garnifhed with thick fucculent leaves of a lucid green, fmooth, and very full of a milky juice. The flowers come out in loofe bunches at the end of the branches; they are of a cream colour, having long narrow tubes, and are cut into five obtufe fegments, which feem twifted, fo as to ftand oblique to the tube. The wood of this tree ftinks moft abominably, and the kernels of the nuts are a deadly poifon, to which there is no antidote; fo that the Indians will not even ufe the wood for fuel.

CERBERUS, in fabulous hiftory, a dreadful three-headed maftiff, born of Typhon and Echidna, and placed to guard the gates of hell. He fawned upon thofe who entered, but devoured all who attempted to get back. He was, however, maftered by Hercules, who dragged him up to the earth, where in ftruggling, a foam dropped from his mouth, which produced the poifonous herb called *aconite* or *wolf's-bane*.

CERCELE, in heraldry: a crofs cercele is a crofs which, opening at the ends, turns round both ways like a ram's horn. See CROSS.

CERCIS, the JUDAS-TREE; a genus of the monogynia order, belonging to the decandria clafs of plants; and in the natural method ranking under the 33d order, *Lomentaceæ*. The calyx is quinquedentated, and gibbous below; the corolla papilionaceous, with a fhort vexillum or flag-petal under the wings or fide petals; a leguminous plant. There are only two *fpecies*, both deciduous. 1. The *filiquaftrum*, common Judas-tree, or Italian cercis, a native of Italy and other parts of the fouth of Europe. Thefe differ in the height of their growth in different places. In fome they will arrive to be fine trees, of near twenty feet high; whilft in others they will not rife to more than ten or twelve feet, fending forth young branches irregularly from the very bottom. The ftem of this tree is of a dark-greyifh colour, and the branches, which are few and irregular, have a purplifh caft. The leaves are fmooth, heart-fhaped, and roundifh, of a pleafant green on their upper furface, hoary underneath, and grow alternately on long footftalks. The flowers are of a fine purple: they come out early in the fpring, in clufters, from the fide of the branches, growing upon fhort footftalks; and in fome fituations they are fucceeded by long flat pods, containing the feeds, which, in very favourable feafons, ripen in England. Some people are fond of eating thefe flowers in fallads, on which account alone in fome parts this tree is propagated. The varieties of this fpecies are, 1. The Flefh-coloured: 2. The White-flowered; and, 3. The Broad-podded Judas-tree.—2. The *Canadenfis*, or Canadian cercis, will grow to the fize of the firft fort in fome places. The branches are alfo irregular. The leaves are cordated, downy, and placed alternately. The flowers ufually are of a palifh red colour, and fhow themfelves likewife in the fpring, before the leaves are grown to their fize. Thefe too are often eaten in fallads, and make an excellent pickle. There is a variety of this with deep red, and another with purple flowers. The view which thefe trees will afford in a plantation may be eafily conceived, not only as they exhibit their flowers in clufters, in different colours, early in the fpring, before the leaves are grown to fuch a fize as to hide them; but from the difference of the upper and lower furface of the leaves, the one being of a fine green, the other of a hoary caft; fo that on the fame tree, even in this refpect, is fhown variety; an improvement whereof is made by the waving winds, which will prefent them alternately to view.

As thefe fpecies will not take root by layers, they muft be propagated by feeds, which may be put into common garden mould, well dug, and cleared of roots, weeds, &c. Part of the feeds will come up in the fpring, and the reft will remain until the fpring following; fo that whoever is defirous of drawing the feedlings of a year old to plant out, muft not deftroy the bed, but draw them carefully out, and after that there will be a fucceeding crop. In the winter they may be left to themfelves, for they are very hardy. Toward the latter end of March, or beginning of April, the plants having been in the feed-bed one or two years, they fhould be taken out, and planted in the nurfery, one foot afunder, and two feet in the rows, and there they fhould ftand until they are removed finally. The wood of the cercis is of great value; for it polifhes exceedingly well, and is admirably veined with black and green.

CERCOPITHECI, in natural hiftory, the name given by Mr. Ray to monkeys, or the clafs of apes with long tails. See APE and SIMIA.

CERDA (John Lewis de la), a learned Jefuit of Toledo, wrote large commentaries on Virgil, which have been much efteemed; alfo feveral other works. He died in the year 1643, aged 80.

CERDONIANS, ancient heretics, who maintained moft of the errors of Simon Magus, Saturninus, and the Manichees. They took their name from their leader *Cerdon*, a Syrian, who came to Rome in the time of pope Hyginus, and there abjured his errors; but in appearance only; for he was afterwards convicted of perfifting in them, and accordingly expelled the church again. Cerdon afferted two principles, the one good, and the other evil: this laft, according to him, was the creator of the world, and the god that appeared under the old law. The firft, whom he called *unknown*, was the father of Jefus Chrift; who, he taught, was incarnate only in appearance, and was not born of a virgin; nor did he fuffer death but in appearance. He denied the refurrection, and rejected all the books of the Old Teftament, as coming from an evil principle. Marcion, his difciple, fucceeded him in his errors.

CEREALIA, in antiquity, feafts of Ceres, inftituted by Triptolemus, fon of Celeus king of Eleufine in Attica, in gratitude for his having been inftructed by Ceres, who was fuppofed to have been his nurfe, in the art of cultivating corn and making bread. There were two feafts of this kind at Athens; the one called *Eleufinia*, the other *Thefmophoria*. See the article ELEUSINIA. What both agreed in, and was common to all the *cerealia*, was, that they were celebrated with a world of religion and purity; fo that it was efteemed a great pollution to meddle, on thofe days, in conjugal matters.

CEREALIA, in botany, from *Ceres*, the goddefs of corn; Linnæus's name for the larger efculent feeds of the graffes: thefe are rice, wheat, rye, barley, oats, millet, panic grafs, Indian millet, holcus, zizania, and maize. To this head may be likewife referred darnel *(lolium)*; which, by preparation, is rendered efculent.

CEREBELLUM, that portion of the brain which is contained in the hinder part of the fkull. See ANATOMY, P. 202.

CEREBRUM, the BRAIN, a part whofe ftructure and ufes are not yet well underftood by anatomifts. The celebrated Dr. Hunter has obferved, that the principal parts of the medullary fubftance of the brain in idiots and madmen, fuch as the *thalami nervorum opticorum*, and *medulla oblongata*, are found entirely changed from a medullary to a hard, tough, dark-coloured fubftance, fometimes refembling white-leather. See ANATOMY, P. 202.

CEREMONIAL *(ceremoniale)*, a book in which is prefcribed the order of the ceremonies to be obferved in certain rites and occafions of folemnity and pomp. The ceremonial of the Roman church is called *ordo Romanus*. It

was publiſhed in 1516 by the biſhop of Corcyra; at which the college of cardinals were ſo ſcandalized, that ſome of them voted to have both the books and the author burnt, for his temerity in expoſing the ſacred ceremonies to the eyes of profane people.

Ceremonial is alſo uſed for that ſet or ſyſtem of rules and ceremonies which cuſtom has introduced for regulating our behaviour, and which perſons practiſe towards each other, either out of duty, decency, or civility.

Ceremonial, in a more particular ſenſe, denotes the manner in which princes and ambaſſadors uſe to receive and to treat one another. There are endleſs diſputes among ſovereigns about the *ceremonial*: ſome endeavouring to be on a level, and others to be ſuperior; inſomuch that numerous ſchemes have been propoſed for ſettling them. The chief are, 1. to accommodate the difference by compromiſe or alternation; ſo that one ſhall precede now, the other the next time; or one in one place, and the other in another. 2. By ſeniority; ſo that an elder prince in years ſhall precede a younger, without any other diſtinction. Theſe expedients, however, have not yet been accepted of by any, except ſome *alternate princes*, as they are called, in Germany.

Ceremonial is more particularly uſed in ſpeaking of the laws and regulations given by Moſes relating to the worſhip of God among the ancient Jews. In this ſenſe it amounts to much the ſame with what is called the *Levitical law*, and ſtands contradiſtinguiſhed from the moral as well as judicial law.

CEREMONY, an aſſemblage of ſeveral actions, forms, and circumſtances, ſerving to render a thing more magnificent and ſolemn. In 1646, M. Ponce publiſhed a hiſtory of ancient ceremonies, tracing the riſe, growth, and introduction of each rite into the church, and its gradual advancement towards ſuperſtition. Many of them were borrowed from Judaiſm; but more ſeemingly from Paganiſm. Dr. Middleton has given a fine diſcourſe on the conformity between the pagan and popiſh ceremonies, which he exemplifies in the uſe of incenſe, holy water, lamps, and candles, before the ſhrines of ſaints, votive gifts or offerings round the ſhrines of the deceaſed, &c. In effect, the altars, images, croſſes, proceſſions, miracles, and legends; nay, even the very hierarchy, pontificate, religious orders, &c. of the preſent Romans, he ſhows, are all copied from their heathen anceſtors. We have an ample and magnificent account of the religious ceremonies and cuſtoms of all nations in the world, repreſented in figures deſigned by Picart, with hiſtorical explanations, and many curious diſſertations.

Maſter of the Ceremonies, an officer inſtituted by king James I. for the more honourable reception of ambaſſadors and ſtrangers of quality. He wears about his neck a chain of gold, with a medal under the crown of Great Britain, having on one ſide an emblem of peace, with this motto, *Beati pacifici*; and on the other, an emblem of war, with *Dieu et mon droit*: his ſalary is 300*l. per annum.* He has an aſſiſtant, whoſe ſalary is 141*l.* 13*s.* and 4*d. per annum*: and under them both, is a *Marſhal of the* Ceremonies, having a ſalary of 100*l. per annum.*

CERENZA, a town of Italy in the kingdom of Naples, and in the Hither Calabria, with a biſhop's ſee. It is ſeated on a rock, in E. long. 17. 5. N. lat 39. 23.

CERES, a Pagan deity, the inventor or goddeſs of corn; in like manner as Bacchus was of wine. According to the poets, ſhe was the daughter of Saturn and Ops, and the mother of Proſerpine, whom ſhe had by Jupiter. Cicero ſpeaks of a temple of Ceres at Catanea in Sicily, where was a very ancient ſtatue of that goddeſs, but entirely concealed from the ſight of men, every thing being performed by matrons and virgins.

CERET, a town of France, in the department of the Eaſtern Pyrenees and late province of Rouſſillon, with a magnificent bridge of one arch over the river Tet. Here the commiſſioners of France and Spain met, in 1660, to ſettle the limits of the two kingdoms. It is 12 miles from Perpignan. Long. 2. 46. E. Lat. 42. 36. N.

CEREUS, in botany. See Cactus.

CERIGO, an iſland in the Archipelago, anciently called *Cytherea*; noted for being the birth place of Helen, and, as the poets ſay, of Venus. At preſent there is nothing very delightful in the place; for the country is mountainous, and the ſoil dry. It abounds in hares, quails, turtle, and excellent falcons. It is about 50 miles in circumference, and had formerly good towns; but there is now none remaining but that which gives name to the iſland. This is ſtrong both by art and nature, it being ſeated on a craggy rock. The inhabitants are Chriſtian Greeks, and ſubject to the Venetians, who keep a governor there, whom they change every two years.

CERINES, a town in the iſland of Cyprus, with a good caſtle, an harbour, and a biſhop's ſee. E. long. 33. 35. N. lat. 35. 22.

CERINTHE, Honeywort; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 41ſt order, *Aſperifoliæ*. The limb of the corolla is a ventricoſe tube with the throat pervious; and there are two bilocular ſeeds. There are three ſpecies, natives of Germany, Italy, and the Alps. They are low annual plants with purple, yellow, and red flowers, which may be propagated by ſeed ſown in autumn, in a warm ſituation.

CERINTHIANS, ancient heretics, who denied the deity of Jeſus Chriſt. They took their name from Cerinthus, one of the firſt hereſiarchs in the church, being cotemporary with St. John. They believed that Jeſus Chriſt was a mere man, born of Joſeph and Mary; but that in his baptiſm, a celeſtial virtue deſcended on him in form of a dove; by means whereof he was conſecrated by the holy ſpirit, and made Chriſt. It was by means of this celeſtial virtue therefore, that he wrought ſo many miracles; which, as he received it from heaven, quitted him after his paſſion, and returned to the place whence it came; ſo that Jeſus, whom they called a *pure man*, really died and roſe again; but that Chriſt, who was diſtinguiſhed from Jeſus, did not ſuffer at all. It was partly to refute this ſect, that St. John wrote his goſpel. They received the goſpel of St. Matthew, to countenance their doctrine of circumciſion, from Chriſt's being circumciſed; but they omitted the genealogy. They diſcarded the epiſtles of St. Paul, becauſe that apoſtle held circumciſion aboliſhed.

CEROPEGIA, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants, and in the natural method ranking under the 30th order, *Contortæ*. There are two erect follicles; the ſeeds plumoſe or covered with a feathered pappus; the limb of the corolla connivent or cloſing at top.

CERTHIA, in ornithology, the creeper or ox-eye, a genus belonging to the order of picæ. See Pl. 63. The beak is arched, ſlender, ſharp, and triangular; the tongue is ſharp at the point; and the feet are of the walking kind, i. e. having the toes open and unconnected. Of this genus near 50 ſpecies have been enumerated by ornithologiſts; but Mr. Latham ſuppoſes that many now deſcribed as ſpecies will be found hereafter to be mere varieties; which, he adds, is no wonder, ſince many creepers do not gain their full plumage till the third year's moult. The following are a few of the moſt remarkable:

1. The *familiaris*, or common ox-eye, is grey above and white underneath, with brown wings and ten white ſpots on the ten prime feathers. This bird is found in moſt parts of Europe, though it is believed no where ſo common as in Bri-

tain. It may be thought more fcarce than it really is by the lefs attentive obferver; for, fuppofing it on the body or branch of any tree, the moment it obferves any one, it gets to the oppofite fide, and fo on, let a perfon walk round the tree ever fo often. The facility of its running on the bark of a tree, in all directions, is wonderful; this it does with as much eafe as a fly on a glafs window. Its food is principally, if not wholly, infects, which it finds in the chinks and among the mofs of trees. It builds its neft in fome hole of a tree, and lays generally five eggs, very rarely more than feven: thefe are afh-coloured, marked at the end with fpots and ftreaks of a deeper colour; and the fhell is obferved to be pretty hard. It remains in the places which it frequents during the winter, and builds its neft early in the fpring.

2. The hook-billed *green* creeper has a bill an inch and three quarters long, and bent quite in the fhape of a femicircle; the plumage in general is olive green, paleft beneath, and fomewhat inclined to yellow: the quills and tail are dufky; the legs dufky brown: and the feathers juft above the knee, or garter, white. It inhabits the Sandwich Iflands in general, and is one of the birds whofe plumage the natives make ufe of in conftructing their feathered garments; which having thefe olive-green feathers intermixed with the beautiful fcarlet and yellow ones belonging to the next fpecies, and yellow tufted bee-eater, make fome of the moft beautiful coverings of thefe iflanders.

3. The hooked-billed *red* creeper has the bill fomewhat lefs hooked than the laft fpecies; the general colour of the plumage is fcarlet; wings and tail black. In fome birds the forehead is of a buff-colour; and the parts about the head and neck have both a mixture of buff and dufky black, which are fufpected to be the birds not yet arrived at their full plumage.

4. The *pufila*, or brown and white creeper, according to Edwards, is not above half the fize of our European creeper. The upper part of the body is brown, with a changeable glofs of copper: the under parts are white; the quills brown, edged with gloffy copper; the tail blackifh, the outer feather tipped with white. The bird from which Edwards drew his figure had a label tied to it, by the name of Honey-thief. And that they are fond of honey, is manifeft from thofe who keep birds at the Cape of Good Hope, having many forts in large cages, and fupplying them with only honey and water; but befides this, they catch a great many flies, which come within the reach of their confinement: and thefe two make up their whole fubfiftence; indeed, it has been attempted to tranfport them further, but the want of flies on board a fhip prevented them living more than three weeks; fo neceffary are infects to their fubfiftence.

5. The *Loteni*, or Loten's creeper, has the head, neck, back, rump, fcapulars, and upper tail-coverts, of green gold: beneath, from the breaft to the vent, of velvet black, which is feparated from the green on the neck by a tranfverfe bright violet band, a line and a half in breadth: the leffer wing coverts are of this laft colour; the middle coverts are green gold; and the greater coverts are very fine black, edged with green gold on the outer edge: the quills are of the fame colour, as are alfo the tail feathers. The female differs in having the breaft, belly, fides, thighs, under wing and tail coverts, of a dirty white, fpotted with black; and the wings and tail not of fo fine a black. It inhabits Ceylon and Madagafcar; and is called Angaladian. Buffon tells us, that it makes its neft of the down of plants, in form of a cup, like that of the chaffinch; the female laying generally five or fix eggs: and that it is fometimes chafed by a fpider as large as itfelf, and very voracious, which feizes on the whole brood, and fucks the blood of the young birds.

6. The *cærulea*, or blue creeper, has the head of a moft elegant blue; but on each fide there is a ftripe of black like velvet, in which the eye is placed: the chin and throat are marked with black in the fame manner; the reft of the body violet blue. It inhabits Cayenne. Seba fays, that it makes its neft with great art. The outfide is compofed of dry ftalks of grafs, or fuch like; but within of very downy foft materials, in the fhape of a retort, which it fufpends from fome weak twig, at the end of a branch of a tree; the opening or mouth downwards, facing the ground; the neck is a foot in length, but the real neft is quite at the top, fo that the bird has to climb up this funnel-like opening to get at the neft. Thus it is fecure from every harm; neither monkey, fnake, nor lizard, daring to venture at the end of the branch, as it would not fteadily fupport them.

7. The *cardinal* creeper, *(Lev. Muf.)* has the head, neck, and breaft, of a crimfon colour; down the middle of the back is a ftripe of the fame colour to the rump: the reft of the body is black; and the wings and tail are black. It inhabits the cultivated parts of the ifland of Tanna; is there called Kuyameta, and lives by fucking the moifture of flowers.

8. The *mocking* creeper is of the fize of the leffer thrufh. On the cheeks is a narrow white fpot: the head, efpecially on the crown, is inclined to violet: the plumage in general is olive green, inclining to yellow on the under parts: the quills are brown; the fecondaries edged with olive: the colour of the tail is like that of the fecondaries, and fomewhat forked: the legs are dufky blue, and the claws black. It inhabits both the iflands of New Zealand. It has an agreeable note in general; but at times fo varies and modulates the voice, that it feems to imitate the notes of all other birds; hence it was called by the Englifh the Mocking-bird. This bird being fond of thrufting its head into the bofom of flowers which have a purplifh-coloured farina, much of it adheres to the feathers about the head and bill, and in courfe gives the appearance above mentioned; but this in time rubs off, and the colour of the head appears the fame with the reft of the plumage.

CERTIFICATE *(Trial by)*, in the law of England, a fpecies of trial allowed in thofe cafes where the evidence of the perfon certifying is the only criterion of the point in difpute. For when the fact in queftion lies out of the cognizance of the court, the judges muft rely on the folemn averment or information of perfons in fuch a ftation as affords them the moft clear and competent knowledge of the truth. As therefore fuch evidence, if given to a jury, muft have been conclufive, the law, to fave trouble and circuity, permits the fact to be determined upon fuch certificate merely. Thus, 1. If the iffue be whether A was abfent with the king in his army out of the realm in time of war, this fhall be tried by the certificate of the marefchal of the king's hoft in writing under his feal, which fhall be fent to the juftices. 2. If, in order to avoid an outlawry, or the like, it was alledged that the defendant was in prifon, *ultra mare*, at Bourdeaux, or in the fervice of the mayor of Bourdeaux, this fhould have been tried by the certificate of the mayor, and the like of the captain of Calais. But when this was law, thofe towns were under the dominion of the crown of England. And therefore, by a parity of reafon, it fhould now hold, that in fimilar cafes arifing at Jamaica, or Gibraltar, the trial fhou'd be by certificate from the governor of thofe iflands. We alfo find that the certificate of the queen's meffenger, fent to fummon home a peerefs of the realm, was formerly held a fufficient trial of the contempt in refufing to obey fuch fummons. 3. For matters within the realm; the cuftoms of the city of London fhall be tried by the certificate of the mayor and aldermen, certified by the mouth of their recorder; upon a furmife from the party alledging it, that the cuftom ought to be thus tried: elfe it muft be tried by the country; as, the cuftom of diftributing the effects of freemen deceafed; or enrolling apprentices; or that he who is free of one trade may ufe another; if any of thefe, or other fimilar points come in

iffue.' 4. The trial of all cuftoms and practice of the courts fhall be by certificate from the proper officers of thofe courts refpectively; and what return was made on a writ by the fheriff or under-fheriff, fhall be only tried by his own certificate.

CERTIORARI, in law, a writ which iffues out of the chancery, directed to an inferior court, to call up the records of a caufe there depending, in order that juftice may be done. And this writ is obtained upon complaint, that the party who feeks it has received hard ufage, or is not like to have an impartial trial in the inferior court. A certiorari is made returnable either in the king's bench, common pleas, or in chancery. It is not only iffued out of the court of chancery, but likewife out of the king's bench; in which laft mentioned court it lies where the king would be certified of a record. Indictments from inferior courts, and proceedings of the quarter-feffions of the peace, may alfo be removed into the king's bench by a certiorari: and here the very record muft be returned, and not a tranfcript of it; though ufually in chancery, if a certiorari be returnable there, it removes only the tenor of the record.

CERTITUDE, confidered in the things or ideas which are the objects of our underftanding, is a neceffary agreement or difagreement of one part of our knowledge with another. As applied to the mind, it is the perception of fuch agreement or difagreement; or fuch a firm well-grounded affent, as excludes not only all manner of doubt, but all conceivable poffibility of a miftake. There are three forts of certitude, or affurance, according to the different natures and circumftances of things. 1. A phyfical or natural certitude, which depends upon the evidence of fenfe; as that I fee fuch or fuch a colour, or hear fuch or fuch a found; no body queftions the truth of this, where the organs, the medium, and the object, are rightly difpofed. 2. Mathematical certitude, is that arifing from mathematical evidence; fuch is that the three angles of a triangle are equal to two right ones. 3. Moral certitude is that founded on moral evidence, and is frequently equivalent to a mathematical one; as that there was formerly fuch an emperor as Julius Cæfar, and that he wrote the commentaries which pafs under his name; becaufe the hiftorians of thofe times have recorded it, and no man has ever difproved it fince: this affords a moral certitude, in common fenfe fo great, that one would be thought a fool or madman for denying it.

CERTOSA, a celebrated Carthufian monaftery, in the territory of the Pavefe; in the duchy of Milan, four miles from Pavia; its park is furrounded with a wall 20 miles in circumference; but there are feveral fmall towns and villages in it.

CERVANTES. See SAAVEDRA.

CERVERA, a town of Spain in Catalonia, feated on a fmall river of the fame name, in E. long. 1. 9. N. lat. 41. 28.

CERVIA, a fea-port town of Italy, in Romagna, with a bifhop's fee, feated on the gulph of Venice, in E. long. 13. 5. N. lat. 44. 16.

CERVICAL NERVES, are feven pair of nerves, fo called, as having their origin in the *cervix*, or neck.

CERVICAL *Veffels*, among anatomifts, denote the arteries, veins, &c. which pafs through the *vertebræ* and mufcles of the neck up to the fkull.

CERVIX, in anatomy, properly denotes the hind part of the neck; as contradiftinguifhed from the forepart, which is called *jugulum*, or the throat.

CERVIX of the *Scapula*, denotes the head of the fhoulder-blade, or that upper procefs whofe *finus* receives the head of the *humerus*.

CERVIX *Uteri*, the *neck* of the *uterus*; or that part of the *uterus* immediately above or beyond the *os tincæ*. See ANATOMY.

CERUMEN, a thick, vifcous, bitter, excrementitious humour feparated from the blood by proper glands placed in the *meatus auditorius*, or outer paffage of the ear.

CERUSS, WHITE-LEAD, a calx of lead, made by expofing plates of that metal to the vapour of vinegar. Inftances of the very pernicious effect of this metal are too often feen among thofe perfons who work lead in any form, but particularly among the workers in white-lead, who regularly die off in fucceffion, and that pretty rapidly. The painters ufe cerufs in great quantities; and it is fometimes adulterated with common whiting. As a medicine *cerufs* is greatly laid afide on account of its pernicious effects on the human fyftem, and fo indeed, and very properly, are almoft all the other preparations of lead.

CERVUS, or DEER, in zoology, a genus of quadrupeds belonging to the order of pecora. See Plates 70. and 71. The horns are folid, brittle, covered with a hairy fkin, and growing from the top; they likewife fall off and are renewed annually. There are eight fore-teeth in the under jaw, and they have no dog-teeth. The fpecies of this genus enumerated by Linnæus are feven, viz.

1. The *Camelopardalis*, or giraffe, with fimple or unbranched horns, ftraight, about fix inches long, covered with hair, and truncated at the end, and tufted; in the forehead a tubercle, about two inches high, refembling a third horn. The fore legs are not much longer than the hind legs; but the fhoulders are of a vaft length, which gives the difproportionate height between the fore and hind parts: the head is like that of a ftag: the neck is flender and elegant, and on the upper fide is a fhort mane: the ears are large, tail long and with ftrong hairs at the end: the colour of the whole animal a dirty white, marked with large broad rufty fpots. This is an uncommon animal, few of them having ever been feen in Europe. It inhabits the forefts of Ethiopia, and other interior parts of Africa almoft as high as Senegal; but it is not found in Guinea, or any of the weftern parts; nor farther fouth than about lat. 28. 10. It is very timid, but not fwift; and has been reprefented as living only by browfing the trees, being unable, from the difproportionate length of its fore legs, to graze or feed from the ground. When it would leap, it lifts up its fore legs and then its hind, like a horfe whofe fore legs are tied. It runs very badly and aukwardly, and is very eafily taken. The lateft and beft defcription of this extraordinary quadruped is given in the 16th number of a work intitled, "A Defcription of the uncommon Animals and remarkable Productions in the Cabinet and *Menagerie* of his Serene Highnefs the Prince of Orange;" by M. Vofmaer.

The giraffe has always been celebrated for the gentlenefs of its difpofition. Antonius Conftantius, a writer of the 15th century, defcribes it as fo gentle, that it would eat bread, hay, or fruit, out of the hand of a child; and that, when led through the ftreet, it would take whatever food of this kind was offered to it by the fpectators at the windows, as it paffed along. This character is confirmed by Mr. Gordon, who relates, that a giraffe, which he had wounded, fuffered him to approach it as it lay on the ground, without offering to ftrike with its horns, or fhowing any inclination to revenge itfelf: he even ftroked it over its eyes feveral times, when it only clofed them without any figns of refentment. Its throat was afterwards cut for the fake of its fkin; and when in the pangs of death, it ftruck the ground with its feet with a force much exceeding that of any other animal, and thefe feem to be its principal means of defence. M. Vofmaer obferves, that both the male and female are furnifhed with horns, which, from their fize and form, feem intended merely for ornament: they appear to be excrefcences of the *os frontis*, and therefore are probably not deciduous. The notion of fome writers, that the giraffe cannot feed from the ground, is confuted by the teftimony of M. Vaillant, who afferts, that it can even drink from a river, the furface of which is lower than the bank on which it ftands. M. Vofmaer,

obferves, that this account is confirmed by confidering the ftructure of the neck, the vertebræ of which are connected with thofe of the back by a very ftrong ligament.

The giraffe here defcribed, which Mr. Gordon, who diffected it, fays was the largeft he had ever feen, was 15 feet 4 inches Rhinland meafure (about 15 feet 10 inches Englifh) from the ground to the top of its head; the length of the body, from the cheft to the rump, was 5 feet 7 inches Rhinland meafure. M. Vaillant afferts, that he has feen feveral which were at leaft 17 feet high; and M. Vofmaer declares, that he has been affured by fome very refpectable inhabitants of the Cape, that they had feen and killed giraffes, which, including the horns, were 22 Rhinland feet in height. The giraffe was known to the Romans in early times. It appears among the figures in the affemblage of eaftern animals on the celebrated Prænestine Pavement, made by the direction of Sylla; and is reprefented both grazing and browfing, in its natural attitudes. It was exhibited at Rome by the popular Cæfar, among other animals in the Circæan games.

2. The *Alces*, Elk, or Moofe Deer, has palmated horns, without any proper ftem, and a flefhy protuberance on the throat. The neck is much fhorter than the head, with a fhort, thick, upright mane, of a light-brown colour. The eyes are fmall; the ears a foot long, very broad and flouching; noftrils very large; the upper lip fquare, hangs greatly over the lower, and has a deep fulcus in the middle, fo as to appear almoft bifid. This is the bulkieft animal of the deer kind, being fometimes 17 hands high, and weighing above 1200 pounds. The female is lefs than the male, and wants horns. The elks inhabit the ifle of Cape Breton, Nova Scotia, and the weftern fide of the bay of Fundy; Canada, and the country round the great lakes, almoft as far fouth as the river Ohio. Thefe are its prefent northern and fouthern limits. In all ages it affected the cold and woody regions in Europe, Afia, and America. They are found in all the woody tracts of the temperate parts of Ruffia, but not on the Arctic flats, nor yet in Kamtfchatka. In Siberia they are of a monftrous fize, particularly among the mountains. The elk and the moofe, according to Mr. Pennant, are the fame fpecies; the laft derived from *mufu;* which in the Algonkin language fignifies that animal. The Englifh ufed to call it the black moofe, to diftinguifh it from the ftag, which they named the grey moofe. The French call it *l'orignal.*

Thefe animals refide amidft forefts, for the convenience of browfing the boughs of trees, becaufe they are prevented from grazing with any kind of eafe, by the fhortnefs of their necks and length of their legs. They often have recourfe to water-plants, which they can readily get at by wading. M. Sarrafin fays, that they are very fond of the anagyris fœtida, or ftinking bean trefoil, and will uncover the fnow with their feet in order to get at it. In paffing through the woods, they raife their heads to an horizontal pofition, to prevent their horns from being entangled in the branches. They have a fingular gait: their pace is a fhambling trot, but they go with great fwiftnefs. In their common walk they lift their feet very high, and will without any difficulty ftep over a gate five feet high. They feed principally in the night. If they graze, it is always againft an afcent; an advantage they ufe for the reafon above affigned. They ruminate like the ox. They go to rut in autumn; are at that time very furious, feeking the female by fwimming from ifle to ifle. They bring two young at a birth, in the month of April, which follow the dam a whole year. During the fummer they keep in families. In deep fnows they collect in numbers in the forefts of pines, for protection from the inclemency of the weather under the fhelter of thofe evergreens. They are very inoffenfive, except in the rutting feafon; or except they are wounded, when they will turn on the affailant, and attack him with their horns, or trample him to death beneath their great hoofs. The flefh of the moofe is extremely fweet and nourifhing. The Indians fay, that they can travel three times farther after a meal of moofe, than after any other animal food. The tongues are excellent; but the nofe is perfect marrow, and efteemed the greateft delicacy in Canada. The fkin makes excellent buff, being ftrong, foft, and light. The Indians drefs the hide, and, after foaking it for fome time, ftretch and render it fupple by a lather of the brains in hot water. They not only make their fnow-fhoes of the fkin, but after a chafe form the canoes with it; they few the fkins neatly together, cover the feams with an unctuous earth, and embark in them with their fpoils to return home. The hair on the neck, withers, and hams of a full-grown elk, is of much ufe in making mattraffes and faddles; being by its great length well adapted for thofe purpofes. The palmated parts of the horns are farther excavated by the favages, and converted into ladles, which will hold a pint. The elk was known to the Romans by the name of *Alce* and *Machlis:* they believed that it had no joints in its legs; and, from the great fize of the upper lip, imagined it could not feed without going backward as it grazed.

3. The *Elephus*, or Stag, with long cylindrical ramified horns bent backwards, and flender fharp brow antlers. The colour is generally a reddifh brown, with fome black about the face, and a black lift down the hind part of the neck and between the fhoulders. Stags are common to Europe, Barbary, the north of Afia, and America. In fpring, they fhed their horns, which fall off fpontaneoufly, or by rubbing them gently againft the branches of trees. It is feldom that both horns fall off at the fame time, the one generally preceding the other a day or two. The old ftags caft their horns firft, which happens about the end of February or beginning of March, but young ones not till fome time in May; though in this there is great variety, owing to the greater or lefs feverity of the preceding winter, and other caufes. As foon as their horns have acquired their full fize and folidity, the ftags rub them againft the trees, in order to polifh and clear them of a fkin with which they are covered; and it is at this time that they begin to feel the impreffions of love. Towards the end of Auguft they fearch for the hinds. They cry aloud; the neck and throat fwell: becoming reftlefs, they run about till they find the females, whom they purfue and compel into compliance. The old hinds likewife come in feafon before the younger. When two ftags approach the fame hind, they fight, and the combat never terminates but in the defeat or flight of one of the rivals. The hinds, however, prefer the old ftags, not becaufe they are moft courageous, but becaufe they are much more ardent. As the males pafs from one to another with great eagernefs, and take little food, they become perfectly exhaufted; and hence, at the end of the rutting feafon, are fo meagre, that they do not recover their ftrength for fome time. The rutting feafon of old ftags commences about the beginning, and ends about the 20th of September. Thofe of fix or feven years old, begin about the 10th of September, and conclude in the beginning of October. Young ftags begin about the 15th of October; and at the end of October, the rutting is over, except among the *prickets*, or thofe that have entered into their fecond year; becaufe they, like the young hinds, are lateft of coming into feafon. Hence, at the beginning of November, the feafon of love is entirely over; and the ftags, during this period of weaknefs and laffitude, are eafily hunted down. However, in feafons when acorns and other nuts are plentiful, the ftags foon recover their ftrength, and a fecond rutting frequently happens at the end of October; but it is of much fhorter duration than the firft. In warmer climates, the rutting feafon is more forward. Ariftotle informs us, that in Greece, it commences in the beginning of Auguft, and terminates about the end of September. The hind, after going with young eight months and fome days, produces a fawn in May or the begin-

ning of June. But the young are not called *fawns* or *calves* after the fixth month: the knobs of their horns then begin to appear, and they take the name of *knobbers* till their horns lengthen into *fpears*, and then they are called *brocks* or *ftaggards*. During the firft feafon, they never leave their mothers. In winter, the ftags and hinds, of all ages, keep together in flocks, which are always more numerous in proportion to the rigour of the feafon. They feparate in fpring: the hinds retire to bring forth; and, during this period, the flocks confift only of knobbers and young ftags. In general, the ftags are inclined to affociate, and nothing but fear or neceffity obliges them to difperfe. The life of the ftag is fpent in alternate plenty and want, vigour and debility, health and ficknefs, without having any change introduced into his conftitution by thefe oppofite extremes. He lives as long as other animals which are not fubjected to fuch viciffitudes. As he grows five or fix years, he lives feven times that number, or from 35 to 40 years. What has been reported concerning the longevity of the ftag merits no credit.

The ftag appears to have a fine eye, an acute fmell, and an excellent ear. He is a fimple, and yet a curious and crafty animal. When hiffed or called to from a diftance, he ftops fhort, and looks ftedfaftly, and with a kind of admiration, at carriages, cattle, or men; and if they have neither arms nor dogs, he moves on unconcernedly, and without flying. He appears to liften, with great tranquillity and delight, to the fhepherd's pipe; and the hunters fometimes employ this artifice to encourage and deceive him. In general, he is lefs afraid of men than of dogs, and is never fufpicious, or ufes any arts of concealment, but in proportion to the difturbances he has received. He eats flow, and has a choice in his aliment; and after his ftomach is full, he lies down, and ruminates at leifure. He feems to ruminate with lefs facility than the ox. It is only by violent fhakes or hiccups that the ftag can make the food rife from his firft ftomach, owing to the length and direction of the paffage through which the aliment paffes. The neck of the ox is fhort and ftraight, but that of the ftag is long and arched; and therefore greater efforts are neceffary to raife the food. Thefe efforts are made by a kind of hiccup, the movement of which is apparent, and continues during the time of rumination. His voice is ftronger, and more quivering, in proportion as he advances in years. The voice of the hind is fhorter and more feeble. She never bellows from love, but from fear. The ftag, during the rutting feafon, bellows in a frightful manner: he is then fo tranfported, that nothing difturbs or terrifies him. He is therefore eafily furprifed: being loaded with fat, he cannot keep long before the dogs. But he is dangerous when at bay, and attacks the dogs with a fpecies of fury. He drinks none in winter nor in fpring, the dews and tender herbage being then fufficient to extinguifh his thirft; but, during the parching heats of fummer, to obtain drink, he frequents the brooks, the marfhes, and the fountains; and in the feafon of love, he is fo over-heated, that he fearches every where for water, not only to fatisfy his immoderate thirft, but to bathe and refrefh his body. He then fwims eafier than at other times when his fat proves an incumbrance; and he has even been obferved croffing very large rivers. It has alfo been alleged, that, attracted by the odour of the hinds, the ftags, in the rutting feafon, throw themfelves into the fea, and pafs from one ifland to another at the diftance of feveral leagues. But the ftag leaps ftill more nimbly than he fwims; for, when purfued, he can eafily clear a hedge or a pale fence of fix feet in height. Their food varies in different feafons, but in fummer, when they have great choice, they prefer rye to all other grain, and the black berry-bearing alder to all other wood. The flefh of the fawn is very good: that of the hind and knobber not abfolutely bad; but that of the ftag has always a ftrong and difagreeable tafte. The moft ufeful parts of this animal are, the fkin, which makes a pliable and very durable leather; and the horns, which are ufed by cutlers for knife-handles, &c. In England the ftag is become lefs common than formerly; its exceffive vicioufnefs during the rutting feafon, and the badnefs of its flefh, induce moft people to part with the fpecies. In the Highlands of Scotland, ftags are ftill found in herds of four or five hundred together, ranging wild over the vaft hills of the north. Formerly the chieftains ufed to hunt them with the magnificence of eaftern monarchs, affembling four or five thoufand of their clan, who drove the deer into the toils or to the ftations the lairds had placed themfelves in: but as this pretence was frequently ufed to collect their vaffals for rebellious purpofes, an act was paffed prohibiting any affemblies of this nature. Stags are likewife met with on the moors that border on Cornwall and Devonfhire; and in Ireland on the mountains of Kerry, where they add greatly to the magnificence of the romantic fcenery in the lake of Killarny. The ftags of Ireland during its uncultivated ftate, and while it remained an almoft boundlefs tract of foreft, had an exact agreement in habit with thofe that range at prefent through the wilds of America. They were lefs in body, but very fat; and their horns of a fize far fuperior to thofe of Europe, but of a form fimilar in all refpects.

The chace of the ftag has become an art, and requires a fpecies of knowledge which can only be learned by experience. It implies an affemblage of men, horfes, and dogs, all fo trained, that their movements muft concur in producing one common end. The huntfman fhould know the age and the fex of the animal; he fhould be able to diftinguifh with precifion, whether the ftag he has harboured with his hound be a knobber, a young ftag, in his fixth or feventh year, or an old ftag. The chief marks which convey this intelligence are derived from the foot, and the excrement. The latter of thefe requires, perhaps, greater experience than the knowledge of the foot; but without it the huntfman would be unable to give a proper report to the company. After the report of the huntfman, and the dogs are led to the refuge of the ftag, he ought to encourage his hound, and make him reft upon the track of the ftag, till the animal be unharboured. Inftantly the alarm is given to uncouple the dogs, which ought to be enlivened by the voice and the horn of the huntfman. He fhould alfo diligently obferve the foot of the ftag, in order to difcover whether the animal has ftarted, and fubftituted another in his place. But it is then the bufinefs of the hunters to feparate alfo, and to recal the dogs which have gone aftray after falfe game. The huntfman fhould always accompany his dogs, and encourage, without preffing them too hard. He fhould affift them in detecting all the arts of efcape ufed by the ftag; for this animal has remarkable addrefs in deceiving the dogs. With this view, he often returns twice or thrice upon his former fteps; he endeavours to raife hinds or younger ftags to accompany him, and draw off the dogs from the object of their purfuit: he then flies with redoubled fpeed, or fprings off at fide, lies down on his belly, and conceals himfelf. In this cafe, when the dogs have loft his foot, the huntfmen, by going backwards and forwards, affift them in recovering it. But if they cannot find it, they fuppofe that he is refting within the circuit they have made, and go in queft of him. But if they are ftill unable to difcover him, there is no other method left, but, from viewing the country, to conjecture where he may have taken refuge, and repair to the place. As foon as they have recovered his foot, and put the dogs upon the track, they purfue with more advantage, becaufe they perceive that the ftag is fatigued. He has now no other refource but to fly from the earth which he treads, and get into the waters, in order to cut off the fcent from the dogs. The huntfmen go round thefe waters, and again put the dogs on the track of his foot. The ftag, after taking to the water, is incapable

of running far, and is foon at bay. But he ftill attempts to defend his life, and often wounds the dogs, and even the huntfmen when too forward, by blows with his horns, till one of them cuts his hams to make him fall, and then puts an end to his life by a blow of a hanger. They now celebrate the death of the ftag by a flourifh of their horns; the dogs are allowed to trample upon him, and at laft partake richly of the victory by devouring his flefh.

4. The *Tarandus*, or Rein-deer, is a native of Lapland, and the northern parts of Europe, Afia, and America. The horns are large, cylindrical, branched, and palmated at the tops. Two of the branches hang over the face. He is about the fize of a buck, of a dirty whitifh colour; the hairs of his fkin are thick and ftrong. To the Laplanders this animal is the fubftitute of the horfe, the cow, the goat, and the fheep; and is their only wealth: the milk affords them cheefe; the flefh, food; the fkin, cloathing; the tendons, bow-ftrings; and when fplit, thread; the horns, glue; the bones, fpoons. During the winter it fupplies the want of a horfe, and draws their fledges with amazing fwiftnefs over the frozen lakes and rivers, or over the fnow, which at that time covers the whole country. A rich Laplander is poffeffed of a herd of 1000 rein deer. In autumn they feek the higheft hills, to avoid the Lapland gad-fly, which at that time depofits its eggs in their fkin: it is the peft of thefe animals, and numbers die that are thus vifited. The moment a fingle fly appears, the whole herd inftantly perceive it; they fling up their heads, tofs about their horns, and at once attempt to fly for fhelter amidft the fnows of the loftieft Alps. In fummer they feed on feveral plants; but during winter on the rein-liverwort, to get at which, as it lies far beneath the fnow, they dig with their feet and palmated brow antlers.

The Samoieds, lefs intelligent than the Laplanders, confider them in no other view than as animals of draught, to convey them to the chafe of the wild reins; which they kill for the fake of their fkins. The Korcki, a nation of Kamtfchatka, may alfo, in this refpect, be placed on a level with the Samoieds: they train them to the fledge, but neglect them for every domeftic purpofe. Their hiftorian fays, they couple two to each carriage; and that the deer will travel 150 verfts in a day, that is, 112 Englifh miles. They caftrate the males by piercing the fpermatic arteries, and tying the fcrotum tight with a thong. The favage Efkimaux and Greenlanders, who poffefs amidft their fnows thefe beautiful animals, neglect not only their domeftic ufes, but even are ignorant of their advantage in the fledge. The flefh of the rein is the moft coveted part of their food; they eat it raw, dreffed, and dried and fmoked with the fnow lichen; and the wearied hunters will drink the raw blood. The Greenlanders, before they acquired the knowledge of the gun, caught them by what was called the *clapper-hunt*. The women and children furrounded a large fpace, and, where people were wanting, fet up poles capped with a turf in certain intervals, to terrify the animals; they then, with a great noife, drove the reins into the narrow defiles, where the men lay in wait and killed them with harpoons or darts; but they are now become very fcarce.

The rein-deers are found in the neighbourhood of Hudfon's Bay, in moft amazing numbers; columns of eight or ten thoufand are feen annually paffing from north to fouth in the months of March and April, driven out of the woods by the mufketoes, feeking refrefhment on the fhore, and a quiet place to drop their young. They go to rut in September, and the males foon after fhed their horns; they are at that feafon very fat, but fo rank and mufky as not to be eatable. The females drop their young in June, in the moft fequeftered fpots they can find; and then they likewife lofe their horns. In autumn the deer with the fawns remigrate northward. The Indians are very attentive to their motions; for the rein forms the chief part not only of their drefs but of their food. They often kill multitudes for the fake of their tongues only; but generally they feparate the flefh from the bones, and preferve it by drying it in the fmoke; they alfo fave the fat, and fell it to the Englifh in bladders, who ufe it in frying inftead of butter. The fkins are alfo an article of commerce, and ufed in London by the breeches-makers.

5. The *Dama*, or Fallow-deer, buck and doe; with horns branched, compreffed, and palmated at the top. The colour is various; reddifh, deep brown, white, or fpotted. This fpecies is not fo univerfal as the ftag: though rare in France and Germany, it is found in Greece, the Holy Land, and the north of China. They are very numerous in England; but, except on a few chafes, confined in parks: none exifted originally in America. They are eafily tamed; and their flefh, which goes by the name of venifon, is in high efteem among the luxurious. During rutting time they will contend with each other for their miftrefs, but are lefs fierce than the ftag; during that feafon, the male will form a hole in the ground, make the female lie down in it, and then often walk round and fmell at her. Mr. White has obferved that the head of a fallow-deer is furnifhed with two *fpiracula*, or breathing-places, befide the noftrils. This curious contrivance muft be of fingular fervice to beafts of chafe, by affording them a free refpiration; and no doubt thefe additional noftrils are thrown open when they are hard run. Mr. Pennant has obferved the fame curious organization in the antelope. See CAPRA.

6. The *Capreolus*, or Roe-buck, has erect, cylindrical, branched horns, and forked at the top. His fize is only three feet nine inches long, two feet three inches high before, and two feet feven inches high behind: weight from 50 to 60lb. Though the leaft of the deer kind, his figure is moft elegant and handfome. His eyes are more brilliant and animated than thofe of the ftag. His limbs are more nimble, his movements quicker, and he bounds, feemingly without effort, with equal vigour and agility. His coat or hair is always clean, fmooth, and gloffy. He never wallows in the mire, like the ftag. He delights in dry and elevated fituations, where the air is pureft. He is likewife more crafty, conceals himfelf with greater addrefs, is more difficult to trace, and derives fuperior refources from inftinct: for though he has the misfortune to leave behind him a ftronger fcent than the ftag, which redoubles the ardour and appetite of the dogs, he knows how to withdraw himfelf from their purfuit, by the rapidity with which he begins his flight, and by his numerous doublings. He delays not his arts of defence till his ftrength fails him; but, as foon as he finds that the firft efforts of a rapid chafe have been unfuccefsful, he repeatedly returns on his former fteps; and after confounding, by thefe oppofite movements, the direction he has taken; after intermixing the prefent with the paft emanations from his body, he rifes from the earth by a great bound, and, retiring to a fide, he lies down flat on his belly; and in this immoveable fituation, he allows the whole troop of his deceived enemies to pafs very near him.

The roe-deer differs from the ftag and fallow-deer in difpofition, temperament, manners, and almoft every natural habit. Inftead of affociating in herds, they live in feparate families. The father, mother, and young, go together, and never mix with ftrangers. They are conftant in their amours, and never unfaithful like the ftag. Though always together, they feel the ardour of the rut but once a year, and it continues only fifteen days, commencing at the end of October. During this period, they do not fuffer their fawns to remain with them, but after the rutting feafon is paft, thefe return to their mother, and remain with her fome time; after which they feparate for ever, and remove to a diftance. The female goes with young five months and a half, and brings forth about the end of April,

producing two at a time, which ſhe is very careful to conceal; though in ſpite of her vigilance, the young are ſometimes carried off by men, dogs, or wolves.

Roe-bucks prefer a mountainous woody country to a plain one. They were formerly very common in Wales, in the north of England, and in Scotland; but at preſent the ſpecies no where exiſts in Great Britain except in the Scottiſh highlands. They are unknown in Ireland. Wild roes, during ſummer, feed on graſs; and are very fond of the *rubus ſaxatilis*, called in the Highlands the roe-buck berry; but in the winter time, when the ground is covered with ſnow, they browſe on the tender branches of the fir and birch.

7. The *Guineenſis*, about the ſize of a cat, is of a greyiſh colour, and black underneath. It is a native of Guinea, and the ſize and figure of its horns have not been hitherto deſcribed with any preciſion.

8. The *Axis*, or Speckled-deer, has ſlender and trifurcated horns; the firſt branch near the baſe, the ſecond near the top, each pointing upwards. This ſpecies is about the ſize of the fallow-deer; of a light red colour; the body beautifully marked with white ſpots; along the lower part of the ſides, next the belly, is a line of white; the tail long, as that of a fallow-deer; red above, white beneath. They are common on the banks of the Ganges, and in the iſle of Ceylon. They are very tame, and have the ſenſe of ſmelling in an exquiſite degree. They readily eat bread, but will refuſe a piece that has been breathed on: many other animals of this, the antelope, and goat kind, will do the ſame.

9. The *Porcine* or Hog-deer, has ſlender trifurcated horns, 13 inches long: his body is thick and clumſy; his legs are fine and ſlender: the upper part of the neck, body, and ſides, are brown; belly and rump of a lighter colour. They are found in Bengal; and called, from the thickneſs of their body, *hog-deer*. The ſame ſpecies is alſo found in Borneo.

10. The *Virginiana*, or Virginian-deer, has ſlender horns, bending very much forward; numerous branches on the interior ſides; no brow antlers. It is about the ſize of the Engliſh fallow-deer; of a light colour, cinereous brown; a quite diſtinct ſpecies, and peculiar to America. It inhabits all the provinces ſouth of Canada, but in greateſt abundance in the ſouthern; but eſpecially the vaſt ſavannas contiguous to the Miſſiſippi, and the great rivers which flow into it. They graze in herds innumerable, along with the ſtags and buffaloes. This ſpecies probably extends to Guiana, and is the *baieu* of that country, which is ſaid to be about the ſize of an European buck, with ſhort horns, bending at their ends. They are capable of being made tame: and when properly trained, are uſed by the Indians to decoy the wild deer (eſpecially in the rutting ſeaſon) within ſhot. Both bucks and does herd from September to March; after which they ſeparate, and the does ſecrete themſelves to bring forth, and are found with difficulty. The bucks from this time keep ſeparate till the amorous ſeaſon of September revolves. The deer begin to feed as ſoon as night begins; and ſometimes, in the rainy ſeaſon, in the day; otherwiſe they ſeldom or never quit their haunts. An old American ſportſman has remarked, that the bucks will keep in the thickets for a year, or even two.

Theſe and other clover-footed quadrupeds of America are very fond of ſalt, and reſort eagerly to the places impregnated with it. They are always ſeen in great numbers in the ſpots where the ground has been torn by torrents or other accidents, where they are ſeen licking the earth. Such ſpots are called *licking-places*. The huntſmen are ſure of finding the game there; for notwithſtanding they are often diſturbed, the buffaloes and deer are ſo paſſionately fond of the ſavoury regale, as to bid defiance to all danger, and return in droves to thoſe favourite haunts.

The deer are of the firſt importance to the ſavages. The ſkins form the greateſt branch of their traffic, by which they procure from the coloniſts, by way of exchange, many of the articles of life. Hunting indeed is more than an amuſement to theſe people. They give themſelves up to it not only for the ſake of ſubſiſtence, but to fit themſelves for war, by habituating themſelves to fatigue. A good huntſman is an able warrior. The chaſe is carried on in different ways. Some ſurprize the deer by uſing the ſtale of the head, horns, and hide; but the general method is performed by the whole body. Several hundreds diſperſe in a line, encompaſſing a vaſt ſpace of country, fire the woods, and drive the animals into ſome ſtrait or peninſula, where they become an eaſy prey. The deer alone are not the object; foxes, raccoons, bears, and all beaſts of fur, are thought worthy of attention, and form articles of commerce with the Europeans.

The number of deer deſtroyed in ſome parts of America is incredible: the tongues only are preſerved, and the carcaſes left a prey to wild beaſts. But the motive is much more political than is imagined. The ſavages well know, that ſhould they overſtock the market, they would certainly be over-reached by the European dealers, who take care never to produce more goods than are barely ſufficient for the demand of the ſeaſon, eſtabliſhing their prices according to the quantity of furs brought by the natives.

CERVUS *Volans*, in natural hiſtory, a name given by authors to the ſtag-fly, or horned beetle, a very large ſpecies of beetle with horns ſloped, and ſomething like thoſe of the ſtag.

CERYX, in antiquity. The ceryces were a ſort of public criers appointed to proclaim or publiſh things aloud in aſſemblies. The *ceryx* among the Greeks anſwered to the *præco* among the Romans. Our criers have only a ſmall part of their office and authority. There were two kinds of ceryces, *civil*, and *ſacred*. The former were thoſe appointed to call aſſemblies, and make ſilence therein; alſo to go on meſſages, and do the office of our heralds, &c. The ſacred ceryces were a ſort of prieſts, whoſe office was to proclaim ſilence in the public games and ſacrifices, publiſh the names of the conquerors, proclaim feaſts, and the like. The prieſthood of the ceryces was annexed to a particular family, the deſcendants of Ceryx, ſon of Eumolphus. To them it alſo belonged to lead ſolemn victims to ſlaughter. Before the ceremonies began, they called ſilence in the aſſembly, by the formula, Ευφημειτε σιγη πας εξω κεως; anſwering to the *favete linguis* of the Romans. When the ſervice was over, they diſmiſſed the people with this formula, Δεων αφεσις, *Ite miſſa eſt.*

CESARE, among logicians, one of the modes of the ſecond figure of ſyllogiſms; the minor propoſition of which is an univerſal affirmative, and the other two univerſal negatives: thus,

> CE *No immoral books ought to be read;*
> SA *But every obſcene book is immoral;*
> RE *Therefore no obſcene books ought to be read.*

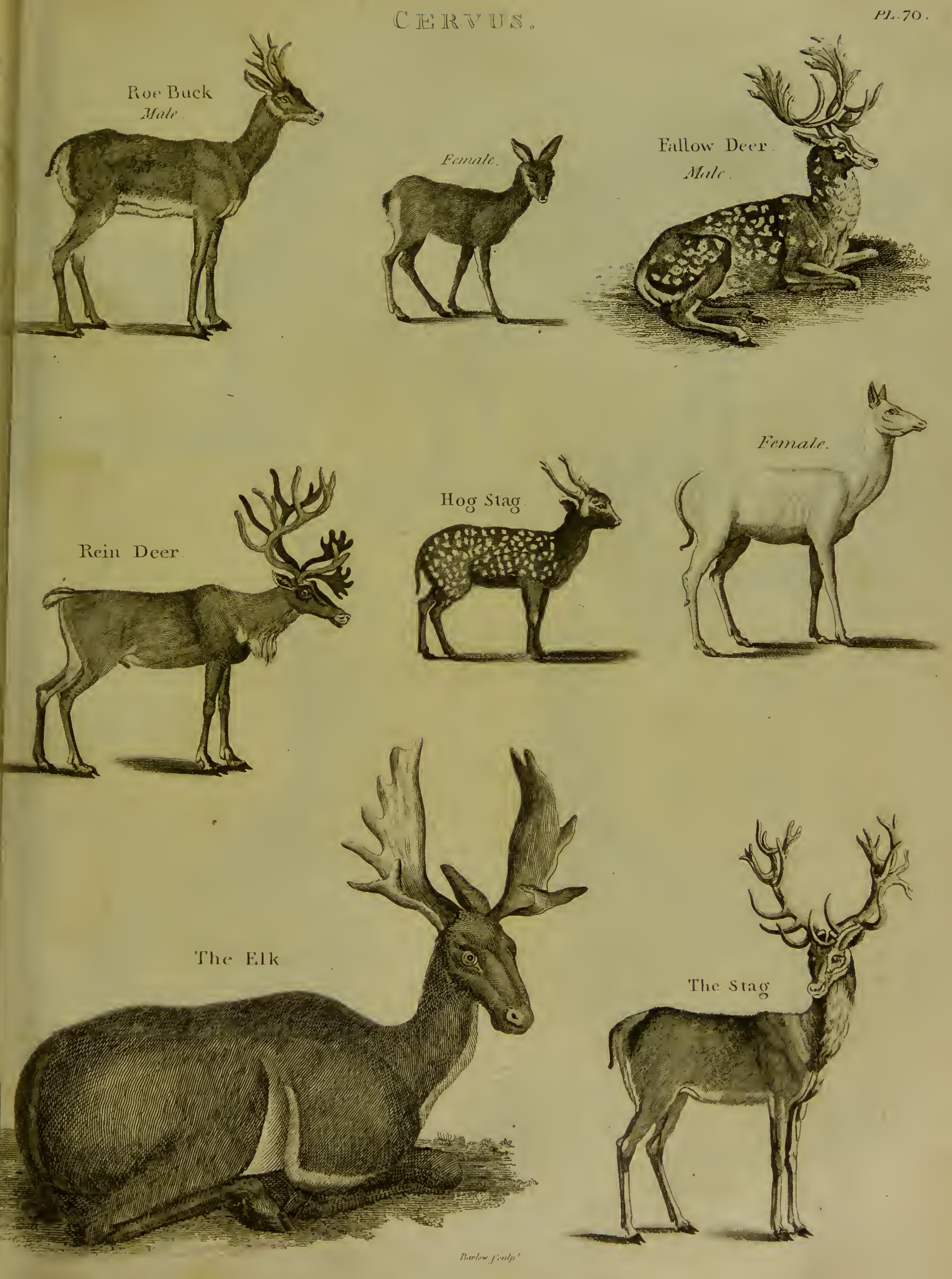
CECENA, a town of Romagna in Italy, with a biſhop's ſee, ſubject to the pope, and ſeated on the river Savio, in E. long. 12. 46. N. lat. 44. 8.

CESPITOSÆ PLANTÆ, from *ceſpes* turf or ſod, are thoſe plants which produce many ſtems from one root, and thence form a cloſe thick carpet on the ſurface of the earth.

CESPITOSÆ *Paludes*, turf bogs.

CESSATION, the act of intermitting, diſcontinuing or interrupting the courſe of any thing, work, action, or the like.

CESSATION *of Arms*, an armiſtice or occaſional truce. See TRUCE. When the commander of a place finds things reduced to an extremity, ſo that he muſt either ſurrender, or ſacrifice the garriſon and inhabitants to the mercy of the enemy, he plants


CERVUS.
Roe Buck
Male.
Female.
Fallow Deer.
Male.
Female.
Hog Stag.
Rein Deer.
The Elk
The Stag
Barlow sculp.


CERVUS.
Axis.
Moofe Deer.
Curculio.
Culex.
Male.
Female.
Camelopardalis.
Barlow sculp.

a white flag on the breach, or beats the chamade; on which a ceſſation of arms and hoſtilities commences, to give time for a capitulation.

CESSION, in law, an act by which a perſon ſurrenders and tranſmits to another perſon a right which belonged to himſelf. Ceſſion is more particularly uſed in the civil law for a voluntary ſurrender of a perſon's effects to his creditors, to avoid impriſonment. See the article BANKRUPT. In ſeveral places the ceſſion carried with it a mark of infamy, and obliged the perſon to wear a green cap or bonnet; at Lucca, an orange one: to neglect this was to forfeit the privileges of the *ceſſion*. This was originally intended to ſignify that the ceſſionary was become poor through his own folly. The Italian lawyers deſcribe the ceremony of ceſſion to conſiſt in ſtriking the bare breech three times againſt a ſtone, called *Lapis Vituperii*, in preſence of the judge. Formerly it conſiſted in giving up the girdles and keys in court: the ancients uſing to carry at their girdles the chief utenſils wherewith they got their living; as the ſcrivener his eſcritoire, the merchant his bag, &c. The form of ceſſion among the ancient Gauls and Romans was as follows: The ceſſionary gathered up the duſt in his left hand from the four corners of the houſe, and ſtanding on the threſhold, holding the door-poſt in his right hand, threw the duſt back over his ſhoulders; then ſtripping to his ſhirt, and quitting his girdle and bags, he jumped with a pole over a hedge; hereby letting the world know that he had nothing left, and that when he jumped, all that he was worth was in the air with him. This was the ceſſion in criminal matters. In civil caſes, it was ſufficient to lay a broom, a ſwitch, or a broken ſtraw, on the threſhold: this was called *chrenecruda per durpillum et feſtucam*.

CESSION, in the eccleſiaſtical law, is when an eccleſiaſtical perſon is created a biſhop, or when a parſon of a pariſh takes another benefice, without diſpenſation, or being otherwiſe qualified. In both theſe caſes their firſt benefices became void by ceſſion, without any reſignation; and to thoſe livings that the perſon had, who was created biſhop, the king may preſent for that time, whoſoever is patron of them; and in the other caſe the patron may preſent: but by diſpenſation of a retainder, a biſhop may retain ſome or all the preferments he was entitled to before he was made biſhop.

CESTRUM, BASTARD JASMINE; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 28th order, *Luridæ*. The corolla is funnel-ſhaped; the ſtamina each ſending out a little tooth about the middle of the inſide. There are ſix ſpecies, all of them natives of the warmeſt parts of America; ſo cannot be preſerved in this country without artificial heat. They are flowering ſhrubs, riſing in height from five to twelve feet, with flowers of a white, herbaceous, or pale yellow colour. The flowers of one ſpecies, commonly called *Badmington Jaſmine*, have the property of ſending out a ſtrong ſcent after ſun-ſet. They may be propagated either by ſeeds or cuttings.

CESTUI, a French word, ſignifying *he* or *him*, frequently uſed in the Engliſh law writings. Thus, *Ceſtui qui truſt*, a perſon who has lands, &c. committed to him for the benefit of another; and if ſuch perſon does not perform his truſt, he is compellable to it in chancery. *Ceſtui qui vie*, one for whoſe life any lands, &c. are granted. *Ceſtui qui uſe*, a perſon to whoſe uſe any one is infeoffed of lands or tenements. Formerly the feoffees to uſes were deemed owners of the land, but now the poſſeſſion is adjudged in *ceſtui qui uſe*.

CESTUS, among ancient poets, a fine embroidered girdle ſaid to be worn by Venus, to which Homer aſcribes the power of charming and conciliating love. The word is alſo written *ceſtum* and *ceſton*: it comes from κεστὸς, *a girdle*, or other thing embroidered or wrought with a needle; derived, according to Servius, from κεντεῖν, *pungere*; whence alſo *inceſtus*, a term uſed at firſt for any indecency by undoing the girdle, &c. but now reſtrained to cohabitation between perſons near a-kin. See INCEST.

CETACEOUS, an appellation given to the fiſhes of the whale kind, the characters of which are: they have no gills; there is an orifice on the top of the head, through which they breathe and eject water; and they have a flat horizontal tail. Nature on this tribe hath beſtowed an internal ſtructure in all reſpects agreeing with that of quadrupeds; and in a few others the external parts in both are ſimilar. Cetaceous fiſh, like land animals, breathe by means of lungs, being deſtitute of gills. This obliges them to riſe frequently on the ſurface of the water to reſpire, to ſleep on the ſurface, as well as to perform ſeveral other functions. They have the power of uttering ſounds, ſuch as bellowing and making other noiſes denied to genuine fiſh. Like land animals they have warm blood, are furniſhed with organs of generation, copulate, bring forth, and ſuckle their young, ſhowing a ſtrong attachment to them. Their bodies beneath the ſkin are entirely ſurrounded with a thick layer of fat (blubber), analogous to the lard on hogs. The number of their fins never exceeds three, viz. two pectoral fins, and one back fin; but in ſome ſpecies the laſt is wanting. Their tails are placed horizontally, or flat in reſpect to their bodies; contrary to the direction of thoſe of all other fiſh, which have them in a perpendicular ſite. This ſituation of the tail enables them to force themſelves ſuddenly to the ſurface of the water to breathe, which they are ſo frequently conſtrained to do. Many of theſe circumſtances induced Linnæus to place this tribe among his *mammalia*, or what other writers call *quadrupeds*. To have preſerved the chain of beings entire, he ſhould in this caſe have made the genus of *phocæ* or *ſeals*, and that of the *trichecus* or *manati*, immediately precede the whale, thoſe being the links that connect the mammalia or quadrupeds with the fiſh: for the ſeal is, in reſpect to its legs, the moſt imperfect of the former claſs; and in the manati the hind feet coaleſce, aſſuming the form of a broad horizontal tail. Notwithſtanding the many parts and properties which cetaceous fiſh have in common with land animals, yet there ſtill remain others which render it more natural to place them, with Ray, in the rank of fiſh: the form of their bodies agrees with that of fiſh; they are entirely naked, or covered only with a ſmooth ſkin; they live conſtantly in the water, and have all the actions of fiſh.

CETE, the name of Linnæus's ſeventh order of mammalia, comprehending the MONODON, BALÆNA, PHYSETER, and DELPHINUS.

CETERACH, in botany, the trivial name of a ſpecies of ASPLENIUM.

CETTE, a ſea port of France, in the department of Herault and late province of Languedoc, ſeated at the place where the Royal Canal begins, between Montpellier and Agde, on the Mediterranean. E. long. 3. 47. N. lat. 43. 24.

CETUS, in aſtronomy, the whale; a large conſtellation of the ſouthern hemiſphere, under Piſces, and next the water of Aquarius. The ſtars in the conſtellation Cetus, in Ptolemy's catalogue, are 22; in Tycho's 21; in Hevelius's 45; in the Britannic catalogue 97. Cetus is repreſented by the poets, as the ſea-monſter which Neptune, at the ſuit of the nymphs, ſent to devour Andromeda for the pride of her mother, and which was killed by Perſeus. In the mandible of cetus is a variable ſtar which appears and diſappears periodically, paſſing through the ſeveral degrees of magnitude, both increaſing and diminiſhing, in about 333 days. See ASTRONOMY.

CEVA, a strong town of Piedmont in Italy, seated on the river Tanero, with a strong fort, in E. long. 8. 8. N. lat. 44. 20.

CEVENNES, mountains of France, in Languedoc, once remarkable for the meetings of the protestants, as a place of security against the tyranny of their governors. In queen Anne's reign, an attempt was made to assist them by an English fleet, but without success.

CEUTA, a maritime town of Barbary in Africa, and in the kingdom of Fez, seated on the straits of Gibraltar, opposite that place, in W. long. 6. 25. N. lat. 36. 35. John king of Portugal took it from the Moors in 1415, but now it belongs to Spain. In 1697, it sustained a vigorous siege by the Moors.

CEYLON, a large island in the Indian Ocean, 250 miles in length, and 195 in breadth. In general the air is very good; and though the country is full of mountains, there are fertile vallies: in some places the mountains are high and barren, being nothing but dreadful rocks without water. It is particularly remarkable for its plenty of cinnamon, which was all in the possession of the Dutch, who drove away the Portuguese. In some places there are rich mines, whence are got rubies, sapphires, topazes, and other stones of less value. In the kingdom of Candy are plenty of cardamoms, very large. The pepper here is so good, that it sells dearer than that of other places. Here is abundance of wood for all sorts of uses, and some proper for dying red. It abounds in corn, buffaloes, goats, hogs, deer, hares, dogs, jackals, monkies, tigers, and bears: they have a quadruped no bigger than a hare, which perfectly resembles a deer. Beside the buffalo there is another of the beeve-kind, which has a high back and white feet; but this is a great rarity. Their elephants are like those in other places, and they have some that are spotted, but very scarce. They have great variety of birds, some of which are not to be met with in other places. They have very dangerous serpents, and ants which do a great deal of mischief. The most remarkable tree in this island is the tallipot, one of whose leaves will cover ten men, and keep them from the rain: they are very light, and travellers carry them from place to place, and use them instead of tents. The inhabitants are divided into several tribes, from the nobleman to the maker of mats, and all the children follow the same business as their fathers: nor is it lawful to marry into any other tribe. They are Pagans; and though they acknowledge a supreme God, they worship none but the inferior sort, and among these they reckon the sun and moon. In their temples are images, well executed, though their figures are monstrous; some are of silver, copper, &c. The different sorts of gods have various priests, who have all some privileges. Their houses are small and low, with walls made of hurdles, smoothly covered with clay, and roofs, thatched. They have no chimnies, and their furniture is only a few earthen vessels, with two copper basons, and two or three stools; none but the king being allowed to sit in a chair. Their food is generally rice and salt, and their common drink is water, which they pour into their mouths out of a vessel like a teapot, through the spout, never touching it with their lips. There are some inscriptions on the rocks, which must be very ancient, for they are not understood by any of the present inhabitants. Before the late conquest of Ceylon by the British forces, the Dutch were possessed of all the principal places along the coast. E. long. from 80 to 82. N. lat. from 6 to 10.

CHACE. See CHASE.

CHACO, a large country of South America situated between 19° and 37° S. lat. It belongs to the Spaniards, by whom it was conquered in 1536. It is not naturally fruitful; but abounds in gold mines, which are so much the more valuable that they are easily worked. The works are carried on by about 8000 blacks, who deliver every day to their masters a certain quantity of gold; and what they can collect above this belongs to themselves; as well as what they find on those days that are consecrated to religion and rest, upon condition that, during the festival, they maintain themselves. This enables many of them to purchase their liberty; after which they intermarry with the Spaniards.

CHADCHOD, in Jewish antiquity. Ezekiel mentions *chadchod* among the several merchandizes which were brought to Tyre. The old interpreters, not very well knowing the meaning of this term, continued it in their translation. St. Jerom acknowledges that he could not discover the interpretation of it. The Chaldee interprets it pearls; others think that the onyx, ruby, carbuncle, crystal, or diamond, is meant by it.

CHÆROPHYLLUM, CHERVIL; a genus of the digynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The involucrum is reflexed-concave; the petals inflexed-cordate: the fruit oblong and smooth. There are seven species, two of which, called cow-weed and wild chervil, are weeds common in many places of Britain. The roots of the first have been found poisonous when used as parsnips: the rundles afford an indifferent yellow dye; the leaves and stalks a beautiful green. Its presence indicates a fertile and grateful soil. It ought to be rooted out from all pastures early in the spring, as no animal but the ass will eat it. It is one of the most early plants in shooting, so that by the beginning of April the leaves are near two feet high. The leaves have been thought aperient and diuretic.

CHÆTODON, in ichthyology, a genus of fishes belonging to the order of thoraci. The teeth are very numerous, thick, setaceous, and flexile; the rays of the gills are six. The back fin and the fin at the anus are fleshy and squamous. There are 23 species, distinguished from each other principally by the figure of the tail, and the number of spines in the back-fin. The most remarkable is the rostratus, or shooting fish, having a hollow, cylindrical beak. It is a native of the East Indies, where it frequents the sides of the sea and rivers in search of food; from its singular manner of obtaining which it receives its name. When it spies a fly sitting on the plants that grow in shallow water, it swims to the distance of four, five, or six feet; and then, with a surprising dexterity, it ejects out of its tubular mouth a single drop of water, which never fails striking the fly into the water, where it soon becomes its prey.

CHAFF, in husbandry, the husks of the corn, separated by screening or winnowing it. It signifies also the rind of corn, and straw cut small for the use of cattle.

CHAFF-*Cutter*, a machine for making chaff to feed horses. That invented by Mr. James Pike of Newton Abbot in Devonshire, is of the most simple and cheap construction. This engine is fixed on a wood frame, which is supported with four legs, and on this frame is a box for containing the straw, four feet six inches long and about ten inches broad; at one end are fixed across the box two rollers inlaid with iron, in a diagonal line about an eighth of an inch above the surface; on the ends of these rollers are fixed two strong brass wheels, which take one into the other. On one of these wheels is a contrect wheel, whose teeth take in a worm on a large arbour; on the end of this arbour is fixed a wooden wheel, two feet five inches diameter, and three inches thick; on the inner part of this wheel is fixed a knife, and at every revolution of the wheel the knife passes before the end of the box and cuts the chaff, which is brought forward between the rollers, which are about two inches and a

half afunder; the ftraw is brought on by the worm taking one tooth of the wheel every round of the knife; the ftraw being fo hard preffed between the rollers, the knife cuts off the chaff with fo great eafe, that twenty-two bufhels can be cut within the hour, and makes no more noife than is caufed by the knife paffing through the chaff. A, in plate 80, is the box into which the ftraw is put. B, the upper roller, with its diagonal projecting ribs of iron, the whole moving by the revolution of the brafs wheel C, on the axis of which it is fixed. D, a brafs wheel, having upon it a face wheel, whofe teeth take into the endlefs fcrew on the arbour E, while the teeth on the edge of this wheel enter between thofe on the edge of the wheel C. On the axis of the wheel D is a roller, with iron ribs fimilar to B, but hid within the box. E, the arbour, one of the ends of which being made fquare and paffing through a mortife in the centre of the wooden wheel F, is faftened by a ftrong fcrew and nut; the other end of this arbour moves round in a hole within the wooden block G. H, the knife, made faft by fcrews to the wooden wheel F, and kept at the diftance of nearly three quarters of an inch from it by means of a ftrip of wood of that thicknefs, of the form of the blade, and reaching to within an inch of the edge. I, the handle mortifed into the outfide of the wooden wheel F.

CHAFFER, in zoology, a fpecies of beetle. See SCARABÆUS.

CHAFFERCONNERS, in commerce, printed linens manufactured in the Great Mogul's dominions. They are imported by the way of Surat, and are of the number of thofe linens prohibited in France.

CHAFFERY, in the iron works, the name of one of the two principal forges. The other is called the *finery*. When the iron has been brought at the finery into what is called an ancony, or fquare mafs, hammered into a bar in its middle, but with its two ends rough, the bufinefs to be done at the chaffery is the reducing the whole to the fame fhape, by hammering down thefe rough ends to the fhape of the middle part.

CHAFFINCH, in ornithology, the Englifh name of a fpecies of FRINGILLA.

CHAGRE, a fort of America in the province of Darien, at the mouth of a river of the fame name. It has been taken feveral times by the buccaneers, and laft of all by admiral Vernon in 1740. W. long. 82. 7. N. lat. 9. 50.

CHAIN, *Catena*, a feries of feveral rings, or links, fitted into one another. Chains vary confiderably in their fize, form, and the materials of which they are made. Ports, rivers, &c. are occafionally clofed with iron chains; and rebellious cities are punifhed by taking away their chains and barriers. Before the new order of things in France, the arms of the kingdom of Navarre were *Chains Or, in a field Gules*. The caufe of this is referred to the kings of Spain having leagued againft the Moors; who having gained a celebrated victory againft them in 1212, in the diftribution of the fpoils, the magnificent tent of Miralmumin fell to the king of Navarre, as being the firft that broke and forced the chains thereof. *A gold* CHAIN is one of the badges of the dignity of chief magiftrate of a city, as the lord mayor of London, of Dublin, &c. Something like this obtained among the ancient Gauls; the principal ornament of their perfons in power and authority being a gold chain, which they wore on all occafions; and even in battle, to diftinguifh them from the common foldiers.

CHAIN alfo denotes a kind of ftring, ufually of twifted wire, ferving to hang watches, feals, and other toys upon. The invention of this is afcribed to the Englifh; whence, in foreign countries, it is denominated the *Englifh chain*. Some of thefe chains are of filver or gold, and fome of gilt copper; but the moft beautiful are of polifhed fteel, which are manufactured in great quantity, and to almoft any price, at Birmingham, Woodftock, and other places.

CHAIN is alfo a kind of meafure in France, in the trade of wood for fuel. There are chains for wood by tale, for wood by the rope, for faggots, for cleft wood, and for round fticks. There are alfo chains for meafuring the fheaves of all forts of corn, particularly with regard to the payment of tithes: for meafuring pottles of hay, and for meafuring horfes. All thefe are divided into feet, inches, hands, &c. according to the ufes they are defigned for.

CHAIN, in furveying, is a meafure, confifting of a certain number of links of iron wire, ufually a hundred; ferving to take the dimenfions of fields, &c. This is what Merfenne takes to be the arvipendium of the ancients. The chain is of various dimenfions, as the length or number of links varies: that commonly ufed in meafuring land, called Gunter's chain, is in length four poles or perches; or fixty-fix feet, or a hundred links; each link being feven inches $\frac{92}{100}$. Whence it is eafy to reduce any number of thofe links to feet, or any number of feet to links. This chain is entirely adapted to Englifh meafures; and its chief convenience is in finding readily the numbers contained in a given field. Where the proportions of fquare feet and acres differ, the chain, to have the fame advantages as Gunter's chain, muft alfo be varied. The chain ordinarily ufed for large diftances, is in length a hundred feet; each link one foot. For fmall parcels, as gardens, &c. is fometimes ufed a fmall chain of one pole, or fixteen feet and a half length; each link one inch $\frac{98}{100}$. Some in lieu of chains ufe ropes; but thefe are liable to feveral irregularities, both from the moifture they are apt to acquire, and the effect of force, which ftretches them.

CHAIN-*Pump*. See PUMP.

CHAIN-*Shot*, two balls with a chain between them. They are ufed at fea to bring down yards or mafts, and to cut the fhrouds or rigging of a fhip.

Top-CHAIN, on board a fhip, a chain to fling the fail-yards in time of battle, in order to prevent them from falling down when the ropes by which they are hung happen to be fhot away or rendered incapable of fervice.

CHAIN-*Wales*, or *Channels*, of a fhip, *portchoiffoirs*, are broad and thick planks projecting horizontally from the fhip's outfide, abreaft of and fomewhat behind the mafts. See plate 80. They are formed to extend the fhrouds from each other, and from the axis or middle line of the fhip, fo as to give a greater fecurity and fupport to the mafts, as well as to prevent the fhrouds from damaging the gunwale, or being hurt by rubbing againft it. Every maft has its chain-wales, which are either built above or below the fecond deck-ports in a fhip of the line. They are ftrongly connected to the fide by knees, bolts, and ftandards, befides being confined thereto by the chains, whofe upper ends pafs through notches on the outer edge of the chain-wales, fo as to unite with the fhrouds above.

CHAINS, in fhip-building, are ftrong links or plates of iron, the lower ends of which are bolted through the fhip's fide to the timbers.

Hanging in CHAINS, a kind of punifhment inflicted on murderers. By ftat. 25. Geo. II. c. 37. the judge fhall direct fuch to be executed on the next day but one, unlefs Sunday intervene; and their bodies to be delivered to the furgeons to be diffected and anatomized: and he may direct them afterwards to be hung in chains. During the interval between fentence and execution, the prifoner fhall be kept alone, and fuftained only with bread and water. The judge, however, has power to refpite the execution, and relax the other reftraints of the act.

CHAIN-*Ifland*, an ifland lately difcovered by captain Wallis in the South-Sea. It feemed to be about five miles long and as

many broad, lying in the direction of north-weſt and ſouth-eaſt. It appeared to be a double range of woody iſlands joined together by reefs, ſo as to compoſe one iſland of an oval figure, with a lake in the middle. The trees are large, and from the ſmoke that iſſued from the woods, it appeared to be inhabited. W. long. 145. 54. S. lat. 17. 25.

CHAJOTLI, or CHAYOTI, a Mexican fruit of a round ſhape, and ſimilar in the huſk with which it is covered, to the cheſnut, but four or five times larger, and of a much deeper green colour. Its kernel is of a greeniſh white, and has a large ſtone in the middle, which is white, and like it in ſubſtance. It is boiled, and the ſtone eat with it. This fruit is produced by a twining perennial plant, the root of which is alſo good to eat. See plate 78.

CHAIR, *Cathedra*, was anciently uſed for the pulpit, or ſuggeſtum, whence the prieſt ſpoke to the people. It is ſtill applied to the place whence profeſſors and regents in univerſities deliver their lectures, and teach the ſciences to their pupils: thus, we ſay, the profeſſor's chair, the doctor's chair, &c.

Curule CHAIR, was an ivory ſeat placed on a car, wherein were ſeated the chief magiſtrates of Rome, and thoſe to whom the honour of a triumph had been granted.

Sedan CHAIR, a vehicle ſupported by poles, wherein perſons are carried; borne by two men. In London, hackney-chairs are under the ſame regulations as the hackney-coaches. Their number is now very inconſiderable, except about the court, as hackney-coaches are found more commodious.

CHAIR is alſo applied by the Romaniſts to certain feaſts, held anciently in commemoration of the tranſlation of the ſee, or ſeat of the vicarage of Chriſt, by St. Peter. The perforated chair, wherein the new-elected pope is placed, F. Mabillon obſerves, is to be ſeen at Rome: but the origin thereof he does not attribute, as is commonly done, to the adventure of Pope Joan; but ſays there is a myſtery in it; and it is intended, forſooth, to explain to the pope thoſe words of ſcripture, that *God draws the poor from out of the duſt and mire.*

CHAIRMAN, the PRESIDENT, or ſpeaker of an aſſembly, company, &c. We ſay, the chairman of a committee, of a public meeting, &c.

CHAISE, a ſort of light open chariot, or calaſh. Aurelius Victor relates, that Trajan firſt introduced the uſe of poſt-chaiſes: but the invention is generally aſcribed to Auguſtus; and was probably only improved by Trajan, and ſucceeding emperors.

CHALAZA, among naturaliſts, a white knotty ſort of ſtring at each end of an egg, formed of a plexus of the fibres of the membranes, whereby the yolk and white are connected together. See EGG.

CHALCAS, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants. The calyx is quinquepartite; the corolla campanulated, with the petals heeled; the ſtigma round-headed and warty.

CHALCEDON, or CALCEDON, anciently known by the names of *Procerastis* and *Colbuſa*; a city of Bithynia, ſituated at the mouth of the Euxine, on the north extremity of the Thracian Boſphorus, over againſt Byzantium. Chalcedon, in the Chriſtian times, became famous on account of the council which was held there againſt Eutyches.

CHALCEDONY, in natural hiſtory, a genus of the ſemipellucid gems. They are of an even and regular, not tabulated ſtructure; of a ſemi-opaque and cryſtalline baſis, and variegated with different colours; but thoſe ever diſpoſed in form of miſts or clouds, and, if nicely examined, found to be owing to an admixture of various coloured earths, but imperfectly blended in the maſs, and often viſible in diſtinct moleculæ. It has been doubted by ſome whether the ancients were at all acquainted with the ſtone we call *chalcedony*; they having deſcribed a Chalcedonian carbuncle and emerald, neither of which can at all agree with the characters of our ſtone; but we are to conſider that they have alſo deſcribed a Chalcedonian jaſper which ſeems to have been the very ſame ſtone as they deſcribe by the word *turbida*, which extremely well agrees with our chalcedony. There are four known ſpecies of the chalcedony. 1. A bluiſh white one, the moſt common of all, and found in the ſhape of our flints and pebbles. 2. The dull milky-veined chalcedony, a ſtone of little value, principally found in New Spain. 3. A browniſh, black, dull, and cloudy chalcedony, known to the ancients by the name of ſmoky jaſper, or jaſpis capnitis; common in both the Indies, and in Germany, but of very little value. 4. The yellow and red chalcedony, greatly ſuperior to all the reſt in beauty; and in great repute in Italy, though very little known among us. The Italians make it into beads, and call theſe *caſſidonies*; but they are not determinate in the uſe of the word, but call beads of ſeveral of the agates by the ſame name. All the chalcedonies readily give fire with ſteel, and make no effervescence with nitrous acid.

CHALCIDIC, CHALCIDICUM, or CHALCEDONIUM, in the ancient architecture, a large magnificent hall belonging to a tribunal or court of juſtice. Feſtus ſays, it took its name from the city Chalcis; but he does not give the reaſon. Pilander will have it to be the court or tribunal where affairs of money and coinage were regulated; ſo called from χαλκος, *braſs*, and δικη, *juſtice*. Others ſay, the money was ſtruck in it; and derive the word from χαλκος, and οικος, *houſe*. In Vitruvius, it is uſed for the auditory of a baſilica; in other of the ancient writers for a hall or apartment where the heathens imagined their gods to eat.

CHALCIDIUS, a famous platonic philſopher in the third century, who wrote a commentary, which is eſteemed, on the Timæus of Plato. This work has been tranſlated from the Greek into Latin.

CHALCONDYLAS (Demetrius), a learned Greek, born at Conſtantinople, left that city after its being taken by the Turks, and afterwards taught Greek in ſeveral cities in Italy. He compoſed a Greek grammar; and died at Milan in 1513.

CHALCONDYLAS (Laonicus), a famous Greek hiſtorian of the 15th century, was born at Athens; and wrote an excellent hiſtory of the Turks, from Ottoman, who reigned about the year 1300, to Mahomet II. in 1463.

CHALDEE LANGUAGE, that ſpoken by the Chaldeans, a people of Chaldea. It is a dialect of the HEBREW.

CHALDEE *Paraphraſe*, in the rabbinical ſtyle, is called TARGUM. There are three Chaldee paraphraſes in Walton's Polyglot; viz. that of Onkelos, that of Jonathan ſon of Uziel, and that of Jeruſalem.

CHALDRON, a dry Engliſh meaſure, conſiſting of thirty-ſix buſhels, heaped up according to the ſealed buſhel kept at Guildhall, London: but on ſhip-board, twenty-one chaldrons of coals are allowed to the ſcore. The chaldron ſhould weigh two thouſand pounds.

CHALICE, the cup or veſſel uſed to adminiſter the wine in the ſacrament, and by the Roman Catholics in the maſs. The uſe of the chalice, or communicating in both kinds, is by the church of Rome denied to the laity, who communicate only in one kind, the clergy alone being allowed the privilege of communicating in both kinds.

CHALK, *Creta*, is a white earth found plentifully in Britain, France, Norway, and other parts of Europe, ſaid to have been anciently dug chiefly in the iſland of Crete, and thence to have received its name of *Creta*. Chalk is of two kinds; hard, dry, and firm, or ſoft and unctuous. The former is much the propereſt for burning into lime; but the ſoft and unctuous chalk

is beſt as a manure for lands. Chalk, whether burnt into lime or not, is in ſome caſes an excellent manure. When pure, it melts eaſily with alkali and flint into a tranſparent colourleſs glaſs. With alkaline ſalts it melts ſomewhat more difficultly, and with borax ſomewhat more eaſily, than with flint or ſand. It requires about half its weight of borax, and its whole weight of alkali to fuſe it. This earth greatly promotes the vitrification of flint; a mixture of the two requiring leſs alkali than either of them ſeparately. If glaſs made from flint and alkali be further ſaturated with the flint, ſo as to be incapable of bearing any further addition of that earth without becoming opaque and milky, it will ſtill in a ſtrong fire take up a conſiderable proportion, one-third or one-fourth of its weight, of chalk, without injury to its tranſparency: hence chalk is ſometimes made uſe of in compoſitions for glaſs, as a part of the ſalt may then be ſpared. Chalk likewiſe has a great effect in melting the ſtony matters intermixed with metallic ores, and hence might be of uſe in ſmelting ores; as indeed limeſtone is uſed for that purpoſe. But it is remarkable, that chalk, when deprived of its fixed air, and converted into limeſtone, loſes much of its diſpoſition to vitrify. It is then found to melt very difficultly and imperfectly, and to render the glaſs opaque and milky. Chalk readily imbibes water: its œconomical uſes in cleaning and poliſhing metal or glaſs utenſils are well known. In this caſe it is powdered and waſhed from any gritty matter it may contain, and is then called *whiting*. In medicine it is one of the moſt uſeful abſorbents, and is to be looked upon ſimply as ſuch; the aſtringent virtues attributed to it not being very conſiderable. See CHEMISTRY.

Black CHALK, a name given by painters in crayons to a ſpecies of earth with which they draw on blue paper, &c. It is found in pieces from two to ten feet long, and from four inches to twenty in breadth, generally flat, but ſomewhat riſing in the middle, and thinner towards the edges, commonly lying in large quantities together. While in the earth, it is moiſt and flaky: but being dried, it becomes conſiderably hard, and very light; but always breaks in ſome particular direction; and if attentively examined when freſh broken, appears of a ſtriated texture. To the touch it is ſoft and ſmooth, works very freely, and makes very neat marks. It is eaſily reduced into an impalpable ſoft powder without any diminution of its blackneſs. In this ſtate it mixes eaſily with oil into a ſmooth paſte; and being diffuſed through water, it ſlowly ſettles in a black ſlimy or muddy form; properties which make its uſe very convenient to the painters, both in oil and water colours. It appears to be an earth quite different from common chalk, and rather of the ſlaty bituminous kind. In the fire it becomes white with a reddiſh caſt, and very friable, retaining its flaky ſtructure, and looking much like the white flaky maſſes which ſome ſorts of pit-coal leave in burning. Neither the chalk nor theſe aſhes are at all affected by acids. The colour-ſhops are ſupplied with this earth from Italy or Germany; though ſome parts of England afford ſubſtances nearly, if not entirely, of the ſame quality, and which are found to be equally ſerviceable both for marking, and as black paints. Such particularly is the black earth called *killow*, ſaid by Dr. Merret to be found in Lancaſhire, and by Da Coſta, in his hiſtory of foſſils, to be plentiful near the top of Cay-Avon, an high hill in Merionethſhire.

Red CHALK, an earth much uſed by painters and artificers, and common in the colour-ſhops. It is properly an indurated clayey ochre, and is dug in Germany, Italy, Spain, and France, but in greateſt quantity in Flanders. It is of a fine, even, and firm texture; very heavy, and very hard; of a pale red on the outſide, but of a deep duſky chocolate colour within. It adheres firmly to the tongue, is perfectly inſipid to the taſte, and makes no efferveſcence with acids.

CHALK-*Land*. Barley and wheat will ſucceed very well on the better ſort of chalky land, and oats generally do well on any kind of it. The natural produce of this ſort of land in weeds, is that ſort of ſmall vetch called the *tine-tare*, with poppies, may-weed, &c. Sain-foin and hop-clover will generally ſucceed tolerably well on theſe lands: and where they are of the better ſort, the great clover will do. The beſt manure is dung, old rags, and the ſheep dung left after folding them. See HUSBANDRY.

CHALK-*Stones*, in medicine, ſignify the concretions of calcareous matter in the hands and feet of people violently afflicted with the gout. Leuwenhoek has been at the pains of examining theſe by the microſcope, but his diſtinctions have not led to any thing uſeful with regard to the diſeaſe which produces them.

CHALLENGE, a cartel or invitation to a duel or other combat. A challenge either by word or letter, or to be the bearer of ſuch a challenge, is puniſhable by fine and impriſonment, on indictment or information. See DUEL.

CHALLENGE, among hunters. When hounds or beagles, at firſt finding the ſcent of their game, preſently open and cry, they are ſaid to challenge.

CHALLENGE, in the law of England, is an exception made to jurors; and is either in civil or criminal caſes.

In *civil caſes*, challenges are of two ſorts; challenges to the *array*, and challenges to the *poll*. Challenges to the array are at once an exception to the whole panel, in which the jury are arrayed, or ſet in order by the ſheriff in his return; and they may be made upon account of partiality or ſome default in the ſheriff or his under officer who arrayed the panel. Alſo, though there be no perſonal objection againſt the ſheriff, yet if he arrays the panel at the nomination, or under the direction of either party, this is good cauſe of challenge to the array. Challenges to the polls, *in capite*, are exceptions to particular jurors; and ſeem to anſwer the *recuſatio judicis* in the civil and canon laws; by the conſtitutions of which a judge might be refuſed upon any ſuſpicion of partiality. By the laws of England alſo, in the times of Bracton and Fleta, a judge might be refuſed for good cauſe; but now the law is otherwiſe, and it is held that judges or juſtices cannot be challenged. See *Blackſtone's Commentaries*, vol. iii.

In *criminal caſes*, challenges may be made either on the part of the king, or on that of the priſoner: and either to the whole array, or to the ſeparate polls, for the very ſame reaſons that they may be in civil cauſes. For it is here at leaſt as neceſſary as there, that the ſheriff or returning officer be totally indifferent; that, where an alien is indicted, the jury ſhould be *de medietate*, or half foreigners, if ſo many are found in the place (which does not indeed hold in treaſons, aliens being very improper judges of the breach of allegiance; nor yet in the caſe of Egyptians under the ſtatute 22 Hen. VIII. c. 10.) that on every panel there ſhould be a competent number of hundreders; and that the particular jurors ſhould be *omni exceptione majores*, not liable to objections either *propter honoris reſpectum*, *propter defectum*, *propter affectum*, or *propter delictum*.

Challenges on any of the foregoing accounts are ſtyled challenges *for cauſe*; which may be without ſtint in both civil and criminal trials. But in criminal caſes, or at leaſt in capital ones, there is, *in favorem vitæ*, allowed to the priſoner an arbitrary and capricious ſpecies of challenge to a certain number of jurors, without ſhowing any cauſe at all; which is called a peremptory challenge: a proviſion full of that tenderneſs and humanity to priſoners for which our laws are juſtly famous. This is grounded on two reaſons: 1. As every one muſt be ſenſible what ſudden impreſſions and unaccountable prejudices we are apt to conceive upon the bare looks and geſtures of another;

and how neceffary it is that a prifoner, when put to defend his life, fhould have a good opinion of his jury, the want of which might totally difconcert him; the law wills not that he fhould be tried by any one man againft whom he has conceived a prejudice, even without being able to affign a reafon for fuch his diflike. 2. Becaufe upon challenges for caufe fhown, if the reafon affigned prove infufficient to fet afide the juror, perhaps the bare queftioning his indifference may fometimes provoke a refentment; to prevent all ill confequences from which, the prifoner is ftill at liberty, if he pleafes, peremptorily to fet him afide.

This privilege of peremptory challenges, though granted to the prifoner, is denied to the king by the ftatute 33 Edward I. ftat. 4. which enacts, that the king fhall challenge no jurors without affigning a caufe certain, to be tried and approved by the court. However, it is held that the king need not affign his caufe of challenge till all the panel is gone through, and unlefs there cannot be a full jury without the perfons fo challenged; and then, and not fooner, the king's counfel muft fhow the caufe, otherwife the juror fhall be fworn.

The peremptory challenges of the prifoner muft, however, have fome reafonable boundary, otherwife he might never be tried. This reafonable boundary is fettled by the common law to the number of 35; that is, one under the number of three full juries. For the law judges, that 35 are fully fufficient to allow the moft timorous man to challenge through mere caprice; and that he who peremptorily challenges a greater number, or three full juries, has no intention to be tried at all. And therefore it deals with one who peremptorily challenges above 35, and will not retract his challenge, as with one who ftands mute or refufes his trial; by fentencing him to the *peine forte et dure* in felony, and by attainting him in treafon. And fo the law ftands at this day with regard to treafon of any kind. But by ftatute 22 Hen. VIII. c. 14. (which, with regard to felonies, ftands unrepealed), no perfon arraigned for felony can be admitted to make more than 20 peremptory challenges.

CHALLONS-sur-Saone, an ancient town of France, in the department of Saone and Loire, lately an epifcopal fee of the province of Burgundy. It is the ftaple of iron for Lyons and St. Etienne, and of the wines for exportation. The great Roman way from Lyons to Boulogne paffed by Chalons; and here are various indications of Roman magnificence, particularly the ruins of an amphitheatre. The city contains the Old Town, the New Town, and the fuburbs of St. Lawrence. In the firft is the court of juftice, a modern ftructure, the cathedral, and the hotel-de-ville. In the church of the late Carmelites, is the tomb of the epicure Des Barreaux, immortalized by the fine fonnet, "Grand Dieu, tes jugemens, &c." Chalons is feated on the river Saone, 35 miles S. of Dijon. Lon. 4. 57. E. lat. 46. 47. N.

Challons-*Sur-Marne*, a handfome town of France in the department of Marne, lately an epifcopal fee in the province of Champagne. It contains 15,000 inhabitants, who carry on a confiderable trade in fhalloons and other woollen ftuffs. The famous promenade, called the Gard, has been formed into a new ring much fuperior to the former. Here is an academy of the fciences, arts, and belles-lettres. Chalons is feated between two fine meadows on the rivers Marne-Mau, and Nau, 40 miles S. W. of Verdun, and 95 E. of Paris. Lon. 4. 27. E. lat. 48. 57. N.

CHALONER (Sir Thomas), a ftatefman, foldier, and poet, defcended from a good family in Denbigh in Wales, was born at London about the year 1515. Having been educated in both univerfities, but chiefly at Cambridge, he was introduced at the court of Henry VIII. who fent him abroad in the retinue of Sir Henry Knevet, ambaffador to Charles V. On the acceffion of Edward VI. he became a favourite of the Duke of Somerfet, whom he attended to Scotland, and was knighted by that nobleman after the battle of Muffelburgh, in 1547. The protector's fall put a ftop to Sir Thomas Chaloner's expectations, and involved him in difficulties. During the reign of queen Mary, being a determined proteftant, he was in fome danger; but having many powerful friends, he had the good fortune to efcape. On the acceffion of queen Elizabeth, he appeared again at Court; and was fo immediately diftinguifhed by her Majefty, that fhe appointed him ambaffador to the emperor Ferdinand I. being the firft ambaffador fhe nominated. So various were the talents of Sir Thomas Chaloner, that he excelled in every thing to which he applied himfelf. He made a confiderable figure as a poet. His poetical works were publifhed by William Malim, mafter of St. Paul's fchool, in 1579. His capital work was that "Of reftoring the Englifh republic, in ten books," which he wrote when he was ambaffador in Spain. It is remarkable, that this great man, who knew how to tranfact as well as write upon the moft important affairs of ftates and kingdoms, could defcend to compofe a *dictionary for children*, and to tranflate from the Latin a book *of the office of fervants*, merely for the utility of the fubjects.

Chaloner (Sir Thomas) the younger, though inconfiderable as an author, deferves to be recorded as a fkilful naturalift, in an age wherein natural hiftory was very little underftood in this or any other country; and particularly as the founder of the alum works in Yorkfhire, which have fince proved fo exceedingly advantageous to the commerce of this kingdom. He was the only fon of Sir Thomas Chaloner mentioned in the laft article, and was born in the year 1559. Being very young at the time of his father's death, the lord treafurer Burleigh, taking charge of his education, fent him to St. Paul's fchool, and afterwards to Magdalen college in Oxford. About the year 1580, he made the tour of Europe, and returned to England before 1584; for, in that year, we find him a frequent attendant in the court of queen Elizabeth. About this time he married the daughter of Sir William Fleetwood, recorder of London. In 1591 he was knighted; and, fome time after, difcovered the alum mines on his eftate at Gifborough, in Yorkfhire. He died in the year 1615, and was buried at Chifwick in Middlefex. His eldeft fon William was created a baronet in the 18th of James, *anno* 1620. The title was extinct in 1681. He wrote, 1. Dedication to Lord Burleigh of his father's poetical works, dated 1579. 2. The virtue of nitre, wherein is declared the fundry cures by the fame effected. Lond. 1584, 4to.

CHALYBEATE, in medicine, an appellation given to any liquid, as wine or water, impregnated with particles of iron. See Mineral Waters.

CHAM, or Khan, the title given to the fovereign princes of Tartary. The word, in the Perfian, fignifies *mighty lord*; in the Sclavonic, *emperor*. Sperlingius, in his Differtation on the Danifh term of *Majefty*, *koning*, *king*, thinks the Tartarian *cham* may be well derived from it; adding, that in the north they fay *kan*, *konnen*, *konge*, *konung*, &c. The term *cham* is alfo applied, among the Perfians, to the great lords of the court, and the governors of provinces.

Cham, in geography, a town of the Bavarian palatinate, fituated on a river of the fame name, about 25 miles north-eaft of Ratifbon. E. long. 13. N. lat. 49. 15.

CHAMA, in zoology, a genus of fhell-fifh belonging to the order of vermes teftaceæ. The fhell is thick, and has two valves; it is an animal of the oyfter kind. Linnæus enumerates 14 fpecies, principally diftinguifhed by the figure of their fhells.

CHAMADE, in war, a certain beat of a drum, or found of a trumpet, which is given the enemy as a fignal to inform them of fome propofition to be made to the commander, either to capitulate, to have leave to bury their dead, make a truce, or

the like. Menage derives the word from the Italian *chiamata*, of *chiamare* to *cry*.

CHAMÆDRYS, in botany. See VERONICA.

CHAMÆLEON, in zoology, the trivial name of a ſpecies of LACERTA. See BASILISK.

CHAMÆPITYS, in botany. See TEUCRIUM.

CHAMÆROPS, in botany; a genus of the natural order of palmæ. The hermaphrodite calyx is tripartite; the corolla tripetalous; there are ſix ſtamina, three piſtils, and three monoſpermous plums. The male, is a diſtinct plant, the ſame as the hermaphrodite. There are two ſpecies, the moſt remarkable of which is the glabra, a native of the Weſt Indies, and warm parts of America, alſo of the correſponding latitudes of Aſia and Africa. It never riſes with a tall ſtem; but when the plants are old, their leaves are five or ſix feet long, and upwards of two feet broad: theſe ſpread open like a fan, having many foldings, and at the top are deeply divided like the fingers of a hand. This plant the Americans call *thatch*, from the uſe to which the leaves are applied. Under the name of palmetto, however, Mr. Adanſon deſcribes a ſpecies of palm which grows naturally at Senegal, whoſe trunk riſes from 50 to 60 feet in height: from the upper end of the trunk iſſues a bundle of leaves, which, in turning off, from a round head, each leaf repreſents a fan of five or ſix feet in expanſion, ſupported by a tail of the ſame length. Of theſe trees ſome produce male flowers, which are conſequently barren; others are female, and loaded with fruit, which ſucceed each other uninterruptedly almoſt the whole year round. The fruit of the large palmettos, Mr. Adanſon affirms to be of the bigneſs of an ordinary melon, but rounder: it is inveloped in two ſkins as tough as leather, and as thick as ſtrong parchment; within, the fruit is yellowiſh, and full of filaments faſtened to three large kernels in the middle. The negroes are very fond of this fruit, which, when baked under the aſhes, is ſaid to taſte like a quince. The little palmetto may be eaſily raiſed in this country from feeds brought from America; but as the plants are tender, they muſt be conſtantly kept in a bark-ſtove.

CHAMANIM, in the Jewiſh antiquities, is the Hebrew name for that which the Greeks call *Pyreia* or *Pyrateria*; and St. Jerom in Leviticus has tranſlated *Simalachra*, in Iſaiah, *delubra*. Theſe chamanims were, according to Rabbi Solomon, idols expoſed to the ſun upon the tops of houſes. Abenezoa ſays they were portable chapels or temples made in the form of chariots, in honour of the ſun. What the Greeks call Pyreia, were temples conſecrated to the ſun and fire, wherein a perpetual fire was kept up. They were built upon eminences; and were large incloſures without covering, where the ſun was worſhipped. The Guebres, or worſhippers of fire, in Perſia and the Eaſt Indies, have ſtill theſe Pyreia. The word *chamanim* is derived from *chaman*, which ſignifies to warm or burn.

CHAMARIM, a word which occurs in ſeveral parts of the Hebrew bible, and is generally tranſlated the *prieſts of the idols*, or the *prieſts clothed in black*, becauſe *chamar* ſignifies "black," or "blackneſs." St. Jerom, in the ſecond book of Kings, renders it *aruſpices*. In Hoſea and Zephania, he tranſlates it *ædituі* or church-wardens. But the beſt commentators are of opinion, that by this word we are to underſtand the prieſts of the falſe gods, and in particular the worſhippers of fire; becauſe they were, as they ſay, dreſſed in black; or perhaps the Hebrews gave them this name in deriſion, becauſe, as they were continually employed in taking care about the fuel, and keeping up the fire, they were always as black as ſmiths or colliers. We find prieſts, among thoſe of Iſis, called *melanephori*, that is to ſay, that wear black; but whether this may be by reaſon of their dreſſing in black, or whether it was becauſe they wore a ſhining black veil in the proceſſions of this goddeſs is not certain. *Camar*, in Arabic, ſignifies the "moon." Iſis is the ſame deity. Grotius thinks the Roman prieſts, called *camilli*, came from the Herew *chamarim*. Thoſe among the heathens who ſacrificed to the infernal gods were dreſſed in black.

CHAMBER, in building, an apartment, ordinarily intended for ſleeping in; and called by the Latins *cubiculum*. The word comes from the Latin *camera*; and that, according to *Nicod*, from the Greek καμαρα, *vault* or *curve*; the term *chamber* being originally confined to places arched over.

Privy-CHAMBER. Gentlemen of the privy-chamber, are ſervants of the king; who are to wait and attend on him and the queen at court, in their diverſions, &c. Their number is forty-eight, under the lord-chamberlain; twelve of whom are in quarterly waiting, and two of theſe lie in the privy-chamber. In the abſence of the lord chamberlain, or vice-chamberlain, they execute the king's orders: at coronations, two of them perſonate the dukes of Aquitain and Normandy; and ſix of them, appointed by the lord chamberlain, attend ambaſſadors from crowned heads to their audiences, and in public entries. The gentlemen of the privy-chamber were inſtituted by Henry VII.

CHAMBER, in policy, the place where certain aſſemblies are held, alſo the aſſemblies themſelves. Of theſe ſome are eſtabliſhed for the adminiſtration of juſtice, others for commercial affairs. Of the laſt ſort are, the chambers of commerce; the chambers of aſſurance; and the former royal or ſyndical chambers of bookſellers in France, &c. Chambers of aſſurance uſually denote ſocieties of merchants and others for carrying on the buſineſs of inſuring; except in Holland, where it ſignifies a court of juſtice, where cauſes relating to inſurances are tried.

CHAMBER, in military affairs. 1. Powder-chamber, or bomb-chamber; a place ſunk under ground for holding the powder, or bombs, where they may be out of danger, and ſecured from the rain. 2. Chamber of a mine; the place, moſt commonly of a cubical form, where the powder is confined. 3. Chamber of a mortar; that part of the chaſe, much narrower than the reſt of the cylinder, where the powder lies. It is of different forms; ſometimes like a reverſed cone; ſometimes globular, with a neck for its communication with the cylinder, whence it is called a bottled chamber; but moſt commonly cylindrical, that being the form which is found by experience to carry the ball to the greateſt diſtance.

CHAMBERLAIN, an officer charged with the management and direction of a chamber. See CHAMBER, *in policy*. There are almoſt as many kinds of chamberlains as chambers; the principal whereof are as follows:

Lord CHAMBERLAIN *of Great Britain*, the ſixth great officer of the crown; to whom belongs livery and lodging in the king's court; and there are certain fees due to him from each archbiſhop or biſhop when they perform their homage to the king, and from all peers at their creation or doing their homage. At the coronation of every king, he is to have forty ells of crimſon velvet for his own robes. This officer, on the coronation-day, is to bring the king his ſhirt, coif, and wearing clothes; and after the king is dreſſed, he claims his bed, and all the furniture of his chamber for his fees: he alſo carries, at the coronation, the coif, gloves, and linen, to be uſed by the king on that occaſion; alſo the ſword and ſcabbard; the gold to be offered by the king, and the robes royal, and crown: he dreſſes and undreſſes the king on that day, waits on him before and after dinner, &c. To this officer belongs the care of providing all things in the houſe of lords, in the time of parliament; to him alſo belongs the government of the palace of Weſtminſter: he diſpoſes likewiſe of the ſword of ſtate, to be carried before the king, to what lord he pleaſes.

The great chamberlain of Scotland was ranked by King Mal-

colm as the third great officer of the crown, and was called *Camerarius Domini Regis.* Before there was a treaſurer appointed, it was his duty to collect the revenue of the crown, and he diſburſed the money neceſſary for the king's expences, and the maintenance of the king's houſehold. From the time that a treaſurer was appointed, his province was limited to the boroughs throughout the kingdom, where he was a ſort of juſtice general, as he had a power for judging of all crimes committed within the borough, and of the crime of foreſtalling. He alſo regulated the prices of proviſions within the borough, and the fees of the workmen in the mint-houſe. His ſalary was only L. 200 a-year, but he had great fees ariſing from the profits of eſcheats, fines, tolls, and cuſtoms. This office was granted heritably to the family of Stuart, duke of Lenox; and when their male line failed, king Charles II. conferred it in like manner upon his natural ſon, whom he created duke of Monmouth, and on his forfeiture it went to the duke of Lenox; but that family ſurrendered the office to the crown in 1703.

Lord Chamberlain *of the Houſehold*, an officer who has the overſight and direction of all officers belonging to the king's chambers, except the precinct of the king's bed-chamber. He has the overſight of the officers of the wardrobe at all his majeſty's houſes, and of the removing wardrobes, or of beds, tents, muſic, comedians, hunting, meſſengers, &c. retained in the king's ſervice. He moreover has the overſight and direction of the ſerjeants at arms, of all phyſicians, ſurgeons, apothecaries, the king's chaplains, &c. and adminiſters the oath to all officers above ſtairs.

Other chamberlains are thoſe of the king's court of exchequer, of North Wales, of Cheſter, of the city of London, &c. in which caſes this officer is generally the receiver of all rents and revenues belonging to the place whereof he is chamberlain. In the exchequer there are two chamberlains, who keep a controlment of the pells of receipts and exitus, and have certain keys of the treaſury, records, &c.

Chamberlain *of London* keeps the city money, which is laid up in the chamber of London; he alſo preſides over the affairs of maſters and apprentices, and makes free of the city, &c. His office laſts only a year; but the cuſtom uſually obtains to re-chooſe the ſame perſon, unleſs charged with any miſdemeanor in his office.

CHAMBERLAYNE (Edward), deſcended from an ancient family, was born in Glouceſterſhire 1616, and made the tour of Europe during the diſtractions of the civil war. After the reſtoration, he went as ſecretary with the earl of Carliſle, who carried the order of the Garter to the king of Sweden; was appointed tutor to the duke of Grafton, natural ſon of Charles II. and was afterwards pitched on to inſtruct prince George of Denmark in the Engliſh tongue. He died in 1703, and was buried in a vault in Chelſea church-yard: his monumental inſcription mentions ſix books of his writing; and that he was ſo deſirous of doing ſervice to poſterity, that he ordered ſome copies of his books to be covered with wax, and buried with him. That work by which he is beſt known, is his *Angliæ Notitiæ*, or *The preſent State of England*, which has been often ſince printed.

Chamberlayne (John), ſon to the author of "*The Preſent State of England*," and continuator of that uſeful work, was admitted into Trinity College, Oxford, in 1685; but it doth not appear that he took any degree. Beſide the *Continuation* juſt mentioned, he was author of "Diſſertations hiſtorical, critical, theological, and moral, on the moſt memorable events of the Old and New Teſtaments, with Chronological Tables;" one vol. folio; and tranſlated a variety of works from the French, Dutch, and other languages. He likewiſe was F. R. S. and communicated ſome pieces inſerted in the Philoſophical Tranſactions. It was ſaid of him that he underſtood ſixteen languages; but it is certain that he was maſter of the Greek, Latin, French, High and Low Dutch, Portugueſe, and Italian. Though he was qualified for employment, he had none but that of Gentleman-Uſher to George Prince of Denmark. After a uſeful and well-ſpent life, he died in the year 1724. He was a very pious and good man, and earneſt in promoting the advancement of religion, and the intereſt of true Chriſtianity; for which purpoſe he kept a large correſpondence abroad.

CHAMBERRY, a conſiderable and populous town in Italy, in Savoy, with a caſtle. It is capital of the duchy, and well built, but has no fortifications. The parliament meet here, which is compoſed of four preſidents, and a pretty large number of ſenators, being the ſupreme tribunal of the whole duchy. E. long. 5. 50. N. lat 45. 35.

CHAMBERS (Ephraim), author of the ſcientific Dictionary which goes under his name, was born at Milton in the county of Weſtmoreland. His parents were diſſenters of the Preſbyterian perſuaſion; and his education no other than that common one which is intended to qualify a youth for trade and commerce. When he became of a proper age, he was put apprentice to Mr. Senex the globe maker, a buſineſs which is connected with literature, and eſpecially with aſtronomy and geography. It was during Mr. Chambers's reſidence with this ſkilful mechanic, that he contracted that taſte for ſcience and learning which accompanied him through life, and directed all his purſuits. It was even at this time that he formed the deſign of his grand work, the "Cyclopædia;" and ſome of the firſt articles of it were written behind the counter. Having conceived the idea of ſo great an undertaking, he juſtly concluded that the execution of it would not conſiſt with the avocations of trade; and therefore he quitted Mr. Senex, and took chambers at Gray's-Inn, where he chiefly reſided during the reſt of his days. The firſt edition of the *Cyclopædia*, which was the reſult of many years intenſe application, appeared in 1728, in 2 vols. folio. It was publiſhed by ſubſcription, the price being 4l. 4s.; and the liſt of ſubſcribers was very reſpectable. The dedication, which was to the king, is dated October 15, 1727. The reputation that Mr. Chambers acquired by his execution of this undertaking, procured him the honour of being elected F. R. S. Nov. 6. 1729. In leſs than ten years a ſecond edition, and the year after that, a third became neceſſary, and were accordingly printed, with additions.

But although the Cyclopædia was the grand buſineſs of Mr. Chambers's life, and may be regarded as almoſt the ſole foundation of his fame, his attention was not wholly confined to this undertaking. He was concerned in ſeveral other periodical publications, and in conjunction with Mr. John Martyn, F. R. S. and profeſſor of botany at Cambridge, prepared for the preſs a tranſlation and abridgment in 5 vols. 8vo. of the "Philoſophical Hiſtory and Memoirs of the Royal Academy of Sciences at Paris," an undertaking, which did not appear till 1742, ſome time after our author's deceaſe. Mr. Chambers is alſo ſaid to have publiſhed a tranſlation of the *Jeſuits Perſpective*, from the French; which was printed in 4to, and went through ſeveral editions. But his cloſe and unremitting attention to his ſtudies at length impaired his health, and obliged him to make an excurſion to the ſouth of France, but without that benefit from it which he had himſelf hoped, and his friends wiſhed. Returning to England, he died at his lodging at Canonbury-houſe, Iſlington, and was buried at Weſtminſter; where an inſcription, written by himſelf, is placed on the north ſide of the cloyſters of the Abbey. After the author's death, two more editions of his Cyclopædia were publiſhed. The publiſhers alſo procured a ſupplement to be compiled, which extended to two volumes more: and in the year 1778, there appeared an edition of both, improved, and incorporated

into one alphabet, by Dr. Rees, which was completed in four volumes folio, and forms a very valuable work.

CHAMBRE (Martin Cureau de la), phyfician in ordinary to the French king, was diftinguifhed by his knowledge in medicine, philofophy, and polite learning. He was born at Mons, and was received into the French academy in 1635, and afterwards into the academy of fciences. He wrote a great number of works; the principal of which are, 1. The characters of the paffions. 2. The art of knowing men. 3. On the knowledge of beafts, &c. He died at Paris in 1669.

CHAMELEON. See BASILICUS.

CHAMFERING, in architecture, a phrafe ufed for cutting any thing aflope on the under fide.

CHAMIER (Daniel), an eminent proteftant divine, born in Dauphiné. He was many years preacher at Montellimart; from whence he went in 1612 to Montaubon, to be profeffor of divinity in that city, and was killed by a cannon-ball during the fiege in 1621. The moft confiderable of his works is his *Panftratia Catholica*, or "Wars of the Lord," in four volumes folio; in which he treats very learnedly of the controverfies between the Proteftants and Roman Catholics.

CHAMOIS, or CHAMOIS-GOAT, in zoology. See CAPRA.

CHAMOMILE. See ANTHEMIS.

CHAMOS, or CHEMOSH, the idol or god of the Moabites. The name of *chamos* comes from a root which, in Arabic, fignifies to *make hafte*: for which reafon many believe chamos to be the fun, whofe precipitate courfe might well procure it the name of fwift or fpeedy. Others have confounded chamos with the god *Hammon*, adored not only in Libya and Egypt, but alfo in Arabia, Ethiopia, and the Indies. Macrobius fhows that Hammon was the fun; and the horns, with which he was reprefented, denoted his rays. Calmet is of opinion, that the god Hamonus, and Apollo Chomeus, mentioned by Strabo and Ammianus Marcellinus, were the very fame as chamos or the fun. Thefe deities were worfhipped in many of the eaftern provinces. Some who go upon the refemblance of the Hebrew term *chamos* to that of the Greek *comos*, have believed chamos to fignify the god Bacchus the god of drunkennefs, according to the fignification of the Greek *comos*. St. Jerom, and with him moft other interpreters, take Chamos and Peor for the fame deity. But it feems that Baal-Peor was the fame as Tammuz or Adonis; fo that Chamos muft be the god whom the heathens call the Sun.

CHAMOUNI, one of the elevated valleys of the Alps, fituated at the foot of Mont Blanc. See ALPS and MONT BLANC.

CHAMPAGNE, a late province of France, 162 miles in length, and 112 in breath, bounded on the N. by Hainault and Luxemburg, on the E. by Lorrain and Franche Comté, on the S. by Burgundy, and on the W. by the Ifle of France and Soiffonnois. Its principal rivers are the Meufe, Seine, Marne, Aube, and Ain. It now forms the departments of Ardennes, Aube, Marne, and Upper Marne.

CHAMPAIN, or *Point* CHAMPAIN, in heraldry, a mark of difhonour in the coat of arms of him who kills a prifoner of war after he has called for quarter.

CHAMPERTRY, in law, a fpecies of maintenance, and punifhed in the fame manner; being a bargain with the plaintiff or defendant *campum partire*, "to divide the land," or other matter fued for between them, if they prevail at law; whereupon the champertror is to carry on the party's fuit at his own expence. Thus *Champart*, in the French law, fignified a fimilar divifion of profits, being a part of the crop annually due to the landlord by bargain or cuftom. In our fenfe of the word, it fignifies the purchafing of a fuit, or right of fuing; a practice fo much abhorred by our law, that it is one main reafon why a *chofe* in action, or thing of which one hath the right but not the poffeffion, is not affignable in common law; becaufe no man fhould purchafe any pretence to fue in another's right. Thefe pefts of civil fociety, who are perpetually endeavouring to difturb the repofe of their neighburs, and officioufly interfering in other men's quarrels, even at the hazard of their own fortunes, were feverally animadverted on by the Roman law; and were punifhed by the forfeiture of a third part of their goods, and perpetual infamy. Hitherto alfo muft be referred the provifion of the ftat. 32 Henry VIII. c. 9. that no one fhall fell or purchafe any pretended right or title to land, unlefs the vender hath received the profits thereof for one whole year before fuch grant, or hath been in actual poffeffion of the land, or of the reverfion or remainder; on pain that both purchafer and vender fhall each forfeit the value of fuch land to the king and the profecutor.

CHAMPION, a perfon who undertakes a combat in the place or quarrel of another; and fometimes the word is ufed for him who fights in his own caufe. It appears that champions, in the juft fenfe of the word, were perfons who fought in ftead of thofe that, by cuftom, were obliged to accept the duel, but had a juft excufe for difpenfing with it, as being too old, infirm, or being ecclefiaftics, and the like. Such caufes as could not be decided by the courfe of common law were often tried by fingle combat; and he who had the good fortune to conquer, was alfo reputed to have juftice on his fide. See the article BATTLE.

CHAMPION *of the king*, *(campio regis)* is an ancient officer, whofe office is, at the coronation of our kings, when the king is at dinner, to ride, armed *cap-a-pie*, into Weftminfter-Hall, and by the proclamation of an herald make a challenge, "That if any man fhall deny the king's title to the crown, he is there ready to defend it in a fingle combat, &c." which being done, the king drinks to him, and fends him a gilt cup with a cover full of wine, which the champion drinks, and hath the cup for his fee. This office, at the coronation of king Richard II. when Baldwin Freville exhibited his petition for it, was adjudged from him to his competitor Sir John Dymocke (both claiming from Marmion), and hath continued ever fince in the family of the Dymockes; who hold the manor of Sinvelfby in Lincolnfhire, hereditary from the Marmions by grand ferjeantry, viz. that the lord thereof fhall be the king's champion as aforefaid. Accordingly Sir Edward Dymocke performed this office at the coronation of king Charles II.; a perfon of the name of Dymocke performed at the coronation of his prefent majefty George the third.

CHAMPLAIN (Samuel de), a celebrated French navigator, the founder of the colony of New France, or Canada. He built Quebec; and was the firft governor of the colony in 1603. His death happened after the year 1649.

CHAMPLAIN, LAKE; a lake of N. America, which divides the ftate of New York from that of Vermont. It is 80 miles long from N. to S. and 14 in its broadeft part. Long. 74. 10. W. Lat. 45. 0. N.

CHANCE, a term we apply to events, to denote that they happen without any neceffary or foreknown caufe. See CAUSE. Our aim is, to afcribe thofe things to *chance*, which are not neceffarily produced as the natural effects of any proper caufe: but our ignorance and precipitancy lead us to attribute effects to *chance* which have a neceffary and determinate caufe. When we fay a thing happens *by chance*, we really mean no more than that its caufe is unknown to us: not, as fome vainly imagine, that *chance* itfelf can be the caufe of any thing. The cafe of the painter, who, unable to exprefs the foam at the mouth of a horfe he had painted, threw his fponge in defpair at the piece, and, *by chance*, did that which he could not do before by defign, is an eminent inftance of the power of *chance*: yet, it is obvious, all we here mean by *chance*, is, that the

painter was not aware of the effect, or that he did not throw the ſponge with ſuch a view: not but that he actually did every thing neceſſary to produce the effect; inſomuch that, conſidering the direction wherein he threw his ſponge, together with its form, ſpecific gravity, the colours wherewith it was ſmeared, and the diſtance of the hand from the piece, it was impoſſible, on the preſent ſyſtem of things, the effect ſhould not follow. *Chance* is frequently perſonified, and erected into a chimerical being, whom we conceive as acting arbitrarily, and producing all the effects whoſe real cauſes do not appear to us; in which ſenſe the word coincides with the τυχη, *fortuna*, of the ancients.

Chance is alſo uſed for the manner of deciding things, the conduct or direction whereof is left at large, and not reducible to any determinate rules or meaſures, or where there is no ground for preference: as at cards, dice, lotteries, &c. (*For the laws of* Chance, &c. *See* Game.)

The ancient *ſortilege*, or *chance*, M. Placette obſerves, was inſtituted by God himſelf: and in the Old Teſtament we find ſeveral ſtanding laws and expreſs commands which preſcribed its uſe on certain occaſions. Hence the Scripture ſays, "The *lot*, or *chance*, fell on Matthias," when it was in queſtion who ſhould fill Judas's place in the apoſtolate. Hence alſo aroſe the *ſortes ſanctorum*, or method of determining things, among the ancient Chriſtians, by opening ſome of the ſacred books, and pitching on the firſt verſe they caſt their eye on, as a ſure prognoſtic of what was to befal them. The *ſortes Homericæ, Virgilianæ, Præneſtinæ*, &c. uſed by the heathens, were with the ſame view, and in the ſame manner. See Sortes.

Chance-*Medley*, in law, is where one is doing a lawful act, and a perſon is killed by chance thereby; for if the act be unlawful, it is felony. If a perſon caſt, not intending harm, a ſtone, which happens to hit one, whereof he dies; or ſhoots an arrow in an highway, and another that paſſeth by is killed therewith; or if a workman, in throwing down rubbiſh from a houſe after warning to take care, kills a perſon; or a ſchoolmaſter in correcting his ſcholar, a maſter his ſervant, or an officer in whipping a criminal in a reaſonable manner, happens to occaſion his death; it is chance-medley and miſadventure. But if a man throw ſtones in a highway where perſons uſually paſs; or ſhoot an arrow, &c. in a market-place among a great many people; or if a workman caſt down rubbiſh from a houſe in cities and towns where people are continually paſſing; or a ſchoolmaſter, &c. correct his ſervant or ſcholar, &c. exceeding the bounds of moderation; it is manſlaughter; and if with an improper inſtrument or correction, as with a ſword or iron bar, or by kicking, ſtamping, &c. in a cruel manner, it is murder. If a man whips his horſe in a ſtreet to make him gallop, and the horſe runs over a child and kills it, it is manſlaughter: but if another whips the horſe, it is manſlaughter in him, and chance-medley in the rider. And if two are fighting, and a third perſon coming to part them is killed by one of them without any evil intent, yet this is murder in him, and not manſlaughter by chance-medley or miſadventure. In chance-medley, the offender forfeits his goods; but hath a pardon of courſe.

CHANCEL, is properly that part of the choir of a church, between the altar or communion-table and the baluſtrade or rail that incloſes it, where the miniſter is placed at the celebration of the communion. The word comes from the Latin *cancellus*, which in the lower Latin is uſed in the ſame ſenſe, from *cancelli*, "lattices or croſs bars," wherewith the chancels were anciently encompaſſed, as they now are with rails. The right of a ſeat and a ſepulchre in the chancels is one of the privileges of founders.

CHANCELLOR, was at firſt only a chief notary or ſcribe under the emperors; and was called *cancellarius*, becauſe he ſat behind a lattice (in Latin *cancellus*) to avoid being crowded by the people: though ſome derive the word from *cancellare*, "to cancel" (See Chancery). This officer was afterwards inveſted with ſeveral judicial powers, and a general ſuperintendency over the reſt of the officers of the prince. From the Roman empire it paſſed to the Roman church, ever emulous of imperial ſtate: and hence every biſhop has to this day his chancellor, the principal judge of his conſiſtory. And when the modern kingdoms of Europe were eſtabliſhed upon the ruins of the empire, almoſt every ſtate preſerved its chancellor with different juriſdictions and dignities, according to their different conſtitutions. But in all of them he ſeems to have had the ſuperviſion of all charters, letters, and ſuch other public inſtruments of the crown as were authenticated in the moſt ſolemn manner: and therefore, when ſeals came in uſe, he had always the cuſtody of the king's great ſeal.

Lord High Chancellor *of Great Britain*, or *Lord Keeper of the Great Seal*, is the higheſt honour of the long robe, being created by the mere delivery of the king's great ſeal into his cuſtody; whereby he becomes, without writ or patent, an officer of the greateſt weight and power of any now ſubſiſting in the kingdom. He is a privy counſellor by his office; and, according to Lord Chancellor Elleſmere, prolocutor of the houſe of lords by preſcription. To him belongs the appointment of all the juſtices of the peace throughout the kingdom. Being in former times commonly an eccleſiaſtic (for none elſe were then capable of an office ſo converſant in writing), and preſiding over the royal chapel, he became keeper of the king's conſcience; viſitor, in right of the king, of all hoſpitals and colleges of the king's foundation; and patron of all the king's livings under the value of 20 *l. per annum* in the king's books. He is the general guardian of all infants, idiots, and lunatics; and has the general ſuperintendance of all charitable uſes in the kingdom; and all this over and above the vaſt extenſive juriſdiction which he exerciſes in his judicial capacity in the court of chancery. He takes precedence of every temporal lord except the royal family, and of all others except the archbiſhop of Canterbury. See Chancery.

Chancellor, in Scotland, was the chief in matters of juſtice. In the laws of king Malcolm II. he is placed before all other officers; and from theſe it appears that he had the principal direction of the Chancery, or Chancellary, as it is called, which is his proper office. He had the cuſtody of the king's ſeal; and he was the king's moſt intimate counſellor, as appears by an old law cited by Sir James Balfour. The office of lord chancellor in Scotland was aboliſhed by the Union, there being no farther uſe for the judicial part of this office; and, to anſwer all the other parts of the chancellor's office, a lord keeper of the great ſeal was appointed, with a ſalary of 3000l. a year.

Chancellor *of a Cathedral*, an officer that hears leſſons and lectures read in the church, either by himſelf or his vicar; to correct and ſet right the reader when he reads amiſs; to inſpect ſchools; to hear cauſes; apply the ſeal; write and diſpatch the letters of the chapter; keep the books; take care that there be frequent preachings, both in the church and out of it; and aſſign the office of preaching to whom he pleaſes.

Chancellor *of the Duchy of Lancaſter*, an officer appointed chiefly to determine controverſies between the king and his tenants of the duchy-land, and otherwiſe to direct all the king's affairs belonging to that court. See Duchy *Court*.

Chancellor *of the Exchequer*, an officer who preſides in that court, and takes care of the intereſt of the crown. He is always in commiſſion with the lord-treaſurer, for the letting of crown-lands, &c. and has power, with others, to compound for forfeitures of lands upon penal ſtatutes. He has alſo great

authority in managing the royal revenues, and in matters relating to the firſt-fruits.

CHANCELLOR *of the Order of the Garter, and other Military Orders*, is an officer who ſeals the commiſſions and mandates of the chapter and aſſembly of the knights, keeps the regiſter of their proceedings, and delivers acts thereof under the ſeal of their order.

CHANCELLOR *of an Univerſity*, is he who ſeals the diplomas, or letters of degrees, proviſion, &c. given in the univerſity. The chancellor of *Oxford* is uſually one of the principal nobility, choſen by the ſtudents themſelves in convocation. He is their chief magiſtrate; his office is, *durante vita*, to govern the univerſity, preſerve and defend its rights and privileges, convoke aſſemblies, and do juſtice among the members under his juriſdiction. Under the chancellor is the *vice-chancellor*, who is choſen annually, being nominated by the chancellor, and elected by the univerſity in convocation. He is always the head of ſome college, and in holy orders. His proper office is to execute the chancellor's power, to govern the univerſity according to her ſtatutes, to ſee that officers and ſtudents do their duty, that courts be duly called, &c. When he enters upon his office, he chooſes four pro-vice chancellors from the heads of the colleges, to execute his duty in his abſence.

The chancellor of *Cambridge* is alſo uſually one of the firſt of our nobility, and in moſt reſpects the ſame as that in Oxford; only he does not hold his office *durante vita*, but may be elected every three years. Under the chancellor there is a commiſſary, who holds a court of record for all privileged perſons and ſcholars under the degree of maſter of arts, where all cauſes are tried and determined by the civil and ſtatute law, and by the cuſtom of the univerſity. The vice-chancellor of Cambridge is choſen annually by the ſenate, out of two perſons nominated by the heads of the ſeveral colleges and halls.

CHANCELLOR's *Court*. See UNIVERSITY *Courts*.

CHANCERON, in natural hiſtory, a name given by the French writers to the ſmall caterpillar that eats the corn, and does much miſchief in their granaries. See the article CORN-*Butterfly*.

CHANCERY, the higheſt court of juſtice in Britain next to the parliament, and of very ancient inſtitution. It has its name chancery *(cancellaria)* from the judge who preſides here, the lord chancellor, or *cancellarius*; who, according to Sir Edward Coke, is ſo termed *à cancellando*, from cancelling the king's letters patent when granted contrary to law, which is the higheſt point of his juriſdiction. In chancery there are two diſtinct tribunals: the one ordinary, being a court of common law; the other extraordinary, being a court of equity.

1. The *ordinary* legal court holds pleas of recognizances acknowledged in the chancery, writs of *ſcire facias*, for repeal of letters patent, writs of partition, &c. and alſo of all perſonal actions by or againſt any officer of the court. Sometimes a *ſuperſedeas*, or writ of privilege, hath been here granted to diſcharge a perſon out of priſon: one from hence may have a *habeas corpus* prohibition, &c. in the vacation: and here a *ſubpœna* may be had to force witneſſes to appear in other courts, when they have no power to call them. But in proſecuting cauſes, if the parties deſcend to iſſue, this court cannot try it by jury; but the lord chancellor delivers the record into the king's bench to be tried there; and after trial had, it is to be remanded into the chancery, and there judgment given: though if there be a demurrer in law, it ſhall be argued in this court.

In this court is alſo kept the *officina juſtitiæ*; out of which all original writs that paſs under the great ſeal, all commiſſions of charitable uſes, ſewers, bankruptcy, idiocy, lunacy, and the like, do iſſue; and for which it is always open to the ſubject, who may there at any time demand and have, *ex debito juſtitiæ*, any writ that his occaſions may call for. Theſe writs, relating to the buſineſs of the ſubject, and the returns of them, were, according to the ſimplicity of ancient times, originally kept in a hamper, *in hanaperio*; and the others (relating to ſuch matters wherein the crown is mediately or immediately concerned) were preſerved in a little ſack or bag, *in parva baga*; and hence hath ariſen the diſtinction of the *hanaper* office, and the *petty-bag* office, which both belong to the common law-court in chancery.

2. The *extraordinary* court, or court of equity, proceeds by the rules of equity and conſcience, and moderates the rigour of the common law, conſidering the *intention* rather than the *words* of the law. It gives relief for and againſt infants notwithſtanding their minority, and for and againſt married women notwithſtanding their coverture. All frauds and deceits for which there is no redreſs at common law; all breaches of truſt and confidence; and accidents, as to relieve obligors, mortgagers, &c. againſt penalties and forfeitures, where the intent was to pay the debt, are here remedied: for in chancery, a forfeiture, &c. ſhall not bind, where a thing may be done after or compenſation made for it. Alſo this court will give relief againſt the extremity of unreaſonable engagements entered into without conſideration; oblige creditors that are unreaſonable to compound with an unfortunate debtor; and make executors, &c. give ſecurity and pay intereſt for money that is to lie long in their hands. This court may confirm a title to lands, though one has loſt his writings; and render conveyances, defective through miſtake, &c. good and perfect. In chancery, copyholders may be relieved againſt the ill uſage of their lords; incloſures of lands that are common be decreed; and this court may decree money or lands given to charitable uſes, oblige men to account with each other, &c. But in all caſes where the plaintiff can have his remedy at law, he ought not to be relieved in chancery; and a thing which may be tried by a jury is not triable in this court.

The proceedings in chancery are, firſt to file the bill of complaint, ſigned by ſome counſel, ſetting forth the fraud or injury done, or wrong ſuſtained, and praying relief: after the bill is filed, proceſs of *ſubpœna* iſſues to compel the defendant to appear; and when the defendant appears, he puts in his anſwer to the bill of complaint, if there be no cauſe for the plea to the juriſdiction of the court, in diſability of the perſon, or in bar, &c. Then the plaintiff brings his replication, unleſs he files exceptions againſt the anſwer as inſufficient, referring it to a maſter to report whether it be ſufficient or not; to which report exceptions may alſo be made. The anſwer, replication, rejoinder, &c. being ſettled, and the parties come to iſſue, witneſſes are to be examined upon interrogatories, either in court or by commiſſion in the country, wherein the parties uſually join; and when the plaintiff and defendant have examined their witneſſes, publication is to be made of the depoſitions, and the cauſe is to be ſet down for hearing; after which follows the decree. But it is now uſual to appeal to the houſe of lords; which appeals are to be ſigned by two noted counſel, and exhibited by way of petition; the petition or appeal is lodged with the clerk of the houſe of lords, and read in the houſe, whereon the appellee is ordered to put in his anſwer, and a day fixed for hearing the cauſe; and after counſel heard, and evidence given on both ſides, the lords will affirm or reverſe the decree of the chancery, and finally determine the cauſe by a majority of votes, &c.

CHANDELIER, in fortification, a kind of moveable parapet, conſiſting of a wooden frame, made of two upright ſtakes, about ſix feet high, with croſs planks between them; ſerving to ſupport faſcines to cover the pioneers.

CHANDERNAGORE, a neat and large town of Hindoo-

ſtan Proper, in Bengal. It is a French ſettlement, and had a very ſtrong fort, which was taken and deſtroyed by admiral Watſon in 1757; and, in 1793, the Engliſh again diſpoſſeſſed the French of this ſettlement. It is ſeated on the W. ſide of the river Hoogly, a little N. N. W. of Calcutta.

CHANDLER (Mary), diſtinguiſhed by her talent for poetry, was the daughter of a diſſenting miniſter at Bath, and was born at Malmſbury in Wiltſhire in 1687. She was bred a milliner; but from her childhood had a turn for poetry, and in her riper years applied herſelf to the ſtudy of the poets. Her poems, for which ſhe was complimented by Mr. Pope, breathe the ſpirit of piety and philoſophy. She had the misfortune to be deformed, which determined her to live ſingle; though ſhe had great ſweetneſs of countenance, and was ſolicited to marry. She died in 1745, aged 58.

CHANDLER (Dr. Samuel), an eminent diſſenting miniſter, born in 1693. He wrote, among many other books, "A Vindication of the Chriſtian Religion;" "Reflections on the Conduct of the Modern Deiſts, in their late Writings againſt Chriſtianity;" "A Vindication of the Antiquity and Authority of Daniel's Prophecies, and their Application to Jeſus Chriſt;" The Hiſtory of Perſecution;" and "A Critical Hiſtory of the Life of David." Dr. Chandler died in 1766.

CHANG-TONG, a province of China, bounded on the eaſt by Petcheli and part of Honan, on the ſouth by Kiang-nan, on the eaſt by the ſea, and on the north by the ſea and part of Petcheli. The country is well watered by lakes, ſtreams, and rivers; but is nevertheleſs liable to ſuffer from drought, as rain falls here but ſeldom. The locuſts alſo ſometimes make great devaſtation. However, it abounds greatly in game; and there is perhaps no country where quails, partridges, and pheaſants are ſold cheaper, the inhabitants of this province being reckoned the keeneſt ſportſmen in the empire. The province is greatly enriched by the river Yun, called the *Grand Imperial Canal*, through which all the barks bound to Pekin muſt paſs in their way thither. The duties on this canal alone amount to more than 450,000l. annually. The canal itſelf is greatly admired by European travellers on account of its ſtrong and long dikes, the banks decorated with cut ſtone, the ingenious mechaniſm of its locks, and the great number of natural obſtacles which have been overcome in the execution of the work. The province produces ſilk of the ordinary kind; and beſides this, another from a ſort of inſect reſembling our caterpillar. It is coarſer than the ordinary ſilk, but much ſtronger and more durable; ſo that the ſtuffs made from it have a very extenſive ſale throughout the empire. Chang-tong is remarkable for being the birth-place of the celebrated philoſopher and lawgiver Confucius. His native city is called *Kio-feou*, where there are ſeveral monuments erected in honour of this great man. The province is divided into ſix diſtricts, which contain ſix cities of the firſt claſs, and 114 of the ſecond and third.

CHANGER, an officer belonging to the king's mint, who changes money for gold or ſilver bullion. See MINT.

Money CHANGER, is a banker, who deals in the exchange, receipt, and payment of monies. See BANKER.

CHANGES, the permutations or variations of any number of things, with regard to their poſition, order, &c. as how many changes may be rung on a number of bells, or how many different ways any number of perſons may be placed, or how many ſeveral variations may be made of any number of letters, or any other things propoſed to be varied.

To find out ſuch number of changes, multiply continually together all the terms in a ſeries of arithmetical progreſſion, whoſe firſt term and common difference are each unity or 1, and the laſt term the number of things propoſed to be varied, thus $1 \times 2 \times 3 \times 4 \times 5$ &c. till the laſt number be the propoſed number of things. For,

If there be only two things, as *a* and *b*, they admit of a double order or poſition only; for they may be placed either thus *ab*, or thus, *ba*, viz. $1 \times 2 = 2$ ways.

If there be three things, as *a*, *b*, and *c*, they will admit of 6 variations $= 1 \times 2$ ſince as in the margin, and no more; there each of the three may be combined three different ways with each of the other two.

a b c
a c b
b a c
b c a
c a b
c b a

And if there be 4 things, each of them may be combined 4 ways with each order of the other three, that is 4 times 6 ways, or $1 \times 2 \times 3 \times 4 = 24$ ways.

In like manner, the combinations of

5 things are $1 \times 2 \times 3 \times 4 \times 5 = 120$
6 things are $1 \times 2 \times 3 \times 4 \times 5 \times 6 = 720$
&c.

So that if it be propoſed to aſſign how many different ways a company of 6 perſons may be placed, at table for inſtance, the anſwer will be 720 ways. Alſo the number of changes that can be rung on 7 bells, are $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7$, or $720 \times 7 = 5040$ changes.

CHANNA, in zoology, the name of a fiſh caught in great plenty in the Mediterranean, and brought to market in Italy and elſewhere, among the ſea-perch, which it ſo nearly reſembles, that it would not be diſtinguiſhable from it, but that the ſea-perch is bigger, and has only broad tranſverſe lines on its back, whereas the channa has them both tranſverſe and longitudinal. It has a very wide mouth, and its lower jaw is longer than its upper; ſo that its mouth naturally falls open. Its eyes are ſmall, and its teeth very ſharp: its back is of a blackiſh red: it has ſeveral longitudinal lines of a reddiſh hue; and its tail is marked with reddiſh ſpots. There is an obſervation, that in all the fiſh of this kind which have been examined by naturaliſts, there have been found none but females. This is as old as the days of Ariſtotle. Whether this be true in fact, would require many obſervations. If it ſhould prove ſo, the whole ſeems to end in this, that the channa is no diſtinct ſpecies, but only the female of ſome other fiſh. There is another fiſh not unlike this, called *cannadella*, or rather *channadella*, which at Marſeilles is known by the name of *charina*.

CHANNEL, in geography, an arm of the ſea, or a narrow ſea between two continents, or between a continent and an iſland. Such are the Britiſh channel, St. George's channel, the channel of Conſtantinople, &c.

CHANNEL *of a ſhip*. See CHAIN-*Wales*.

CHAN-SI, a province of China, and one of the ſmalleſt in the empire, is bounded on the eaſt by Petcheli, on the ſouth by Honan, on the weſt by Chen-ſi, and on the north by the great wall. The climate is healthful and agreeable, and the ſoil generally fertile, though the country is full of mountains.

CHANT, *cantus*, is uſed for the vocal muſic of churches. In church-hiſtory we meet with various kinds of *chant* or *ſong*. The firſt is the *Ambroſian*, eſtabliſhed by St. Ambroſe. The ſecond, the *Gregorian chant*, introduced by Pope Gregory the Great, who eſtabliſhed ſchools of chantors, and corrected the church-ſong. This is ſtill retained in the church under the name of *plain-ſong*: at firſt it was called the *Roman ſong*. The *plain* or *Gregorian chant*, is where the choir and people ſing in uniſon, or all together in the ſame manner.

CHANTILLY, a town of France, 17 miles from Paris; celebrated for a fine foreſt and magnificent hunting-ſeat, which belonged, before the late revolution, to the prince of Condé. Lon. 2. 36. E. Lat. 49. 11. N.

CHANTOR, a ſinger of a choir in a cathedral. The word is almoſt grown obſolete, *choriſter* or *ſinging-man* being commonly uſed inſtead of it. All great chapters have chantors

and chaplains to aſſiſt the canons, and officiate in their abſence.

CHANTOR is uſed by way of excellence for the precentor or maſter of the choir, which is one of the firſt dignities of the chapter. At St. David's in Wales, where there is no dean, he is next in dignity to the biſhop. The ancients called the chantor *primicerius cantorum*. To him belonged the direction of the deacons and other inferior officers. Chantors in the Temple of Jeruſalem were a number of Levites employed in ſinging the praiſes of God, and playing upon inſtruments before his altar. They had no habits diſtinct from the reſt of the people; yet in the ceremony of removing the ark to Solomon's temple, the chantors appeared dreſſed in tunics of byſſus or fine linen. 2 Chron. v. 12.

CHANTRY, or CHAUNTRY, was anciently a church or chapel endowed with lands, or other yearly revenue, for the maintenance of one or more prieſts, daily ſaying or ſinging maſs for the ſouls of the donors, and ſuch others as they appointed. Hence *chauntry-rents* are rents paid to the crown by the tenants or purchaſers of *chauntry-lands*.

CHAOLOGY, the hiſtory or deſcription of the chaos. Orpheus, in his chaology, ſets forth the different alterations, ſecretions, and various forms, which matter went through till it became inhabitable, which amounts to the ſame with what we otherwiſe call *coſmogony*. Dr. Burnet, in his theory of the earth, repreſents the chaos as it was at firſt, entire, undivided, and univerſally rude and deformed; or the *tohu bohu*: he then ſhows how it came to be divided into its reſpective regions; how the homogeneous matter gathered itſelf apart from all of a contrary principle; and laſtly, how it hardened and became a ſolid habitable globe. See EARTH.

CHAOS, that confuſion in which matter lay when newly produced out of nothing at the beginning of the world, before God, by his almighty word, had put it into the order and condition wherein it was after the ſix days creation. See EARTH.

Chaos is repreſented by the ancients as the firſt principle, ovum, or ſeed of nature and the world. All the ſophiſts, ſages, naturaliſts, philoſophers, theologues, and poets, held that chaos was the eldeſt and firſt principle, το αρχαιον χαος. The Barbarians, Phœnicians, Egyptians, Perſians, &c. all refer the origin of the world to a rude, mixed, confuſed maſs of matter. The Greeks, Orpheus, Heſiod, Menander, Ariſtophanes, Euripides, and the writers of the Cyclic Poems, all ſpeak of the firſt chaos; the Ionic and Platonic philoſophers build the world out of it. The Stoics hold, that as the world was firſt made of a chaos, it ſhall at laſt be reduced to a chaos; and that its periods and revolutions in the mean time are only tranſitions from one chaos to another. Laſtly, the Latins, as Ennius, Varro, Ovid, Lucretius, Statius, &c. are all of the ſame opinion. Nor is there any ſect or nation whatever that does not derive their διακοσμησις, *the ſtructure of the world*, from a chaos. Mr. Whiſton ſuppoſes the ancient chaos, the origin of our earth, to have been the atmoſphere of a comet; which, though new, yet, all things conſidered, is not the moſt improbable aſſertion. He endeavours to make it out by many arguments, drawn from the agreement which appears to be between them. So that, according to him, every planet is a comet, formed into a regular and laſting conſtitution, and placed at a proper diſtance from the ſun, revolving in a nearly circular orbit: and a comet is a planet either beginning to be deſtroyed or re-made; that is, a chaos or planet unformed, or in its primæval ſtate, and placed as yet in an orbit very eccentrical.

CHAOS, in the phraſe of Paracelſus, imports the air. It has alſo ſome other ſignifications amongſt the alchemiſts.

CHAOS, in zoology, a genus of inſects belonging to the order of vermes zoophyta. The body has no ſhell or covering, and is capable of reviving after being dead to appearance for a long time: it has no joints or external organs of ſenſation. There are five ſpecies, moſtly obtained by infuſions of different vegetables in water, and only diſcoverable by the microſcope. See ANIMALCULE.

CHAPEAU, in heraldry, an ancient cap of dignity worn by dukes, being ſcarlet-coloured velvet on the outſide, and lined with a fur. It is frequently borne above an helmet inſtead of a wreath, under gentlemen's creſts.

CHAPEL, a place of divine worſhip, ſo called. The word is derived from the Latin *capella*. In former times, when the kings of France were engaged in war, they always carried St. Martin's hat into the field, which was kept in a tent as a precious relic: from whence the place was called *capella*; and the prieſts, who had the cuſtody of the tent, *capellani*. Afterwards the word *capella* became applied to private oratories. In Britain there are ſeveral ſorts of chapels. 1. Parochial chapels: theſe differ from pariſh-churches only in name; they are generally ſmall, and the inhabitants within the diſtrict few. If there be a preſentation *ad eccleſiam*, inſtead of *capellam*, and an admiſſion and inſtitution upon it, it is no longer a chapel, but a church. 2. Chapels, which adjoin to, and are part of the church: ſuch were formerly built by honourable perſons, as burying-places for themſelves and their families. 3. Chapels of eaſe: theſe are uſually built in very large pariſhes, where all the people cannot conveniently repair to the mother-church. 4. Free chapels; ſuch as were founded by kings of England. They are free from all epiſcopal juriſdiction, and only to be viſited by the founder and his ſucceſſors; which is done by the lord chancellor: yet the king may licenſe any ſubject to build and endow a chapel, and by letters patent exempt it from the viſitation of the ordinary. 5. Chapels in the univerſities, belonging to particular colleges. 6. Domeſtic chapels, built by noblemen or gentlemen for the private ſervice of God in their families. See CHAPLAIN.

CHAPEL is alſo a name given to a printer's work-houſe; becauſe, according to ſome authors, printing was firſt actually performed in chapels or churches; or, according to others, becauſe Caxton, an early printer, exerciſed the art in one of the chapels in Weſtminſter Abbey. In this ſenſe they ſay, *the orders* or *laws of the chapel*, *the ſecrets of the chapel*, &c.

Knights of the CHAPEL, called alſo *Poor knights of Windſor*, were inſtituted by Henry VIII. in his teſtament. Their number was firſt thirteen, but has been ſince augmented to twenty-ſix. They aſſiſt in the funeral ſervice of the kings of England: they are ſubject to the office of the canons of Windſor, and live on penſions aſſigned them by the order of the garter. They bear a blue or red cloak, with the arms of St. George on the left ſhoulder.

CHAPELAIN (James), an eminent French poet, born at Paris in 1595; and often mentioned in the works of Balzac, Menage, and other learned men. He wrote ſeveral works, and at length diſtinguiſhed himſelf by an heroic poem called *La Pucelle, ou France Delivrée*, which employed him ſeveral years; and which, raiſing the expectation of the public, was as much decried by ſome as extolled by others. He was one of the king's counſellors; and died in 1674, very rich, but was very covetous and ſordid.

CHAPELET, in the manege, a couple of ſtirrup-leathers, mounted each of them with a ſtirrup, and joined at top in a ſort of leather buckle, called the *head of the chapelet*, by which they are made faſt to the pummel of the ſaddle, after being adjuſted to the rider's length and bore. They are uſed both to avoid the trouble of taking up or letting down the ſtirrups every time that the gentleman mounts on a different horſe and ſaddle, and to ſupply the place of the academy ſaddles, which have no ſtirrups to them.

CHAPELLE (Claudius Emanuel Luillier), the natural fon of Francis Luillier, took the name of *Chapelle* from a village between Paris and St. Denys, where he was born. He diftinguifhed himfelf by writing fmall pieces of poetry, in which he difcovered great delicacy, an eafy turn, and an admirable facility of expreffion. He was the friend of Gaffendi and Moliere; and died in 1686.

CHAPERON, CHAPERONNE, or CHAPEROON, properly fignifies a fort of hood or covering of the head, anciently worn both by men and women, the nobles and the populace, and afterwards appropriated to the doctors and licentiates in colleges, &c. Hence the name paffed to certain little fhields, and other funeral devices, placed on the foreheads of the horfes that drew the hearfes in pompous funerals, and which are ftill called *chaperoons*, or *fhafferoons*; becaufe fuch devices were originally faftened on the *chaperonnes*, or hoods, worn by thofe horfes with their other coverings of ftate.

CHAPERON *of a bit-mouth*, in the manege, is only ufed for fcatch-mouths, and all others that are not cannon-mouths, fignifying the end of the bit that joins to the branch juft by the banquet. In fcatch-mouths the chaperon is round, but in others it is oval: and the fame part that in fcatch and other mouths is called *chaperon*, is in cannon-mouths called *fronteau*.

CHAPITERS, in architecture, the fame with capitals.

CHAPITERS, in law, formerly fignified a fummary of fuch matters as were inquired of, or prefented before juftices in eyre, juftices of affize, or of the peace in their feffions. Chapiters, at this time, denote fuch articles as are delivered by the mouth of the juftice in his charge to the inqueft.

CHAPLAIN, an ecclefiaftical perfon, in the houfe of a prince, or perfon of quality, who officiates in their chapels, &c. In England there are 48 chaplains to the king, who wait four each month, preach in the chapel, read the fervice to the family, and to the king in his private oratory, and fay grace in the abfence of the clerk of the clofet. While in waiting they have a table, and attendance, but no falary. In Scotland the king has fix chaplains, with a falary of 50l. each, three of them having in addition the deanery of the chapel-royal divided between them, making up above 100l. to each. Their only duty at prefent is to fay prayers at the election of peers for Scotland to fit in parliament. According to a ftatute of Henry VIII. the perfons vefted with a power of retaining chaplains, together with the number each is allowed to qualify, is as follows: An archbifhop, eight; a duke or bifhop, fix; marquis or earl, five; vifcount, four; baron, knight of the garter, or lord chancellor, three; a duchefs, marchionefs, countefs, baronefs, the treafurer and comptroller of the king's houfe, clerk of the clofet, the king's fecretary, dean of the chapel, almoner, and mafter of the rolls, each of them two; chief juftice of the king's bench, and warden of the cinque-ports, each one. All thefe chaplains may purchafe a licence or difpenfation, and take two benefices with cure of fouls. A chaplain muft be retained by letters teftimonial under hand and feal; for it is not fufficient that he ferve as chaplain in the family. The firft chaplains are faid to have been thofe inftituted by the ancient kings of France, for preferving the chape, or cape, with the other relics of St. Martin, which the kings kept in their palaces, and carried out with them to the war. The firft chaplain is faid to have been Gul. de Mefmes, chaplain to St. Louis.

CHAPLAIN *in the order of Malta*, is ufed for the fecond rank or clafs in that order; otherwife called *diaco*. The knights make the firft clafs, and the chaplains the fecond.

CHAPLAINS *of the Pope*, are the auditors, or judges of caufes in the facred palace; fo called, becaufe the pope anciently gave audience in his chapel, for the decifion of cafes fent from the feveral parts of Chriftendom. He hither fummoned as affeffors the moft learned lawyers of his time; and they hence acquired the appellation of *capellani*, chaplains. It is from the decrees formerly given by thefe that the body of decretals is compofed: their number pope Sixtus IV. reduced to twelve. Some fay, the fhrines of relics were covered with a kind of tent, cape, or *capella*, i. e. little cape; and that hence the priefts, who had the care of them, were called chaplains. In time thefe relics were depofited in a little church, either contiguous to a larger, or feparate from it; and the fame name, *capella*, which was given to the cover, was alfo given to the place where it was lodged: and hence the prieft who fuperintended it came to be called chaplain.

CHAPLET, an ancient ornament for the head, like a garland or wreath: but this word is frequently ufed to fignify the circle of a crown. There are inftances of its being borne in a coat of arms, as well as for crefts: the paternal arms for Lafcelles are argent, three chaplets, gules.

CHAPLET alfo denotes a ftring of beads ufed by the Roman Catholics, to count the number of their prayers. The invention of it is afcribed to Peter the hermit, who probably learned it of the Turks, as they owe it to the Eaft Indians. Chaplets are fometimes called *pater-nofters*; and are made of coral, of diamonds, of wood, &c. The common chaplet contains fifty ave-marias, and five pater-nofters. There is alfo a chaplet of our Saviour, confifting of 33 beads, in honour of his 33 years living on earth, inftituted by father Michael the Camaldufian.

The Orientals have a kind of chaplets which they call *chains*, and which they ufe in their prayers, rehearfing one of the perfections of God on each link or head. The Great Mogul is faid to have 18 of thefe chains, all precious ftones; fome diamonds, others rubies, pearls, &c. The Turks have likewife chaplets, which they bear in the hand, or hang at the girdle; but father Dandini obferves, they differ from thofe ufed by the Romanifts, in that they are all of the fame bignefs, and have not that diftinction into decads, though they confift of fix decads, or 60 beads. He adds, that the Muffulmans run over the chaplet almoft in an inftant, the prayers being extremely fhort, as containing only thefe words, " praife to God," or " glory to God," for each bead. Befides the common chaplet they have likewife a larger one confifting of 100 beads, where there is fome diftinction, as being divided by little threads into three parts; on one of which they repeat 30 times *foubhan Allah*, i. e. " God is worthy to be praifed;" on another, *ellamb Allah*, " glory be to God;" and on the third, *Allah ecber*, " God is great." Thefe thrice thirty times making only 90; to complete the number 100, they add other prayers for the beginning of the chaplet.—He adds, that the Mahometan chaplet appears to have had its rife from the *mea beracoth*, or " hundred benedictions;" which the Jews are obliged to repeat daily, and which we find in their prayer-books; the Jews and Mahometans having this in common, that they fcarce do any thing without pronouncing fome laud or benediction. Menage derives the word *chaplet* from *chapeau*, " hat." The modern Latins call it *chapellina*, the Italians more frequently *corona*.

CHAPLET, or *Chapelet*, in architecture, a little moulding, cut or carved into round beads, pearls, olives, or the like.

CHAPMAN (George), born in 1557, a man highly efteemed in his time for his dramatic and poetic works. He wrote 17 plays; tranflated Homer and fome other ancient poets; and was thought no mean genius. He died in 1634; and was buried in St. Giles's in the fields, where his friend Inigo Jones erected a monument to him.

CHAPPE, in heraldry, the dividing an efcutcheon by lines drawn from the centre of the upper edge to the angles below, into three parts, the fections on the fides being of different metal or colour from the reft.

CHAPPEL IN FRITH, a market-town of Derbyfhire, about

26 miles north-weſt of Derby. W. long. 1. 50. N. lat. 53. 22.

CHAPPEL (William), a learned and pious biſhop of Cork, Cloyne, and Roſs, in Ireland, born in Nottinghamſhire in 1582. When the troubles began under Charles I. he was proſecuted by the puritan party in parliament, and retired to Derby, where he devoted himſelf to ſtudy until his death in 1649. He wrote *Methodus Concionandi*, i. e. "the method of preaching;" and he is one of thoſe to whom the *Whole duty of Man* has been attributed. He left behind him alſo his own life written by himſelf in Latin, which has been twice printed.

CHAPTER, in eccleſiaſtical polity, a ſociety or community of clergymen belonging to the cathedrals and collegiate churches. It was in the eighth century that the body of canons began to be called a chapter. The chapter of the canons of a cathedral were a ſtanding council to the biſhop, and, during the vacancy of the ſee, had the juriſdiction of the dioceſe. In the earlier ages, the biſhop was the head of the chapter; afterwards abbots and other dignitaries, as deans, provoſts, treaſurers, &c. were preferred to this diſtinction. The deans and chapters had the privilege of chooſing the biſhops in England; but Henry VIII. got this power veſted in the crown: and as the ſame prince expelled the monks from the cathedrals, and placed ſecular canons in their room, thoſe he thus regulated were called deans and chapters of the new foundation; ſuch are Canterbury, Wincheſter, Ely, Carliſle, &c. See DEAN.

CHAPTER, in matters of literature, a diviſion in a book for keeping the ſubject treated of more clear and diſtinct.

CHAR, in ichthyology, a ſpecies of SALMO.

CHARA, in botany; a genus of the monandria order, belonging to the monœcia claſs of plants. There is neither male calyx nor corolla; and the anthera is placed under the germen. The female calyx is tetraphyllous; no corolla; the ſtigma quinquefid, with one roundiſh ſeed.

CHARABON, a ſea-port town on the northern coaſt of the iſland of Java in the Eaſt-Indies. E. long. 10. 8. S. lat. 6.

CHARACTER, in a general ſenſe, ſignifies a mark or figure drawn on paper, metal, ſtone, or other matter, with a pen, graver, chiſſel, or other inſtrument, to ſignify or denote any thing. The word is Greek, χαρακτηρ, formed from the verb, χαρασσειν, *inſculpere*, "to engrave, impreſs," &c. The various kinds of characters may be reduced to three heads, viz. *Literal Characters*, *Numerical Characters*, and *Abbreviations*.

Literal CHARACTER, is a letter of the alphabet, ſerving to indicate ſome articulate ſound, expreſſive of ſome idea or conception of the mind. See ALPHABET.

1. Theſe may be divided, with regard to their nature and uſe, into *Nominal Characters*, or thoſe we properly call *letters*; which ſerve to expreſs the names of things. *Real Characters*; thoſe that inſtead of names expreſs things and ideas. *Emblematical* or *Symbolical Characters*; which have this in common with real ones, that they expreſs the things themſelves; but have this further, that they in ſome meaſure perſonate them, and exhibit their form: ſuch are the hieroglyphics of the ancient Egyptians. See HIEROGLYPHIC, SYMBOL, &c.

2. *Literal Characters* may be again divided, with regard to their invention and uſe, into *particular* and *general* or *univerſal*.

Particular CHARACTERS, are thoſe peculiar to this or that nation. Such are the Roman, Italic, Greek, Hebrew, Arabic, Gothic, Chineſe, &c. *characters*. See HEBREW, GOTHIC, CHINESE, &c.

Univerſal CHARACTERS, are alſo *real characters*, and make what ſome authors call a *Philoſophical Language*. That diverſity of *characters* uſed by the ſeveral nations to expreſs the ſame idea, is found the chief obſtacle to the advancement of learning: to remove this, ſeveral authors have taken occaſion to propoſe plans of *characters* that ſhould be univerſal, and which each people ſhould read in their own language. The *character* here is to be real, not nominal: to expreſs things and notions, not, as the common ones, letters or ſounds: yet to be mute, like letters, and arbitrary; not emblematical, like hieroglyphics.

Thus, every nation would retain its own language, yet every one underſtand that of each other, without learning it; only by ſeeing a real or univerſal *character*, which ſhould ſignify the ſame things to all people, by what ſounds ſoever each expreſs it in their particular idiom. For inſtance, by ſeeing the *character* deſtined to ſignify *to drink*, an Engliſhman ſhould read *to drink*; a Frenchman, *boire*; a Latin, *bibere*; a Greek, πινειν; a Jew שתה; a German, *trincken*; and ſo of the reſt: in the ſame manner as ſeeing a horſe, each people expreſs it after their own manner; but all mean the ſame animal.

This real *character* is no chimera; the Chineſe and Japaneſe have already ſomething like it. They have a common *character* which each of theſe nations underſtand alike in their ſeveral languages; though they pronounce them with ſuch different ſounds, that they do not underſtand one another in ſpeaking. The firſt and moſt conſiderable attempts for a *real character*, or philoſophical language, in Europe, are thoſe of biſhop Wilkins and Dalgarme: but theſe, with how much art ſoever they were contrived, have yet proved ineffectual. M. Leibnitz had ſome conceptions the ſame way; he thinks thoſe great men did not hit the right method. It was probable, indeed, that by their means, people, who do not underſtand one another, might eaſily have a commerce together; but they have not hit on true *real characters*. According to him, the *characters* ſhould reſemble thoſe uſed in Algebra; which, in effect, are very ſimple, yet very expreſſive; without any thing ſuperfluous or equivocal, and contain all the varieties required.

The *real character* of biſhop Wilkins has its juſt applauſe: Dr. Hook recommends it on his own knowledge and experience as a moſt excellent ſcheme; and to engage the world to the ſtudy thereof, publiſhes ſome fine inventions of his own by way of addition.

M. Leibnitz tells us, he had under conſideration an *alphabet of human thoughts*, in order to a new philoſophical language on his own ſcheme: but his death prevented its being brought to maturity.

M. Lodwic, in the *Philoſophical Tranſactions*, gives us a plan of *an univerſal alphabet* or *character* of another kind: this was to contain an enumeration of all ſuch ſingle ſounds, or letters, as are uſed in any language; by means whereof, people ſhould be enabled to pronounce truly and readily any language; to deſcribe the pronunciation of any language that ſhall be pronounced in their hearing, ſo as others accuſtomed to this language, though they had never heard the language pronounced, ſhall at firſt be able truly to pronounce it: and laſtly, this *character* to ſerve as a ſtandard to perpetuate the ſounds of any language. In the Journal Literaire, for 1720, we have a very ingenious project for an univerſal *character*. The author, after obviating the objections that might be made againſt the feaſibleneſs of ſuch ſchemes in the general, propoſes his own: his *characters* are to be the common Arabic, or numeral figures. The combinations of theſe nine are ſufficient to expreſs diſtinctly an incredible quantity of numbers, much more than we ſhall need terms to ſignify our actions, qualities, duties, paſſions, &c. Thus is all the trouble of framing and learning any new *character* at once ſaved; the Arabic figures having already all the univerſality required.

The advantages are immenſe. For, 1. We have here a ſtable, faithful interpreter; never to be corrupted or changed, as the popular languages continually are. 2. Whereas the difficulty of pronouncing a foreign language is ſuch as uſually gives the learner the greateſt trouble, and there are even ſome ſounds

which foreigners never attain to. In the *character* here propoſed, this difficulty has no place: every nation is to pronounce them according to the particular pronunciation that already obtains among them. All the difficulty is, the accuſtoming the pen and the eye to affix certain notions to *characters* that do not, at firſt ſight, exhibit them. But this trouble is no more than we find in the ſtudy of any language whatever.

The inflections of words are here to be expreſſed by the common letters. For inſtance, the ſame *character* ſhall expreſs a *filly* or a *colt*, a *horſe* or a *mare*, an *old horſe* or an *old mare*, as accompanied with this or that diſtinctive letter, which ſhall ſhow the ſex, youth, maturity, or old age: a letter alſo to expreſs the bigneſs or ſize of things: thus, *v. g.* a man with this or that letter, to ſignify a *great man*, or a *little man*, &c. The uſe of theſe letters belongs to the grammar; which, once well underſtood, would abridge the vocabulary exceedingly. An advantage of this grammar is, that it would only have one declenſion and one conjugation: thoſe numerous anomalies of grammarians are exceeding troubleſome; and hence it is, that the common languages are governed by the populace, who never reaſon on what is beſt: but in the *character* here propoſed, men of ſenſe having the introduction of it, would have a new ground, whereon to build regularly. But the difficulty is not in inventing the moſt ſimple, eaſy, and commodious *character*, but in engaging the ſeveral nations to uſe it, there being nothing they agree leſs in than the underſtanding and purſuing their common intereſt.

3. Literal characters may again be divided, with reſpect to the nations among whom they have been invented, into Greek characters, Roman characters, Hebrew characters, &c. The Latin character now uſed through all Europe was formed from the Greek, as the Greek was from the Phœnician; and the Phœnician, as well as the Chaldee, Syriac, and Arabic characters, were formed from the ancient Hebrew, which ſubſiſted till the Babyloniſh captivity: for after that event the character of the Aſſyrians, which is the ſquare Hebrew now in uſe, prevailed, the ancient being only found on ſome Hebrew medals, commonly called Samaritan medals. It was in 1091 that the Gothic characters, invented by Ulfias, were aboliſhed, and the Latin ones eſtabliſhed in their room.

Medalliſts obſerve, that the Greek character, conſiſting only of majuſcule letters, has preſerved its uniformity on all medals, as low as the time of Gallienus, from which time it appears ſomewhat weaker and rounder: from the time of Conſtantine to Michael we find only Latin characters: after Michael, the Greek characters recommence; but from that time they began to alter with the language, which was a mixture of Greek and Latin. The Latin medals preſerved both their character and language as low as the tranſlation of the ſeat of the empire to Conſtantinople: towards the time of Decius the character began to loſe its roundneſs and beauty; ſome time after, it retrieved, and ſubſiſted tolerably till the time of Juſtin, when it degenerated gradually into the Gothic. The rounder then, and better formed a character is upon a medal, the fairer pretence it has to antiquity.

Numerical CHARACTERS, or characters uſed to expreſs numbers, are either letters or figures.

The Arabic character, called alſo the common one, becauſe it is uſed almoſt throughout Europe in all ſorts of calculations, conſiſts of theſe ten digits 1, 2, 3, 4, 5, 6, 7, 8, 9, 0.

The Roman numerical character conſiſts of ſeven majuſcule letters of the Roman alphabet, *viz.* I, V, X, L, C, D, M. The I denotes one, V five, X ten, L fifty, C a hundred, D five hundred, and M a thouſand. The I repeated twice makes two, II; thrice, three, III; four is expreſſed thus IV, as I before V or X takes an unit from the number expreſſed by theſe letters. To expreſs ſix, an I is added to a V, VI; for ſeven, two, VII; and for eight, three, VIII. Nine is expreſſed by an I before X, thus IX. The ſame remark may be made of the X before L or C, except that the diminution is by tens; thus, XL denotes forty, XC ninety, and LX ſixty. The C before D or M diminiſhes each by a hundred. The number five hundred is ſometimes expreſſed by an I before a C inverted, thus, IↃ; and inſtead of M, which ſignifies a thouſand, an I is ſometimes uſed between two C's, the one direct, and the other inverted, thus CIↃ. The addition of C and Ↄ before or after raiſes CIↃ by tens, thus, CCIↃↃ expreſſes ten thouſand, CCCIↃↃↃ, a hundred thouſand. The Romans alſo expreſſed any number of thouſands by a line drawn over any numeral leſs than a thouſand; thus $\overline{\text{V}}$ denotes five thouſand, $\overline{\text{LX}}$ ſixty thouſand: ſo likewiſe $\overline{\text{M}}$ is one million, $\overline{\text{M}}\overline{\text{M}}$ is two millions, &c.

The Greeks had three ways of expreſſing numbers: 1. Every letter according to its place in the alphabet, denoted a number, from α, one, to ω, twenty-four. 2. The alphabet was divided into eight units, α one, β two, γ three, &c.; into eight tens, ι ten, κ twenty, λ thirty, &c.; and eight hundreds, ρ one hundred, σ two hundred, τ three hundred, &c. 3. I ſtood for one, Π five, Δ ten, H a hundred, X a thouſand, M ten thouſand; and when the letter Π incloſed any of theſe, except I, it ſhowed the incloſed letter to be five times its value; as $\overline{|\Delta|}$ fifty, $\overline{|\text{H}|}$ five hundred, $\overline{|\text{X}|}$ five thouſand, $\overline{|\text{M}|}$ fifty thouſand.

CHARACTERS *of Abbreviations*, &c. in ſeveral of the arts, are ſymbols contrived for the more conciſe and immediate conveyance of the knowledge of things. For the

CHARACTERS *uſed in Algebra*: See ALGEBRA.

CHARACTERS *uſed in Aſtronomy*: Of the Planets: ſee Plates 33. fig. 9. and 43. fig. 68. Of the Signs: Plate 35. fig. 22.

Of the aſpects.

☌ or S Conjunction	△ Trine
SS Semiſextile	Bq Biquintile
* Sextile	Vc Quincunx
Q Quintile	☍ Oppoſition
□ Quartile	☊ Dragon's head
Td Tredeciles	☋ Dragon's tail

Of time.

A. M. *ante meridiem*, before the ſun come upon the meridian.

O. or N. noon.

P. M. *poſt meridiem*, when the ſun is paſt the meridian.

CHARACTERS *in Commerce.*

D° *ditto*, the ſame	R° *recto* } *folio*
N° *numero*, or number	V° *vero* } *folio*
F° *folio*, or page	
C or ⊕ hundred weight, or 112 pounds.	£ or *l.* pounds ſterling
	p^r *per*, or by, as p^r *ann.* by the year, p^r *cent.*
q^rs quarters	℞^x rixdollar
S or *s* ſhillings	D^· ducat
d pence or deniers	P. S. poſtſcript, &c.
℔ pound weight	

CHARACTERS *in Chemiſtry*. See Plates 73, 74, &c.

CHARACTERS *in Geometry and Trigonometry.*

∥ The character of parallelism	$\underset{=}{\text{v}}$ equiangular, or ſimilar
△ triangle	$\stackrel{\text{I}}{=}$ equilateral
□ ſquare	< an angle
▯ ▭ rectangle	∟ right angle
⊙ circle	⊥ perpendicular

° denotes a degree; thus 45° implies 45 degrees.

′ Denotes a minute; thus 50′, is 50 minutes.

$''$, $'''$, $''''$, denote ſeconds, thirds, and fourths; and the ſame characters are uſed where the progreſſions are by tens, as it is here by ſixties.

CHARACTERS *in Grammar, Rhetoric, Poetry, &c.*

() parentheſis	D. D. doctor in divinity.
[] crotchet	V. D. M. miniſter of the word of God
- hyphen	LL. D. doctor of laws
' apoſtrophe	J. V. D. doctor of civil and canon law
´ emphaſis or accent	" quotation
˘ breve	M. D. doctor in phyſic
¨ dialyſis	A. M. maſter of arts
‸ caret and circumflex	A. B. bachelor of arts
‡† and * references	
§ ſection or diviſion	
¶ paragraph	

F. R. S. fellow of the royal ſociety.

For the other characters uſed in grammar, ſee COMMA, COLON, SEMICOLON, &c.

CHARACTERS *among the ancient Lawyers, and in ancient Inſcriptions.*

§ paragraphs	C. code
ff digeſts	C. C. conſules
Scto. ſenatus conſulto	T. titulus
E. extra	P. P. D. D. propria pecunia dedicavit
S. P. Q. R. ſenatus populuſque Romanus	D. D. M. dono dedit monumentum.
P. P. pater patriæ	

CHARACTERS *in Medicine and Pharmacy.*

℞ recipe	coch. cochleare, a ſpoonful
$\bar{a}$, $\bar{a}\bar{a}$, or ana, of each alike	M. manipulus, a handful
℔ a pound, or a pint	P. a pugil
℥ an ounce	P. Æ. equal quantities
ʒ a drachm	S. A. according to art
℈ a ſcruple	q. s. a ſufficient quantity
gr. grains	q. pl. as much as you pleaſe
ſs or *ſs* half of any thing	P. P. pulvis patrum, the Jeſuits' bark
cong. congius, a gallon	

CHARACTERS *upon Tomb-ſtones.*

S. V. Siſte viator, *i. e.* Stop traveller. M. S. Memoriæ ſacrum, *i. e.* Sacred to the memory. D. M. Diis manibus. J. H. S. Jeſus. X. P. a character found in the catacombs, about the meaning of which authors are not agreed.

CHARACTERS *uſed in Muſic, and of Muſical Notes with their proportions, are as follow:*

characters of a large	8	crotchet	$\frac{1}{4}$
a long	4	quaver	$\frac{1}{8}$
a breve	2	ſemiquaver	$\frac{1}{16}$
a ſemibreve	1	demiſemiquaver	$\frac{1}{32}$
a minim	$\frac{1}{2}$		

✻ character of a ſharp note: this character at the beginning of a line or ſpace, denotes that all the notes in that line are to be taken a ſemitone higher than in the natural ſeries; and the ſame affects all the octaves above and below, though not marked: but when prefixed to any particular note, it ſhows that note alone to be taken a ſemitone higher than it would be without ſuch character. ♭ or *b*, character of a flat note: this is the contrary to the other above; that is, a ſemitone lower. ♮ character of a natural note: when in a line or ſeries of artificial notes, marked at the beginning *b* or ✻, the natural note happens to be required, it is denoted by this character. 𝄞 character of the treble cliff. 𝄡 character of the mean cliff. 𝄢 baſs cliff. $\frac{2}{4}$ or $\frac{4}{8}$ characters of common duple time, ſignifying the meaſure of two crotchets to be equal to two notes, of which four make a ſemibreve. C ₵ Ɑ, characters that diſtinguiſh the movements of common time, the firſt implying ſlow, the ſecond quick, and the third very quick. $\frac{3}{1}$, $\frac{3}{2}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{3}{16}$, characters of ſimple triple time, the meaſure of which is equal to three ſemibreves, or to three minims. $\frac{6}{4}$, $\frac{6}{8}$, or $\frac{6}{16}$, characters of a mixed triple time, where the meaſure is equal to ſix crotchets, or ſix quavers. $\frac{9}{4}$, or $\frac{9}{8}$, or $\frac{9}{16}$, or $\frac{9}{1}$, or $\frac{9}{2}$, characters of compound triple time. $\frac{12}{4}$, $\frac{12}{8}$, $\frac{12}{16}$, or $\frac{12}{1}$, or $\frac{12}{2}$, characters of that ſpecies of triple time called the meaſure of twelve times.

CHARACTER, in poetry, particularly the epopee and drama, is the reſult of the manners or peculiarities by which each perſon is diſtinguiſhed from others.

The poetical character, ſays Mr. Boſſu, is not properly any particular virtue or quality, but a compoſition of ſeveral which are mixed together, in a different degree, according to the neceſſity of the fable and the unity of the action: there muſt be one, however, to reign over all the reſt; and this muſt be found, in ſome degree, in every part. The firſt quality in Achilles, is wrath; in Ulyſſes, diſſimulation; and in Æneas, mildneſs: but as theſe characters cannot be alone, they muſt be accompanied with others to embelliſh them, as far as they are capable, either by hiding their defects, as in the anger of Achilles, which is palliated by extraordinary valour; or by making them centre in ſome ſolid virtue, as in Ulyſſes, whoſe diſſimulation makes a part of his prudence; and in Æneas, whoſe mildneſs is employed in a ſubmiſſion to the will of the gods. In the making up of this union, it is to be obſerved, the poets have joined together ſuch qualities as are by nature the moſt compatible; valour with anger, piety with mildneſs, and prudence with diſſimulation. The fable required prudence in Ulyſſes, and piety in Æneas; in this therefore the poets were not left to their choice: but Homer might have made Achilles a coward, without abating any thing from the juſtneſs of his fable: ſo that it was the neceſſity of adorning his character that obliged him to make him valiant. The character then of a hero in an epic poem is compounded of three ſorts of qualities; the firſt, eſſential to the fable; the ſecond, an embelliſhment of the firſt; and valour, which ſuſtains the other two, makes the third.

Unity of character is as neceſſary as the unity of the fable. For this purpoſe a perſon ſhould be the ſame from the beginning to the end; not that he is always to betray the ſame ſentiments, or one paſſion, but that he ſhould never ſpeak or act inconſiſtently with his fundamental character. For inſtance, the weak may ſally into a warmth, and the breaſt of the paſſionate be calm, a change which often introduces in the drama a very affecting variety; but if the natural diſpoſition of the former was to be repreſented as boiſterous, and that of the latter mild and ſoft, they would both act out of character, and contradict probability.

True characters are ſuch as we truly and really ſee in men, or may exiſt without any contradiction to nature. No man queſtions but there have been men as generous and as good as Æneas, as paſſionate and as violent as Achilles, as prudent and wiſe as Ulyſſes, as impious and atheiſtical as Mezentius, and as amorous and paſſionate as Dido; all theſe characters, therefore, are true, and nothing but juſt imitations of nature. On the contrary, a character is falſe when an author ſo feigns it, that one can ſee nothing like it in the order of nature wherein he deſigns it ſhall ſtand; and ſuch ſhould be wholly excluded from a poem.

CHARACTER, among naturaliſts, is ſynonymous with the definition of the genera of animals, plants, &c.

CHARACTERISTIC, in grammar, denotes the principal letter of a word; which is preſerved in moſt of its tenſes and moods, its derivatives and compounds.

CHARACTERISTIC *of a Logarithm*, is its index or exponent. See LOGARITHM.

CHARACTERISTIC *Triangle of a Curve*, in the higher geometry, is a rectilinear right-angled triangle, whofe hypothenufe makes a part of the curve, not fenfibly different from a right line. It is fo called, becaufe curve lines are ufed to be diftinguifhed by it. See CURVE.

CHARADE, the name of a trifling fpecies of compofition or literary amufement. It owes its name to the idler who invented it. Its fubject muft be a word of two fyllables, each forming a diftinct word; and thefe two fyllables are to be concealed in an enigmatical defcription, firft feparately, and then together. A fingle inftance of this nonfenfical art will fuffice:

My *firft*, when a Frenchman is learning Englifh, ferves him to fwear by. My *fecond*, is either hay or corn. My *whole*, is the delight of the prefent age, and will be the admiration of pofterity. *Gar-rick.*

CHARADRIUS, in ornithology, a genus belonging to the order of grallæ. The beak is cylindrical and blunt; the noftrils are linear; and the feet have each three toes. See Plate 63. 1. The *Hiaticula*, or Sea-lark of Ray, has a black breaft; a white ftreak along the front; the top of the head is brown; and the legs and beak are reddifh. It is found on the fhores of Europe and America. They frequent our fhores in the fummer, but are not numerous. They lay four eggs, of a dull whitifh colour, fparingly fprinkled with black: at the approach of winter they difappear. 2. The *Alexandrinus*, or Alexandrian Dotterel, is of a brownifh colour, with the forehead, collar, and belly white; the prime tail-feathers on both fides are white; and the legs are black. It is about the fize of a lark, and lives upon infects. 3. The *Vociferus*, or Noify Plover of Catefby, has black ftreaks on the breaft, neck, forehead, and cheeks; and the feet are yellow. It is a native of North America. 4. The *Ægyptius* has a black ftreak on the breaft, white eye-brows, the prime tail-feathers ftreaked with black at the points, and blueifh legs. It is found in the plains of Egypt, and feeds on infects. 5. The *Morinellus* has an iron-coloured breaft, a fmall white ftreak on the breaft and eye-brows, and black legs. It is the Dotterel of Ray, and a native of Europe. They are found in Cambridgefhire, Lincolnfhire, and Derbyfhire. On Lincoln-heath, and on the moors of Derbyfhire, they are migratory; appearing there in fmall flocks of eight or ten only in the latter end of April, and ftay there all May and part of June, during which time they are very fat, and much efteemed for their delicate flavour. In the months of April and September, they are taken on the Wiltfhire and Berkfhire downs. They are alfo found in the beginning of the former month on the fea-fide at Meales in Lancafhire, and continue there about three weeks, attending the barley fallows: from thence they remove northward to a place called *Leyton Haws*, and ftay there about a fortnight; but where they breed, or where they refide during the winter, we have not been able to difcover. They are reckoned very foolifh birds, fo that a dull fellow is proverbially ftyled a *dotterel*. They were alfo believed to mimic the action of the fowler, ftretching out a wing when he ftretches out an arm, &c. continuing their imitation, regardlefs of the net that is fpreading for them. 6. The *Apricarius* has a black belly; the body is brown, and variegated with white and yellow fpots; and the legs are afh-coloured. It is the fpotted Plover of Edwards, and a native of Canada. 7. The *Pluvialis* is black above, with green fpots, white underneath, and the feet are afh-coloured. It is the green Plover of Ray, and is a native of Europe. They lay four eggs, fharply pointed at the lefler end, of a dirty white colour, and irregularly marked, efpecially at the thicker end, with blotches and fpots. It breeds on feveral of our unfrequented mountains: and is very common on thofe of the ifle of Rum, and others of the loftier Hebrides. They make a fhrill whiftling noife: and may be enticed within fhot by a fkilful imitator of their note. 8. The *Torquatus* has a black breaft, and a white front; the top of the head and the collar are black; and the beak and feet are blueifh. It is a native of St. Domingo. 9. The *Calidris* has black feet, and a black bill: the rump is greyifh; and the body is pure white below. It frequents the fhores of Europe. 10. The *Œdicnemus*, or Stone-curlew of Ray, is of a grey colour, with two of the prime wing-feathers black, but white in the middle: it has a fharp bill, and afh-coloured feet; and is about the fize of a crow. In Hampfhire, Norfolk, and on Lincoln-heath, it is called the curlew, from a fimilarity of colours to the curlew. It breeds in fome places in rabbit-burrows; alfo among ftones on the bare ground, laying two eggs of a copper-colour fpotted with a darker red. The young run foon after they are hatched. Thefe birds feed in the night on worms and caterpillars: they will alfo eat toads, and will catch mice. They inhabit fallow lands and downs; prefer dry places, never being feen near any waters. When they fly, they extend their legs ftraight out behind; are very fhy birds; run far before they take to wing; and often fquat: are generally feen fingle; and are efteemed very delicate food. 11. The *Himantopus* is white below, with a black back, and a long black bill; the feet are red and very long. It is the autumnal dotterel of the Englifh authors, and frequents the fea-fhores of Europe. It is alfo found in the lakes of Egypt in the month of October. 12. The *Spinofus*, armed Dotterel, or Lapwing, has black breaft, legs, and wings; it has a creft on the hinder part of the head. It is of the fize of a pigeon; the French call it *dominicanus*, from the refemblance it has to the drefs of a Dominican monk. It is a native of Egypt. 13. The *New Zealand* Plover has the forepart of the head, taking in the eye, chin, and throat, black, paffing backwards in a collar at the hind head; all the back part of the head, behind the eye, greenifh afh-colour; thefe two colours divided by white: the plumage on the upper parts of the body is the fame colour as the back of the head: the quills and tail are dufky: the laft order of coverts is white for fome part of their length, forming a bar on the wing: the under parts of the body are white; and the legs red. It inhabits Queen Charlotte's found; where it is known by the name of *Doodooroa-attoo*. There are 12 or 13 more fpecies.

CHARAG, the tribute which Chriftians and Jews pay to the grand fignior. It confifts of ten, twelve, or fifteen francs *per annum*, according to the eftate of the party. Men begin to pay it at nine or at fixteen years old; women are difpenfed with, as alfo priefts, rabbins, and religious.

CHARAIMS, a fect of the Jews in Egypt. They live by themfelves, and have a feparate fynagogue; and as the other Jews are remarkable for their eyes, fo are thofe for their large nofes, which run through all the families of this fect. Thefe are the ancient Effenes. They ftrictly obferve the five books of Mofes, according to the letter; and receive no written traditions. It is faid that the other Jews would join the *Charaims*; but thofe not having obferved the exact rules of the law with regard to divorces, thefe think they live in adultery.

CHARANTIA, in botany. See MOMORDICA.

CHARBON, in the manege, that little black fpot or mark which remains after a large fpot in the cavity of the corner teeth of a horfe is loft. In the feventh or eighth year, when the cavity fills up, the tooth being fmooth and equal, it difappears.

CHARCAS, the fouthern divifion of Peru in South America, remarkable for the filver mines of Potofi.

CHARCOAL, a fort of artificial coal, or fuel, confifting of wood half burnt: chiefly ufed where a clear ftrong fire, without fmoke, is required; the humidity of the wood being here

moſtly diſſipated, and exhaled in the fire wherein it is prepared. The operation of charring wood is performed in the following manner: The wood intended for this purpoſe is cut into proper lengths, and piled up in heaps near the place where the charcoal is intended to be made: when a ſufficient quantity of wood is thus prepared, they begin conſtructing their ſtacks, for which there are three methods. The firſt is this: they level a proper ſpot of ground, of about twelve or fifteen feet in diameter, near the piles of wood; in the centre of this area a large billet of wood, ſplit acroſs at one end and pointed at the other, is fixed with its pointed extremity in the earth, and two pieces of wood inſerted through the clefts of the other end, forming four right-angles; againſt theſe croſs pieces four other billets of wood are placed, one end on the ground, and the other leaning againſt the angles. This being finiſhed, a number of large and ſtraight billets are laid on the ground to form a floor, each being as it were the radius of the circular area: on this floor a proper quantity of bruſh or ſmall wood is ſtrewed, in order to fill up the interſtices, when the floor will be complete; and in order to keep the billets in the ſame order and poſition in which they were firſt arranged, pegs or ſtumps are driven into the ground in the circumference of the circle, about a foot diſtant from one another: upon this floor a ſtage is built, with billets ſet upon one end, but ſomething inclining towards the central billet; and on the tops of theſe another floor is laid in a horizontal direction, but of ſhorter billets, as the whole is, when finiſhed, to form a cone.

The ſecond method of building the ſtacks for making charcoal is performed in this manner: A long pole is erected in the centre of the area above deſcribed, and ſeveral ſmall billets ranged round the pole on their ends: the interſtices between theſe billets and the pole is filled with dry bruſh-wood, then a floor is laid, on that a ſtage in a reclining poſition, and on that a ſecond floor, &c. in the ſame manner as deſcribed above; but in the lower floor there is a billet larger and longer than the reſt, extending from the central pole to ſome diſtance beyond the circumference of the circle.

The third method is this: A chimney, or aperture of a ſquare form, is built with billets in the centre, from the bottom to the top; and round theſe, floors and inclined ſtages are erected, in the ſame manner as in the ſtacks above deſcribed, except that the baſe of this, inſtead of being circular like the others, is ſquare; and the whole ſtack, when completed, forms a pyramid.

The ſtack of either form being thus finiſhed, is coated over with turf, and the ſurface plaſtered with a mixture of earth and charcoal-duſt well tempered together. The next operation is the ſetting the ſtack on fire. In order to this, if it be formed according to the firſt conſtruction, the central billet in the upper ſtage is drawn out, and ſome pieces of very dry and combuſtible wood are placed in the void ſpace, called, by workmen, the chimney, and fire is ſet to theſe pieces. If the ſtack be built according to the ſecond conſtruction, the central pole is drawn out, together with the large horizontal billet above deſcribed; and the void ſpace occupied by the latter being filled with pieces of very dry combuſtible wood, the fire is applied to it at the baſe of the ſtack. With regard to the third conſtruction, the ſquare aperture or chimney is filled with ſmall pieces of very dry wood, and the fire applied to it at the top or apex of the pyramidal ſtack. When the ſtack is ſet on fire, either at the top or bottom, the greateſt attention is neceſſary in the workman; for in the proper management of the fire the chief difficulty attending the art of making good charcoal conſiſts. In order to this, care is taken, as ſoon as the flame begins to iſſue ſome height above the chimney, that the aperture be covered with a piece of turf, but not ſo cloſe as to hinder the ſmoke from paſſing out: and whenever the ſmoke appears to iſſue very thick from any part of the pile, the aperture muſt be covered with a mixture of earth and charcoal duſt. At the ſame time, as it is neceſſary that every part of the ſtack ſhould be equally burnt, it will be requiſite for the workman to open vents in one part and ſhut them in another. In this manner the fire muſt be kept up till the charcoal be ſufficiently burnt, which will happen in about two days and a half, if the wood be dry; but if green, the operation will not be finiſhed in leſs than three days. When the charcoal is thought to be ſufficiently burnt, which is eaſily known from the appearance of the ſmoke, and the flames no longer iſſuing with impetuoſity through the vents; all the apertures are to be cloſed up very carefully with a mixture of earth and charcoal-duſt, which, by excluding all acceſs of the external air, prevents the coals from being any further conſumed, and the fire goes out of itſelf. In this condition it is ſuffered to remain, till the whole is ſufficiently cooled; when the cover is removed, and the charcoal is taken away. If the whole proceſs is ſkilfully managed, the coals will exactly retain the figure of the pieces of wood: ſome are ſaid to have been ſo dexterous as to char an arrow without altering even the figure of the feather.

There are conſiderable differences in the coals of different vegetables, in regard to their habitude to fire: the very light coals of linen, cotton, ſome fungi, &c. readily catch fire from a ſpark, and ſoon burn out; the more denſe ones of woods and roots are ſet on fire more difficultly, and burn more ſlowly: the coals of the black berry-bearing alder, of the hazel, the willow, and the lime-tree, are ſaid to anſwer beſt for the making of gunpowder and other pyrotechnical compoſitions, perhaps from their being eaſily inflammable: for the reduction of metallic calces thoſe of the heavier woods, as the oak and the beech, are preferable, theſe ſeeming to contain a larger proportion of the phlogiſtic principle, and that perhaps in a more fixed ſtate: conſidered as common fuel, thoſe of the heavy woods give the greateſt heat, and require the moſt plentiful ſupply of air to keep them burning; thoſe of the light woods preſerve a glowing heat, without much draught of air, till the coals themſelves are conſumed; the bark commonly crackles and flies about in burning, which the coal of the wood itſelf very ſeldom does.

Mathematical inſtrument-makers, engravers, &c. find charcoal of great uſe to poliſh their braſs and copper-plates after they have been rubbed clean with powdered pumice-ſtone. Plates of horn are poliſhable in the ſame way, and a gloſs may be afterwards given with tripoli. The coals of different ſubſtances are alſo uſed as pigments; hence the bone-black, ivory-black, &c. of the ſhops.

Charcoal is not ſoluble in any of the acids: but may be diſſolved in conſiderable quantities by a ſolution of *hepar ſulphuris*, to which it communicates a green colour. Melted with colourleſs frits or glaſſes, it gives a pale yellow, dark yellow, reddiſh, browniſh, or blackiſh colour, according as the inflammable matter is in greater or leſs proportion: the phlogiſton, or inflammable matter of the coal, ſeeming to be the direct tinging ſubſtance. When the phlogiſtic matter is thus diffuſed through glaſs, it is no more affected by continued ſtrong fire than charcoal is when excluded from the air.

The vapour of burning charcoal is found to be highly noxious, being no other than *fixed air*. From ſome late experiments it appears, that charcoal poſſeſſes many extraordinary properties altogether unſuſpected by former chemiſts. It has particularly a great attraction for what is called the *phlogiſton*, or rather for any kind of oily matter with which other ſubſtances may be ſullied; ſo that it now promiſes to be very uſeful in the arts in various ways never thought of before.

Charcoal has lately been ſeparated from the pureſt ſpirit of wine in the proceſs for making ether; and by M. Lavoiſier is

ſuppoſed to be one of the conſtituent parts or elements of that very volatile liquid. But the moſt extraordinary modern diſcovery concerning this ſubſtance is that of Dr. Prieſtley, who has found that ſeveral of the metals may be converted into charcoal, by paſſing the ſteam of ſpirit of wine over them when red-hot; and this, by way of diſtinction, he calls the *charcoal of metals*. For farther particulars relative to charcoal, ſee CHEMISTRY.

CHARDIN (Sir John), a celebrated traveller, was born at Paris in 1643. His father, who was a jeweller, had him educated in the Proteſtant religion; after which he travelled into Perſia and India. He traded in jewels, and died at London in 1713. The account he wrote of his travels is much eſteemed.

CHARENTON, a ſmall town, four miles S. of Paris; once famous for its Proteſtant church; and ſeated on the river Seine. Long. 2. 25. E. Lat. 48. 45. N.

CHARES the Lydian, a celebrated ſtatuary, was the diſciple of Lyſippus; and made the famous Coloſſus of the ſun in the city of Rhodes. He flouriſhed 288 years before Chriſt.

CHARGE, in gunnery, the quantity of powder and ball wherewith a gun is loaded for execution. The rules for charging large pieces in war are, That the piece be firſt clean or ſcoured within ſide; that the proper quantity of powder be next driven in and rammed down, care, however, being taken, that the powder, in ramming, be not bruiſed, becauſe that weakens its effect; that a ſmall quantity of paper, hay, lint, or the like, be rammed over it; and that the ball or ſhot be introduced. If the ball be red-hot, a tompion, or trencher of green wood, is to be driven in before it. The common allowance for a charge of powder for a piece of ordnance, is half the weight of the ball. In the Britiſh navy, the allowance for 32 pounders is but ſeven-ſixteenths of the weight of the bullet. But a late author is of opinion, that if the powder in all ſhip-cannon whatever was reduced to one-third weight of the ball, or even leſs, it would be of conſiderable advantage, not only by ſaving ammunition, but by keeping the guns cooler and quieter, and at the ſame time more effectually injuring the veſſels of the enemy. With the preſent allowance of powder the guns are heated, and their tackle and furniture ſtrained; and this only to render the bullets leſs efficacious: for a bullet which can but juſt paſs through a piece of timber, and loſes almoſt all its motion thereby, has a much better chance of rending and fracturing it, than if it paſſes through with a much greater velocity.

CHARGE, in heraldry, is applied to the figures repreſented on an eſcutcheon, by which the bearers are diſtinguiſhed from one another; and it is to be obſerved, that too many charges are not ſo honourable as fewer.

CHARGE *of Lead*, the quantity of 36 pigs. See PIG.

To CHARGE, in the military language, is to attack the enemy collectively either with horſe or foot.

CHARGE, in law, denotes the inſtructions given to the grand jury, with reſpect to the articles of their inquiry, by the judge who preſides on the bench. It alſo ſignifies a thing done that bindeth him who doth it; and *diſ*charge is the removal of that charge. Lands may be charged in various ways; as, by grant of rent out of it, by ſtatutes, judgments, conditions, warranties, &c.

CHARGE, or rather *Overcharge*, in painting, is an exaggerated repreſentation of any perſon; wherein the likeneſs is preſerved, but at the ſame time ridiculed. Few painters have the genius neceſſary to ſucceed in theſe charges: the method is, to ſelect and heighten ſomething already amiſs in the face, whether by way of defect, or redundancy: for inſtance, if Nature has given a man a noſe a little larger than ordinary, the painter falls in with her, and makes the noſe extravagantly long: or if the noſe be naturally too ſhort, in the painting it will be a mere ſtump; and thus of the other parts.

CHARGED, in heraldry, a ſhield carrying ſome impreſs or figure, is ſaid to be charged therewith; ſo alſo, when one bearing, or charge, has another figure added upon it, it is properly ſaid to be charged.

CHARGED, in electrical experiments, is when a vial, pane of glaſs, or other electric ſubſtance, properly coated on both ſides, has a quantity of electricity communicated to it; in which caſe the one ſide is always electrified poſitively, and the other negatively.

CHARIOT, a half coach, having only a ſeat behind. See COACH. The chariots of the ancients, chiefly uſed in war, were called by the ſeveral names *bigæ*, *trigæ*, &c. according to the number of horſes applied to draw them. Every chariot carried two men, who were probably the warrior and the charioteer; and we read of ſeveral men of note and valour employed in driving the chariot. When the warriors came to encounter in cloſe fight, they alighted out of the chariot, and fought on foot; but when they were weary, which often happened by reaſon of their armour, they retired into their chariots, and thence annoyed their enemies with darts and miſſive weapons. Theſe chariots were made ſo ſtrong, that they laſted for ſeveral generations. But beſides this ſort, we find frequent mention of the *currus falcati*, or chariots armed with hooks, or ſcythes, with which whole ranks of ſoldiers were cut off together, if they had not the art of avoiding the danger; theſe were not only uſed by the Perſians, Syrians, Egyptians, &c. but we find them among the ancient Britons; and notwithſtanding the imperfect ſtate of ſome of the moſt neceſſary arts among the latter before the invaſion of the Romans, it is certain that they had war-chariots in great abundance. By the Greek and Roman hiſtorians, theſe chariots are deſcribed by the ſix following names: viz, Benna, Petoritum, Currus, or Carrus, Covinus, Eſſedum, and Rheda.

CHARIOTS, in the heathen mythology, were ſometimes conſecrated to the ſun; and the ſcripture obſerves, that Joſiah burnt thoſe which had been offered up to the ſun by the king's predeceſſors. This ſuperſtitious cuſtom was an imitation of the heathens, and principally of the Perſians, who had horſes and chariots conſecrated in honour of the ſun. Herodotus, Xenophon, and Quintus Curtius, ſpeak of white chariots, crowned, which were conſecrated to the ſun, among the Perſians, who in their ceremonies drew them by white horſes conſecrated to the ſame luminary.

Triumphal CHARIOT, was one of the principal ornaments of the Roman celebration of a victory. The Roman triumphal chariot was generally made of ivory, round like a tower, or rather of a cylindrical figure. It was ſometimes gilt at the top, and ornamented with crowns; and to repreſent a victory more naturally, they uſed to ſtain it with blood. It was uſually drawn by four white horſes; but oftentimes by lions, elephants, tigers, bears, leopards, dogs, &c.

CHARISIA, in the heathen theology, a wake, or night-feſtival, inſtituted in honour of the graces. It continued the whole night, moſt of which time was ſpent in dancing; after which, cakes made of yellow flower mixed with honey, and other ſweetmeats, were diſtributed among the aſſiſtants. Chariſia is alſo ſometimes uſed to ſignify the ſweetmeats uſed on ſuch occaſions.

CHARISIUS, in the heathen theology, a ſurname given to Jupiter. The word is derived from χαρις, *gratia*, "grace" or "favour;" he being the God by whoſe influence men obtain the favour and affection of one another. On this account the Greeks uſed, at their meals, to make a libation or cup to Jupiter Chariſius.

CHARISTIA, a feſtival of the ancient Romans, celebrated in the month of February, wherein the relations by blood and marriage, met, in order to preſerve a good correſpondence; and that if there happened to be any difference among them, it

might be the more eafily accommodated, by the good humour and mirth of the entertainment. *Ovid. Faft.* 1. 617.

CHARISTICARY, *commendatory*, or *donatory*, a perfon to whom is given the enjoyment of the revenues of a monaftery, hofpital, or benefice. The Chariiticaries among the Greeks, were a kind of donatories, or commendatories, who enjoyed all the revenues of hofpitals and monafteries, without giving an account thereof to any perfon. The original of this abufe is referred to the Iconoclaftæ, particularly Conftantine Copronymus, the avowed enemy of the monks, whofe monafteries he gave away to ftrangers. In after times, the emperors and patriarchs gave many to people of quality, not by way of gift to reap any temporal advantage from them, but to repair, beautify, and patronize them. At length avarice crept in, and thofe in good condition were given away, efpecially fuch as were rich; and at laft they were all given away, rich and poor, thofe of men and of women, and that to laymen and married men.

CHARITY, among divines, one of the three grand theological virtues, confifting in the love of God and of our neighbour, or the habit and difpofition of loving God with all our hearts, and our neighbour as ourfelves. Charity is alfo ufed for the effect of a moral virtue, which confifts in fupplying the neceffities of others, whether with money, counfel, affiftance, or the like.

As pecuniary relief is generally the moft efficacious, and at the fame time that from which we are moft apt to excufe ourfelves, this branch of the duty merits particular illuftration; and a better cannot be offered than that which we find in the elegant *Moral Syftem* of Archdeacon *Paley*. Whether pity be an inftinct or a habit, it is in fact a property of our nature, which God has appointed; and the final caufe for which it was appointed, is to afford to the miferable, in the compaffion of their fellow creatures, a remedy for thofe inequalities and diftreffes which God forefaw that many muft be expofed to, under every general rule for the diftribution of property.

Charity *Schools*, are fchools erected and maintained in various parifhes by the voluntary contributions of the inhabitants, for teaching poor children to read, write, and other neceffary parts of education. See School.

Brothers of Charity, a fort of religious hofpitallers, founded about the year 1297, fince denominated *Billetins*. They took the third order of St. Francis, and the fcapulary, making three ufual vows, but without begging. *Brothers of* Charity alfo denote an order of hofpitallers, ftill fubfifting in Romifh countries, whofe bufinefs is to attend the fick poor, and minifter to them both fpiritual and temporal fuccour. They are all laymen, except a few priefts, for adminiftering the facraments to the fick in their hofpitals. The brothers of charity ufually cultivate botany, pharmacy, furgery, and chemiftry, which they practife with utility. They were firft founded at Granada, by St. John de Dieu; and a fecond eftablifhment was made at Madrid in the year 1553: the order was confirmed by Gregory XIII. in 1572: Gregory XIV. forbad them to take holy orders; but by leave of Paul V. in 1609, a few of the brothers might be admitted to orders. In 1619 they were exempted from the jurifdiction of the bifhop. Thofe of Spain are feparated from the reft; and they, as well as the brothers of charity in Germany, Poland, and Italy, have their diftinct generals, who refide at Rome. They were introduced into France by Mary of Medicis in 1601, and built a fine hofpital in the Fauxbourg St. Germain.

Charity *of St. Hippolitus*, a religious congregation founded about the end of the 14th century, by one Bernardin Alvarez, a Mexican, in honour of St. Hippolitus the martyr, patron of the city of Mexico; and approved by Pope Gregory XIII.

Charity *of our Lady*, in church-hiftory, a religious order in France, which, though charity was the principal motive of their union, grew in length of time fo diforderly and irregular, that their order dwindled, and at laft became extinct. Before the French revolution there was at Paris a religious order of women, called *nuns hofpitallers of the charity of our lady*. The religious of this hofpital were by vow obliged to adminifter to the neceffities of the poor and the fick, but thofe only women.

CHARLATAN, or Charletan, fignifies an empiric or quack, who retails his medicines on a public ftage, and draws people about him with his buffooneries, feats of activity, &c. The word, according to Calepine, comes from the Italian *ceretano*; of *Cæretum*, a town near Spoletto in Italy, where thefe impoftors are faid to have firft rifen. Menage derives it from *ciarlatano*, and that from *circulatorius*, of *circulator*, a quack.

CHARLEMONT, a town of the province of Namur in the Auftrian Netherlands, about 18 miles fouth of Namur. E. long. 4. 40. N. lat. 50. 10.

Charlemont is alfo the name of a town of Ireland, fituated on the river Blackwater, in the county of Armagh, and province of Ulfter, about fix miles fouth-eaft of Dungannon. W. long. 6. 50. N. lat. 50. 16.

CHARLEROY, a ftrong town in the province of Namur in the Auftrian Netherlands, fituated on the river Sambre, about 19 miles weft of Namur. E. long. 4. 20. N. lat. 50. 30.

CHARLES Martel, a renowned conqueror in the early annals of France. He depofed and reftored Chilperic king of France; and had the entire government of the kingdom, once with the title of *mayor of the palace*, and afterwards as *duke of France*; but he would not accept the crown. He died regretted, in 741.

CHARLES's-cape, a promontory of Virginia, in North-America, forming the northern head-land of the ftrait that enters the bay of Chefapeak.

Charles's-*Fort*, a fortrefs in the county of Corke, and province of Munfter, in Ireland, fituated at the mouth of Kinfale harbour. W. long. 8. 20. and N. lat. 51. 21.

Charleston, or *Charleftown*, the capital of South Carolina, in N. America. It has a commodious and fecure harbour, and is a place of good trade. The public buildings are, an exchange, a ftate-houfe, an armoury, and a poor-houfe. In 1787, there were 1600 houfes, 9600 white inhabitants, and 5400 negroes. It is feated on a peninfula formed by the rivers Afhley and Cooper, the former of which is navigable for fhips of burden 20 miles above the town; and the rivers are adorned with beautiful plantations, and fine walks, interfperfed with rows of trees, which make this town very agreeable. W. long. 79. 30. N. lat. 32. 50.

Charles's-*Wain*, in aftronomy, feven ftars in the conftellation called *urfa major*, or the Great Bear.

CHARLETON, an ifland at the bottom of Hudfon's bay, in North America, fubject to Great Britain. W. long. 80. 0. N. lat. 52. 30.

Charleton (Walter), a learned Englifh phyfician, born in 1619, was phyfician in ordinary to Charles I. and Charles II. one of the firft members of the royal fociety, and prefident of the college of phyficians. He wrote on various fubjects; but at laft his narrow circumftances obliged him to retire to the ifland of Jerfey, where he died in 1707.

CHARLOCK, the Englifh name of the Raphanus; it is a very troublefome weed among corn, being more frequent than almoft any other. There are two principal kinds of it; the one with a yellow flower, the other with a white. Some fields are particularly fubject to be over-run with it, efpecially thofe which have been manured with cow-dung alone, that being manure very favourable to the growth of it. The farmers in

fome places are fo fenfible of this, that they always mix horfe-dung with their cow-dung, when they ufe it for arable land. When barley, as is often the cafe, is infefted with this weed to fuch a degree as to endanger the crop, it is a very good method to mow down the charlock in May, when it is in flower, cutting it fo low as juft to take off the tops of the leaves of barley with it. By this means the barley will get up above the weed; and people have got four quarters of grain from an acre of fuch land as would have fcarce yielded any thing without this expedient. Where any land is particularly fubject to this weed, the beft method is to fow it with grafs-feed, and make a pafture of it; for then the plant will not be troublefome, as it never grows where there is a coat of grafs upon the ground.

Queen CHARLOTTE's ISLAND, an ifland in the South Sea, firft difcovered by captain Wallis in the Dolphin, in 1767, who took poffeffion of it in the name of King George III. Here is good water, and plenty of cocoa-nuts, palm-nuts, and fcurvy-grafs. The inhabitants are of a middle ftature, and dark complexion, with long hair hanging over their fhoulders; the men are well made, and the women handfome; their cloathing is a kind of coarfe cloth, or matting, which they faften about their waifts.

Queen CHARLOTTE's *Iflands*, a clufter of South-fea iflands, difcovered in 1767 by captain Carteret. He counted feven, and there were fuppofed to be many more. The inhabitants of thefe iflands are defcribed as extremely nimble and vigorous, and almoft as well qualified to live in the water as upon land. They are very warlike; for, upon a quarrel with fome of captain Carteret's people, they attacked them with great refolution; mortally wounded the mafter and three of the failors; were not at all intimidated by the fire-arms; and at laft, notwithftanding the averfion of captain Carteret to fhed blood, he was obliged to fecure the watering-places by firing grape-fhot into the woods, which deftroyed many of the inhabitants. Thefe iflands lie in S. lat. 11. E. long. 164. They are fuppofed to be the Santa Cruz of Mandana, who died there in 1595.

CHARM, a term derived from the Latin *carmen*, "a verfe;" and ufed to denote a magic power, or fpell, by which, with the affiftance of the devil, forcerers and witches were fuppofed to do wonderful things, far furpaffing the power of nature.

CHARNEL, or CHARNEL-HOUSE, a kind of portico, or gallery, ufually in or near a church-yard, over which were anciently laid the bones of the dead, after the flefh was wholly confumed. Charnel-houfes are now ufually adjoining to the church.

CHARON, in fabulous hiftory, the fon of Erebus and Nox, whofe office was to ferry the fouls of the deceafed over the waters of Acheron, for which each foul was to pay a piece of money. For this reafon the Pagans had a cuftom of putting a piece of money into the mouths of the dead, in order that they might have fomething to pay Charon for their paffage.

CHARONDAS, a celebrated legiflator of the Thurians, and a native of Cathnea in Sicily, flourifhed 446 years before Chrift. He forbad any perfon's appearing armed in the public affemblies of the nation; but one day going thither in hafte, without thinking of his fword, he was no fooner made to obferve his miftake than he ran it through his body.

CHAROST, a town of France, in the department of Indre and late province of Berry, on the river Arnon, fix miles N. E. of Iffoudun. E. long. 2. 10. N. lat. 47. 1.

CHAROUX, a town of France, in the former Bourbonnois, feated on an eminence, near the river Sioulle. E. long. 3. 15. N. lat. 46. 10.

CHARPENTIER (Francis), dean of the French academy, was born in 1620. His early capacity inclined his friends to educate him for the bar: but he was much more delighted with the ftudy of languages and of antiquity than of the law; and preferred repofe to tumult. M. Colbert made ufe of him in eftablifhing his new academy of medals and infcriptions; and no perfon of that learned fociety contributed more than himfelf toward that noble feries of medals which were ftruck on the confiderable events that diftinguifhed the reign of Louis XIV. He publifhed feveral works, which were all well received; and died in 1702.

CHARR, in ichthyology. See SALMO.

CHARRON (Peter), the author of a book intitled *Of Wifdom*, which gained him great reputation, was born at Paris in the year 1541. After being advocate in the parliament of Paris for five or fix years, he applied himfelf to divinity; and became fo great a preacher, that the bifhops of feveral diocefes offered him the higheft dignities in their gift. He died at Paris, fuddenly in the ftreet, November 16, 1603.

CHART, or SEA-CHART, an hydrographical map, or a projection of fome part of the earth's fuperficies *in plano*, for the ufe of navigators. Charts differ very confiderably from geographical or land-maps, which are of no ufe in navigation. Nor are fea charts all of the fame kind, fome being what we call plane-charts, others mercator-charts, and others globular charts.

Plane CHART, is a reprefentation of fome part of the fuperficies of the terraqueous globe, in which the meridians are fuppofed parallel to each other, the parallels of latitude at equal diftances, and confequently the degrees of latitude and longitude every where equal to each other. See PLANE *Chart*.

Mercator's CHART, is that where the meridians are ftraight lines, parallel to each other, and equidiftant; the parallels are alfo ftraight lines, and parallel to each other: but the diftance between them increafes from the equinoctial towards either pole, in the ratio of the fecant of the latitude to the radius. See NAVIGATION.

Globular CHART, a meridional projection, wherein the diftance of the eye from the plane of the meridian, upon which the projection is made, is fuppofed to be equal to the fine of the angle 45°. This projection comes the neareft of all to the nature of the globe, becaufe the meridians therein are placed at equal diftances; the parallels alfo are nearly equidiftant, and confequently the feveral parts of the earth have their proper proportion of magnitude, diftance, and fituation, nearly the fame as on the globe itfelf. See GLOBULAR *Projection*.

Hiftorical CHART. A very excellent chart of hiftory has been publifhed by Dr. Prieftley.

Hydrographic CHARTS, fheets of large paper, whereon feveral parts of the land and fea are defcribed, with their refpective coafts, harbours, founds, flats, rocks, fhelves, fands, &c. together with the longitude and latitude of each place, and the points of the compafs. See MERCATOR's *Chart*.

Selenographic CHARTS, particular defcriptions of the fpots, appearances, and maculæ of the moon. See ASTRONOMY.

Topographic CHARTS, draughts of fome fmall parts of the earth only, or of fome particular places, without regard to its relative fituation, as London, York, &c.

CHARTA, or CARTA, primarily fignifies a fort of paper made of the plant *papyrus* or *biblus*. See PAPER, and CHARTER.

CHARTA *Emporetica*, in pharmacy, &c. a kind of paper made very foft and porous, ufed for filtering tinctures and other fluids through. See FILTRATION.

CHARTA is alfo ufed in our ancient cuftoms for a charter, or deed in writing. See CHARTER.

Magna CHARTA, the great charter of the liberties of Britain, and the bafis of our laws and privileges. This charter may be faid to derive its origin from king Edward the Confeffor, who

granted ſeveral privileges to the church and ſtate by charter: theſe liberties and privileges were alſo granted and confirmed by king Henry I. by a celebrated great charter now loſt; but which was confirmed or re-enacted by king Henry II. and king John. Henry III. the ſucceſſor of this laſt prince, after having cauſed 12 men to make inquiries into the liberties of England in the reign of Henry I. granted a new charter; which was the ſame as the preſent magna charta. This he ſeveral times confirmed, and as often broke; till, in the 37th year of his reign, he went to Weſtminſter-hall, and there, in preſence of the nobility and biſhops, who held lighted candles in their hands, magna charta was read, the king all the time holding his hand to his breaſt, and at laſt ſolemnly ſwearing faithfully and inviolably to obſerve all the things therein contained, &c. Then the biſhops extinguiſhing the candles, and throwing them on the ground, they all cried out, "Thus let him be extinguiſhed, and ſtink in hell, who violates this charter." It is obſerved, that, notwithſtanding the ſolemnity of this confirmation, king Henry, the very next year, again invaded the rights of his people, till the barons entered into a war againſt him; when, after various ſucceſs, he confirmed this charter, and the charter of the foreſt, in the 52d year of his reign.

This charter confirmed many liberties of the church, and redreſſed many grievances incident to feodal tenures, of no ſmall moment at that time; though now, unleſs conſidered attentively and with this retroſpect, they ſeem but of trifling concern. But, beſides theſe feodal proviſions, care was alſo taken therein to protect the ſubject againſt other oppreſſions, then frequently ariſing from unreaſonable amercements, from illegal diſtreſſes or other proceſs for debts or ſervices due to the crown, and from the tyrannical uſe of the prerogative of purveyance and pre-emption. It fixed the forfeiture of lands for felony in the ſame manner as it ſtill remains; prohibited for the future the grants of excluſive fiſheries; and the erection of new bridges ſo as to oppreſs the neighbourhood. With reſpect to private rights, it eſtabliſhed the teſtamentary power of the ſubject over part of his perſonal eſtate, the reſt being diſtributed among his wife and children; it laid down the law of dower, as it has continued ever ſince; and prohibited the appeals of women, unleſs after the death of their huſbands. In matters of public police and national concern, it enjoined an uniformity of weights and meaſures; gave new encouragements to commerce, by the protection of merchant-ſtrangers; and forbad the alienation of lands in mortmain. With regard to the adminiſtration of juſtice, beſides prohibiting all denials or delays of it, it fixed the court of common pleas at Weſtminſter, that the ſuitors might no longer be haraſſed with following the king's perſon in all his progreſſes; and at the ſame time brought the trial of iſſues home to the very doors of the freeholders, by directing aſſizes to be taken in the proper counties, and eſtabliſhing annual circuits: it alſo corrected ſome abuſes then incident to the trials by wager of law and of battle; directed the regular awarding of inqueſts for life or member; prohibited the king's inferior miniſters from holding pleas of the crown, or trying any criminal charge, whereby many forfeitures might otherwiſe have unjuſtly accrued to the exchequer; and regulated the time and place of holding the inferior tribunals of juſtice, the county-court, ſheriff's torn, and court-leet. It confirmed and eſtabliſhed the liberties of the city of London, and all other cities, boroughs, towns, and ports of the kingdom. And laſtly (which alone would have merited the title that it bears, of the *great charter*), it protected every individual of the nation in the free enjoyment of his life, his liberty, and his property, unleſs declared to be forfeited by the judgment of his peers, or the law of the land. This excellent charter, ſo equitable, and beneficial to the ſubject, is the moſt ancient written law in the kingdom. By the 25th Edward I. it is ordained, that it ſhall be taken as the common law; and by the 43d Edward III. all ſtatutes made againſt it are declared to be void.

CHARTER, in law, a written inſtrument, or evidence of things acted between one perſon and another. The word charter comes from the Latin *charta*, anciently uſed for a public and authentic act, a donation, contract, or the like; and from the Greek χαρτης, "thick paper" or "paſteboard," whereon public acts were wont to be written. Britton divides charters into thoſe of the king, and thoſe of private perſons. 1. Charters of the king, are thoſe whereby the king paſſeth any grant to any perſon or body politic, as a *charter of exemption* of privilege, &c. *charter of pardon*, whereby a man is forgiven a felony, or other offence committed againſt the king's crown and dignity; *charter of the foreſt*, wherein the laws of the foreſt are compriſed, ſuch as the charter of Canutus, &c. 2. Charters of private perſons, are deeds and inſtruments for the conveyance of lands, &c. And the purchaſer of lands ſhall have all the charters, deeds, and evidences, as incident to the ſame, and for the maintenance of his title.

CHARTER-*Governments* in America. See COLONY.

CHARTER-*Land*, ſuch land as a perſon holds by charter; that is, by evidence in writing, otherwiſe called freehold.

CHARTERPARTY, in commerce, denotes the inſtrument of freightage, or articles of agreement for the hire of a veſſel. See FREIGHT, &c. The charterparty is to be in writing; and to be ſigned both by the proprietor or the maſter of the ſhip, and the merchant who freights it. It is to contain the name and the burden of the veſſel; the names of the maſter and the freighter; the price or rate of freight; and the time of loading and unloading; and the other conditions agreed on. It is properly a deed, or policy, whereby the maſter or proprietor of the veſſel engages to furniſh immediately a tight ſound veſſel, well equipped, caulked, and ſtopped, provided with anchors, ſails, cordage, and all other furniture to make the voyage required, as equipage, hands, victuals, and other munitions; in conſideration of a certain ſum to be paid by the merchant for the freight. Laſtly, the ſhip with all its furniture, and the cargo, are reſpectively ſubjected to the conditions of the *charterparty*. The *charterparty* differs from a *bill of lading*, in that the firſt is for the entire freight, or lading, and that both for going and returning; whereas the latter is only for a part of the freight, or at moſt only for the voyage one way. Boyer ſays, the word comes from hence, that *per medium charta incidebatur, et ſic fiebat charta partita*; becauſe, in the time when notaries were leſs common, there was only one inſtrument for both parties: this they cut in two, and gave each his portion; joining them together at their return, to know if each had done his part. This he obſerves to have ſeen practiſed in his time; agreeable to the method of the Romans, who, in their ſtipulations, uſed to break a ſtaff, each party retaining a moiety thereof as a mark.

CHARTOPHYLAX, the name of an officer of the church of Conſtantinople, who attends at the door of the rails when the ſacrament is adminiſtered, and gives notice to the prieſts to come to the holy table. He repreſents the patriarch upon the bench, tries all eccleſiaſtical cauſes, keeps all the marriage regiſters, aſſiſts at the conſecration of biſhops, and preſents the biſhop elect at the ſolemnity, and likewiſe all other ſubordinate clergy. This office reſembles in ſome ſhape that of the *bibliothecarius* at Rome.

CHARTRES, an ancient and conſiderable town of France, in the department of Eure and Loire and late province of Beauce. It is the epiſcopal ſee of the department, and, before the abolition of nobility in France, gave title to the eldeſt ſon of the duke of Orleans. Here is a general hoſpital, and another for 120 blind perſons. The cathedral is one of the fineſt in France, and its ſteeple much admired. The principal trade

confifts in corn. It is feated on the river Eure, 45 miles S. W. of Paris. E. long. 1. 34. N. lat. 48. 27.

CHARTREUSE, or Chartreuse-grand, a celebrated monaftery, the capital of all the convents of the Carthufian monks, fituated on a fteep rock in the middle of a large foreft of fir-trees, about feven miles N. E. of Grenoble, in the former province of Dauphiny in France. E. long. 5. 5. N. lat. 41. 20. (See Carthusians.) From this mother-convent, all the others of the fame order take their names; among which was the Chartreufe of London, commonly called the Charterhoufe, now converted into an hofpital, and endowed with a revenue of 600l. per ann. Here are maintained 80 decayed gentlemen, not under 50 years of age; alfo 40 boys are educated and fitted either for the univerfity or trades. Thofe fent to the univerfity have an exhibition of 20l. a-year for eight years; and have an immediate title to nine church livings in the gift of the governors of the hofpital, who are fixteen in number, all perfons of the firft diftinction, and take their turns in the nomination of penfioners and fcholars.

CHARTULARY, Chartularius, a title given to an ancient officer in the Latin church, who had the care of charters and papers relating to public affairs. The chartulary prefided in ecclefiaftical judgments, in lieu of the pope. In the Greek church the chartulary was called *chartophylax*; but his office was there much more confiderable; and fome even diftinguifh the chartulary from the chartophylax in the Greek church. See Chartophylax.

CHARYBDIS, a whirlpool in the ftraits of Meffina, according to the poets; near Sicily, and oppofite to Scylla, a rock on the coaft of Italy. Thucydides makes it to be only a ftrong flux and reflux in the ftrait, or a violent reciprocation of the tide, efpecially if the wind fets fouth. But on diving into the Charybdis, there are found vaft gulphs and whirlpools below, which produce all the commotion on the furface of the water. *Charybdis* is ufed by Horace to denote a rapacious proftitute.

CHASE, or Chace, in law, is ufed for a driving of cattle to or from any place; as to a diftrefs, or fortlet, &c.

Chase, or *Chace*, is alfo a place of retreat for deer and wild beafts; of a middle kind between a foreft and a park, being ufually lefs than a foreft, and not poffeffed of fo many privileges; but wanting, *e. g.* courts of attachment, fwinmote, and juftice-feat. Yet it is of a large extent, and ftocked both with a greater diverfity of wild beafts or game, and more keepers than a park. Crompton obferves, that a foreft cannot be in the hands of a fubject, but it forthwith lofes its name, and becomes a *chafe*; fince all thofe courts lofe their nature when they come into the hands of a fubject; and that none but a king can make a lord chief juftice in eyre of the foreft. See Justice *in Eyre*. Of the Englifh chafes an hiftory is given by Mr. Pennant in his Brit. Zoolog. v. i. p. 42.

Chase, in the fea language, is to purfue a fhip; which is alfo called *giving chafe*. *Stern*-Chase, is when the chafer follows the chafed a-ftern directly upon the fame point of the compafs. *To lie with a fhip's fore-foot in a* Chase, is to fail and meet with her by the neareft diftance; and fo to crofs her in her way, or to come acrofs her fore-foot. A fhip is faid to have a *good chafe*, when fhe is fo built forward on, or a-ftern, that fhe can carry many guns to bear forwards or backwards; according to which fhe is faid to have a *good forward* or *good ftern-chafe*.

Chase-*Guns*, are fuch whofe ports are either in the head (and then they are ufed in chafing of others); or in the ftern, which are only ufeful when they are purfued or chafed by any other fhip.

Chase *of a Gun*, is the whole bore or length of a piece taken within-fide.

Wild-goofe Chase, a term ufed to exprefs a fort of racing on horfeback ufed formerly, which refembled the flying of wild geefe; thofe birds generally going in train one after another, not in confufed flocks as other birds do. In this fort of race the two horfes, after running twelvefcore yards, had liberty, which horfe foever could take the leading, to ride what ground the jockey pleafed, the hindmoft horfe being bound to follow him within a certain diftance agreed on by the articles, or elfe to be whipped in by the triers and judges who rode by; and whichever horfe could diftance the other, won the race. This fort of racing was not long in common ufe; for it was found inhuman, and deftructive to good horfes, when two fuch were matched together. For in this cafe neither was able to diftance the other till they were both ready to fink under their riders; and often two very good horfes were both fpoiled, and the wagers forced to be drawn at laft. The mifchief of this fort of racing foon brought in the method now in ufe, of running only for a certain quantity of ground, and determining the plate or wager by the coming in firft at the poft.

Chasing *of Gold, Silver, &c.* See Enchasing.

CHASTE-tree. See Vitex.

CHASTITY; purity of the body, or freedom from obfcenity. The Roman law juftifies homicide in defence of the chaftity either of one's felf or relations; and fo alfo, according to Selden, ftood the law in the Jewifh republic. Our law likewife juftifies a woman for killing a man who attempts to ravifh her. So the hufband or father may juftify killing a man who attempts a rape upon his wife or daughter; but not if he takes them in adultery by confent; for the one is forcible and felonious, but not the other.

Chaftity is a virtue univerfally celebrated. There is indeed no charm in the female fex that can fupply its place. Without it, beauty is unlovely, and rank is contemptible; good breeding degenerates into wantonnefs, and wit into impudence. Out of the numerous inftances of eminent chaftity recorded by authors, thofe of *Lucretia*, and *Chiomara*, the wife of Ortiagon, a Gaulifh prince, are the moft remarkable. The like virtue in men is termed *continence*. See Continence.

CHATEAU-briant, a town of France, in the department of Lower Loire and late province of Brittany, with an old caftle. It is 24 miles S. of Rennes. Lon. 1. 16. W. lat. 47. 46. N.

Chateau-*Cambrefis*, a town of France, in the department of the North and late province of the Cambrefis, with a magnificent palace, which belonged to the late archiepifcopal fee of Cambray. It is famous for a treaty concluded here between Henry II. of France and Philip II. of Spain; and is 12 miles S. E. of Cambray.

Chateau-*Chinon*, a town of France, in the department of Nievre and late province of Nivernois, with a confiderable manufactory of cloth. It is feated on the Yonne, near the fource of that river, 36 miles E. of Nevers. E. lon. 4. 8. N. lat. 47.

Chateau-*Dauphin*, a ftrong caftle of Piedmont, in the marquifate of Saluces. It was taken by the French and Spaniards in 1744, and reftored by the treaty of Aix-la-Chapelle.

Chateau-*du-Loire*, a town of France, in the department of Sarte and late province of Maine, famous for a fiege of feven years againft the count of Mans. It is feated on the Loire, 22 miles S. E. of Mans, and 97 W. of Paris. Lon. 0. 30. E. Lat. 47. 40. N.

Chateau-*Dun*, an ancient town of France, in the department of Eure and Loire and late province of Beauce. Here is a caftle, and a holy chapel, built by the famous count of Dunois. The treafury of this church contained a magnificent crofs of gold, enriched with precious ftones, and a glafs vafe which bears the name of Charlemagne, and is faid to be a prefent from Aaron king of Perfia. The ftreets are ftraight; the

houſes uniform; and the great ſquare is very ſpacious. Chataudun is ſeated on an eminence, near the Loir, 30 miles N. of Blois, and 72 S. W. of Paris. Long. 1. 22. E. Lat. 48. 4. N.

Chateau-*Gontier*, a town of France, in the department and late province of Maine, ſeated on the river Maine, with a caſtle. It has a mineral ſpring; its trade conſiſts in linens; and it is 22 miles N. W. of Angers, and 147 S. W. of Paris. Long. 0. 36. E. Lat. 47. 47. N.

Chateau-*Landon*, a town of France, in the department of Seine and Marne and late province of the Iſle of France, with a late Auguſtine abbey, ſeated on a hill, five miles S. of Nemours, and 50 S. by E. of Paris. Long. 2. 38. E. Lat. 48. 11. N.

Chateaulin, a town of France, in the department of Finiſterre and late province of Britanny, 18 miles N. of Quimper, on the little river Auzon, where there is a ſalmon fiſhery.

Chateau-*Meillant*, a town of France, in the department of Cher and late province of Berry, nine miles E. of La Chatre. Here is a caſtle, with a tower, ſaid to have been built by Julius Cæſar.

Chateauneuf, a town of France, in the department of Cher and late province of Berry, 16 miles ſouth of Bourges.

Chateauneuf, a town of France, in the department of Eure and Loire and late province of Beauce, 12 miles N. E of Chartres.

Chateauneuf, a town of France, in the department of Maine and Loire and late province of Berry, ſeated on the Sarte, 12 miles from Angers.

Chateau-*Renaud*, a town of France, in the department of Indre and Loire and late province of Touraine, 20 miles N. W. of Amboiſe, and 88 S. W. of Paris. Long 1. 1. W. lat. 47. 33. N.

Chateauroux, a town of France, in the late province of Berry, and recently erected into the epiſcopal ſee of the department of Indre, with a caſtle. It has a manufactory of cloth, and is ſeated on a pleaſant plain on the Indre, 15 miles S. W. of Iſſoudun, aud 148 S. of Paris. Long. 1. 15. E. Lat. 46. 46. N.

Chateau-*Thierry*, a town of France, in the department of Aiſne and late province of Champagne, with a handſome caſtle on an eminence, ſeated on the river Maine. It is the birth place of the inimitable La Fontaine; and is 27 miles S. W. of Rheims, and 97 N. W. of Paris. Long. 3. 33. E. Lat. 49. 2. N.

CHATEL, a town of France, in the department of the Voſges and late province of Lorrain, ſeated on the Moſelle, eight miles from Mirecourt.

Chater-*Chalon*, a town of France, in the department of Jura and late province of Franche-Comté, remarkable for its late Benedictine nunnery, 20 miles S. of Dole. Long. 5. 38. E. Lat. 46. 46. N.

CHATELET, a town of the Netherlands, in Namur, ſeated on the Sambre, in the biſhoprick of Liege. E. long. 4. 28. N. lat. 50. 25.

Chatelet, the name of certain courts of juſtice exiſting in ſeveral cities of France before the revolution in that country. The grand chatelet at Paris, was the place where the preſidial or ordinary court of juſtice of the provoſt of Paris was kept; conſiſting of a preſidial, a civil chamber, a criminal chamber, and a chamber of policy.

CHATELLERAULT, a town of France, in the department of Vienne and late province of Poitou; ſeated in a fertile and pleaſant country, on the river Vienne, over which is a handſome ſtone bridge. It is noted for its cutlery, watchmaking, and the cutting of falſe diamonds. It gives the title of duke to the Scotch duke of Hamilton. It is 22 miles N. E. of Poitiers, and 168 S. W. of Paris.

CHATHAM, a town of Kent, adjoining to Rocheſter, and ſeated on the river Medway. It is the principal ſtation of the royal navy; and the yards and magazines are furniſhed with all kinds of naval ſtores, as well as materials for building and rigging the largeſt men of war. The entrance into the river Medway is defended by Sheerneſs and other forts; notwithſtanding which, the Dutch fleet burnt ſeveral ſhips of war here in the reign of Charles II. after the peace of Breda had been agreed upon. In the year 1757, by direction of the duke of Cumberland, ſeveral additional fortifications were begun at Chatham; ſo that now the ſhips are in no danger of an inſult either by land or water. It has a church, a chapel of eaſe, and a ſhip uſed as a church for the ſailors. It has likewiſe about 500 houſes, moſtly low, and built with brick; and about 3000 inhabitants. The principal employment of the labouring hands is ſhip-building in the king's yard and private docks. This town gave the title of Earl to that great ſtateſman William Pitt, in the reigns of George II. and III. E. long. 0. 40. N. lat. 51. 20.

CHATIGAN, a town of Aſia, in the kingdom of Bengal, on the moſt eaſterly branch of the river Ganges. It is but a poor place, though it was the firſt the Portugueſe ſettled at in theſe parts, and who ſtill keep a ſort of poſſeſſion. It has but a few cotton manufactures; but affords the beſt timber for building of any place about it. The inhabitants are ſo ſuſpicious of each other, that they always go armed with a ſword, piſtol, and blunderbuſs, not excepting the prieſts. It is ſubject to the great Mogul. E. long. 91. 10. N. lat. 23. 0.

CHATILLON-sur-seine, a town of France, in the department of Cote d'Or and late province of Burgundy, divided into two by the river Seine. It has iron-works in its neighbourhood, and is 36 miles N. W. of Dijon. Long. 4. 35. E. Lat. 47. 42. N.

CHATRE, la, a town of France, in the department of the Indre and late province of Berry, ſeated on the river Indre, 37 miles from Bourges. It has a conſiderable trade in cattle. Long. 1. 55. E. Lat. 46. 35. N.

CHATTELS, a Norman term, under which were anciently comprehended all moveable goods; thoſe immoveable being termed *fief*, or *fee*.

Chattels, in the modern ſenſe of the word, are all ſorts of goods, moveable, or immoveable, except ſuch as are in the nature of freehold.

CHATTERER, in ornithology. See Ampelis.

CHATTERTON (Thomas), a late unfortunate poet, whoſe fate and performances have excited in no ſmall degree the public attention, as well as given riſe to much literary controverſy. He was born at Briſtol, Nov. 20, 1752; and educated at a charity-ſchool on St. Auguſtin's Back, where nothing more was taught than reading, writing, and accounts. At 14 years of age, he was articled clerk to an attorney at Briſtol, with whom he continued about three years; yet, though his education was thus confined, he diſcovered an early turn towards poetry and Engliſh antiquities, and particularly towards heraldry. How ſoon he began to be an author is not known. In the Town and Country Magazine for March 1769, are two letters, probably from him, as they are dated from Briſtol, and ſubſcribed with his uſual ſignature, D. B. that is, *Dunhelmus Briſtolienſis*. The former contains ſhort extracts from two MSS. "written 300 years ago by one Rowley a monk," concerning dreſs in the age of Henry II.; the latter, "Ethelgar, a Saxon poem," in bombaſt proſe. In the ſame magazine for May 1769, are three communications from Briſtol, with the ſame ſignature D. B. one of them intitled "Obſervations upon Saxon Heraldry, with drawings of Saxon Atchievements;" and in the ſubſequent months of 1769 and 1770, there are ſeveral other pieces in the ſame magazine, which are undoubtedly of his compoſition.

In April 1770, he left Briſtol, diſguſted with his profeſſion,

and irreconcileable to the line of life in which he was placed; and coming to London in hopes of advancing his fortune by his pen, he funk at once from the fublimity of his views to an abfolute dependence on the patronage of bookfellers. Things, however, feem foon to have brightened up a little with him; for, May 14, he wrote to his mother, in high fpirits, upon the change of his fituation, with the following farcaftic reflection upon his former patrons at Briftol: "As to Mr. ——, Mr. ——, &c. &c. they rate literary lumber fo low, that I believe an author, in their eftimation, muft be poor indeed: but here matters are otherwife. Had Rowley been a Londoner inftead of a Briftowyan, I could have lived by copying his works." In a letter to his fifter, May 30, he informs us that he is to be employed in writing a voluminous Hiftory of London, to appear in numbers the beginning of next winter. Meanwhile, he had written fomething in praife of Beckford, then lord mayor, which had procured him the honour of being prefented to his lordfhip; and, in the letter juft mentioned, he gives the following account of his reception, with certain obfervations upon political writing: "The lord mayor received me as politely as a citizen could: but the devil of the matter is, there is no money to be got on this fide of the queftion. However, he is a poor author who cannot write on both fides. Effays on the patriotic fide will fetch no more than what the copy is fold for. As the patriots themfelves are fearching for places, they have no gratuity to fpare. On the other hand, unpopular effays will not even be accepted, and you muft pay to have them printed; but then you feldom lofe by it, as courtiers are fo fenfible of their deficiency in merit, that they generoufly reward all who know how to daub them with the appearance of it."

He continued to write inceffantly in various periodical publications. July 11th, he tells his fifter that he had pieces laft month in feveral magazines; in The Gofpel Magazine, The Town and Country, the Court and City, The London, The Political Regifter, &c. But all thefe exertions of his genius brought in fo little profit, that he was foon reduced to the extremeft indigence; fo that at laft, oppreffed with poverty and alfo difeafe, in a fit of defpair he put an end to his exiftence, Aug. 1770, with a dofe of poifon. This unfortunate perfon, though moft certainly an extraordinary genius, feems yet to have been a moft ungracious compofition. He was violent and impetuous to a ftrange degree. From the firft of the above-cited letters he feems to have had a portion of ill humour and fpleen more than enough for a lad of 17; and the editor of his Mifcellanies records, "that he poffeffed all the vices and irregularities of youth, and that his profligacy was at leaft as confpicuous as his abilities."

In 1777 were publifhed in one volume 8vo, "Poems, fuppofed to have been written at Briftol, by Thomas Rowley and others, in the 15th century: the greateft part now firft publifhed from the moft authentic copies, with an engraved fpecimen of one of the MSS. To which are added, a Preface, an introductory Account of the feveral Pieces, and a Gloffary." And in 1778, were publifhed, in one volume 8vo, "Mifcellanies in Profe and Verfe by Thomas Chatterton, the fuppofed author of the Poems publifhed under the names of Rowley, &c."

Of Rowley's poems, we have the following account in the preface, given in the words of Mr. George Catcot of Briftol, to whom, it is faid, the public is indebted for them: "The firft difcovery of certain MSS. having been depofited in Redclift church about three centuries ago, was made in the year 1768, at the time of opening the new bridge at Briftol; and was owing to a publication in Farley's Weekly Journal, Oct. 1ft, containing an account of the ceremonies obferved at the opening of the old bridge, taken, as it was faid, from a very ancient MS. This excited the curiofity of fome perfons to enquire after the original. The printer, Mr. Farley, could give no account of it, or of the perfon who brought the copy: but after much inquiry it was difcovered, that this perfon was a youth between 15 and 16 years of age, whofe name was Thomas Chatterton, and whofe family had been fextons of Redclift church for near 150 years. His father, who was now dead, has alfo been mafter of the free-fchool in Pile-ftreet. The young man was at firft very unwilling to difcover from whence he had the original: but, after many promifes made to him, was at laft prevailed on to acknowledge that he had received this, together with many other MSS. from his father, who had found them in a large cheft in an upper room over the chapel, on the north fide of Redclift church. It is added, that foon after this Mr. Catcot commenced an acquaintance with Chatterton, and partly as prefents, partly as purchafes, procured from him copies of many of his MSS. in profe and verfe; as other copies were difpofed of in like manner to others. It is concluded, however, that whatever may have been Chatterton's part in this very extraordinary tranfaction, whether he was the author, or only (as he conftantly afferted) the copier of all thefe productions, he appears to have kept the fecret entirely to himfelf, and not to have put it in any one's power to bear certain teftimony either of his fraud or of his veracity."

This affair, however, has fince become the foundation of a mighty controverfy among the critics, which has yet fcarcely fubfided. The poems in queftion, publifhed in 1777, were republifhed in 1778, with an "Appendix, containing fome obfervations upon their language; tending to prove that they were written, not by any ancient author, but entirely by Chatterton." Mr. Warton, in the third volume of his Hiftory of Englifh Poetry, hath efpoufed the fame fide of the queftion. Mr. Walpole alfo obliged the world with a Letter on Chatterton, from his prefs at Strawberry hill. On the other hand have appeared, "Obfervations" upon thefe poems, "in which their authenticity is afcertained," by Jacob Bryant, Efq. 1781, two vols. 8vo; and another edition of the "Poems, with a Comment, in which their Antiquity is confidered and defended, by Jeremiah Milles, D. D. Dean of Exeter, 1782," 4to. In anfwer to thefe two works, we have had three pamphlets: 1. "Curfory Obfervations on the Poems, and Remarks on the Commentaries of Mr. Bryant and Dr. Milles; with a falutary propofal addreffed to the friends of thofe gentlemen." 2. "An Archæological Epiftle to Dean Milles, editor of a fuperb edition of Rowley's Poems, &c." 3. "An Inquiry into the authenticity of the Poems attributed to Thomas Rowley, in which the Arguments of the Dean of Exeter and Mr. Bryant are examined, by Thomas Warton;" and other pieces in the public prints and magazines. All preparatory to the complete fettlement of the bufinefs in "A Vindication of the Appendix to the Poems called Rowley's, in reply to the Anfwers of the dean of Exeter, Jacob Bryant, Efq; and a third Anonymous Writer; with fome further Obfervations upon thofe Poems, and an Examination of the Evidence which has been produced in fupport of their Authenticity. By Thomas Tyrwhitt, 1782," 8vo.

CHAUCER (Sir Geofrey), an eminent Englifh poet in the 14th century, born at London in 1328. After he left the univerfity he travelled into Holland, France, and other countries. Upon his return he entered himfelf in the Inner-temple, where he ftudied the municipal laws of England. His firft ftation at court was page to Edward III. and he had a penfion granted him by that prince till he could otherwife provide for him. Soon after we find him gentleman of the king's privy chamber; next year, fhield-bearer to the king. Efteemed and honoured, he fpent his younger days in a conftant attendance at court, or for the moft part living near it, in a fquare ftone-houfe near the park-gate at Woodftock, ftill called *Chaucer's Houfe.*

Soon after, having got the Duke of Lancafter for his patron, Chaucer began every day to rife in greatnefs; and it was in the meridian of his profperity, in perfect health of body and peace

of mind, that he wrote his moſt humourous poems. His ſatires againſt the prieſts were probably written to oblige his patron the Duke of Lancaſter, who favoured the cauſe of Wickliff, and endeavoured to expoſe the clergy to the indignation of the people. In the laſt year of Edward III. our poet was employed in a commiſſion to treat with the French; and in the beginning of King Richard's reign alſo, he was in ſome degree of favour at court.

The Duke of Lancaſter at laſt finding his views checked, began to abandon Wickliff's party: upon which Chaucer likewiſe, how much ſoever he had eſpouſed that divine's opinions, thought it prudent to conceal them more than he had done. With the Duke's intereſt that of Chaucer entirely ſunk; and the former paſſing over ſea, his friends felt all the malice of the oppoſite party. Theſe misfortunes occaſioned his writing that excellent treatiſe, *The Teſtament of Love*, in imitation of Boethius on the conſolations of philoſophy. Being much reduced, he retired to Woodſtock, to comfort himſelf with ſtudy, which produced his admirable treatiſe of the *Aſtrolabe*.

The Duke of Lancaſter, at laſt ſurmounting his troubles, married Lady Catharine Swynford, ſiſter to Chaucer's wife; ſo that Thomas Chaucer, our poet's ſon, became allied to moſt of the nobility, and to ſeveral of the kings of England. Now the ſun began to ſhine upon Chaucer with an evening ray; for by the influence of the Duke's marriage, he again grew to a conſiderable ſhare of wealth. But being now 70, he retired to Dunnington-caſtle near Newbury. He had not enjoyed this retirement long, before Henry IV. ſon of the Duke of Lancaſter, aſſumed the crown, and in the firſt year of his reign gave our poet marks of his favour. But however pleaſing the change of affairs might be to him at firſt, he afterwards found no ſmall inconvenience from it. The meaſures and grants of the late king were annulled; and Chaucer, in order to procure freſh grants of his penſions, left his retirement, and applied to court: where, though he gained a confirmation of ſome grants, yet the fatigue of attendance, and his great age, prevented him from enjoying them. He fell ſick at London; and ended his days in the 72d year of his age, leaving the world as though he deſpiſed it, as appears from his ſong of *Flie from the Preſe*. The year before his death he had the happineſs, if at his time of life it might be ſo called, to ſee the ſon of his brother-in-law (Hen. IV.) ſeated on the throne. He was interred in Weſtminſter abbey; and in 1556, Mr. Nicholas Bingham, a gentleman of Oxford, at his own charge, erected a handſome monument for him there. Caxton firſt printed the Canterbury Tales; but his works were firſt collected and publiſhed in one volume folio, by William Thynne, London, 1542. They were afterwards reprinted in 1561, 1598, 1602. Oxford, 1721.

Chaucer was not only the firſt, but one of the beſt poets which theſe kingdoms ever produced. He was equally great in every ſpecies of poetry which he attempted; and his poems in general poſſeſs every kind of excellence, even to a modern reader, except melody and accuracy of meaſure; defects which are to be attributed to the imperfect ſtate of our language, and the infancy of the art in this kingdom at the time when he wrote. "As he is the father of Engliſh poetry (ſays Mr. Dryden), ſo I hold him in the ſame degree of veneration as the Grecians held Homer, or the Romans Virgil. He is a perpetual fountain of good ſenſe, learned in all ſciences, and therefore ſpeaks properly on all ſubjects. As he knew what to ſay, ſo he knows alſo when to leave off: a continence which is practiſed by few writers, and ſcarcely by any of the ancients, except Virgil and Horace." This character Chaucer certainly deſerved. He had read a great deal; and was a man of the world, and of ſound judgment. He was the firſt Engliſh poet who wrote *poetically*, as Dr. Johnſon obſerves in the preface to his Dictionary, and (he might have added) who wrote like a gentleman. He had alſo the merit of improving our language conſiderably, by the introduction and naturalization of words from the Provençal, at that time the moſt poliſhed dialect in Europe.

CHAUD MEDLEY, in law, is of much the ſame import with CHANCE-*Medley*. The former in its etymology ſignifies an affray in the heat of blood or paſſion; the latter, a caſual affray. The latter is in common ſpeech too often erroneouſly applied to any manner of homicide by miſadventure; whereas it appears by the ſtat. 24 Hen. VIII. c. 5. and ancient books (Staundf. P. C. 16.), that it is properly applied to ſuch killing as happens in ſelf defence upon ſudden encounter.

CHAL, a town of the Eaſt Indies, on the coaſt of Malabar, in the province of Blagana, and kingdom of Viſapour. Its river affords a good harbour for ſmall veſſels. The town is fortified, and ſo is the iſland on the ſouth of the harbour. It had formerly a good trade, but is now miſerably poor. It was taken by the Portugueſe in 1507, to whom it ſtill belongs. It is 15 miles ſouth of Bombay, and five miles from the ſea. E. long. 72. 45. N. lat. 18. 30.

CHAULIEU (William Amfryede), abbé d'Amale, one of the moſt polite and ingenious of the French poets, was born in 1639, and died at the age of 84. The moſt complete edition of his poems is that printed in 2 vols 8vo in 1733.

CHAUMONT, a town of France, in the department of Upper Marne and late province of Champagne. The principal gate of the church of the college is much admired, although, in the opinion of the connoiſſeurs, it has too great a profuſion of ornament. It is ſeated on a mountain, near the river Marne, 14 miles S. of Joinville. E. long. 5. 9. N. lat. 48. 8.

CHAUNTRY. See CHANTRY.

CHAUNY, a town of France, in the department of Oiſe and late province of the Iſle of France, 20 miles E. of Noyon. E. long. 3. 18. N. lat. 49. 17.

CHAUVIN (Stephen), a celebrated miniſter of the reformed religion, born at Niſmes, left France at the revocation of the edict of Nantz, and retired to Rotterdam, where he began a new *Journal des Scavans*; and afterwards removing to Berlin, continued it there three years. At this laſt place, he was made profeſſor of philoſophy, and diſcharged that office with much honour and reputation. His principal work is a philoſophical dictionary, in Latin, which he publiſhed at Rotterdam in 1662; and gave a new edition of it, much augmented, at Lewarden, in 1713, folio. He died in 1725, aged 85.

CHAVEZ, a ſtrong town of Tralos-Montes in Portugal, is ſeated at the foot of a mountain on the river Tamega. It has two ſuburbs, and as many forts: one of which looks like a citadel. Between the town and ſuburb of Magdalena, is an old Roman ſtone-bridge about 92 geometrical paces long. W. long. 7. 1. N. lat. 41. 45.

CHAZELLES (John Matthew), a French mathematician and engineer, was born at Lyons in 1657, and educated there in the college of Jeſuits, from whence he removed to Paris in 1675. He firſt became acquainted with Du Hamel, ſecretary to the Academy of Sciences, and through him with Caſſini, who employed him with himſelf at the obſervatory, where Chazelles greatly improved himſelf, and alſo aſſiſted Caſſini, in the meaſurement of the ſouthern part of the meridian of France. Having, in 1684, inſtructed the duke of Mortemar in the mathematical ſciences, this nobleman procured him the appointment of hydrography-profeſſor to the galleys of Marſeilles. In diſcharging the duties of this department, he made numerous geometrical and aſtronomical obſervations, from which he drew a new map of the coaſt of Provence. He alſo performed many other ſervices in that department, and as an

engineer, along with the armies and naval expeditions. To make obfervations in geography and aftronomy, he undertook alfo a voyage to the Levant, and among other things he meafured the pyramids of Egypt, and found the four fides of the largeft of them exactly to face the four cardinal points of the compafs. He made a report of his voyage, on his return, to the Academy of Sciences, upon which he was named a member of their body in 1695, and had many papers inferted in the volumes of their Memoirs, from 1693 to 1708. Chazelles died at Marfeilles the 16th of January 1710.

CHAZINZARIANS, a fect of heretics who rofe in Armenia in the feventh century. The word is formed of the Armenian *chazus*, "Crofs." They are alfo called *ftaurolatræ*, which in Greek fignifies the fame as *Chazinzarians* in Armenian, viz. *adorers of the crofs*; they being charged with paying adoration to the crofs alone. In other refpects they were Neftorians; and admitted two perfons in Jefus Chrift. Nicephorus afcribes other fingularities to them; particularly their holding an annual feaft in memory of the dog of their falfe prophet Sergius, which they called *artzibartzes*.

CHEASAPEAK BAY, in North America, the entrance between Cape Henry and Cape Charles, running up 300 miles between Virginia and Maryland. It is navigable almoft all the way for large fhips, and has feveral navigable rivers that fall into it, by means of which fhips go up to the very doors of the planters, to take in their lading of goods. Here was a fea-engagement in 1781 between the Britifh fleet under Admiral Graves confifting of 19 fhips of the line, and the French fleet of 24 line-of-battle fhips under the Count de Graffe, which ended in the Count's keeping poffeffion of the Bay, by which Lord Cornwallis and his whole army were made prifoners of war at York-town, being invefted both by fea and land by very fuperior numbers.

CHEATS, are deceitful practices in defrauding, or endeavouring to defraud, another of his known right, by means of fome artful device. If any perfon deceitfully get into his hands or poffeffion any money or other things of any other perfon's, by colour of any falfe token, &c. being convicted, he fhall have fuch punifhment by imprifonment, fetting upon the pillory, or by any corporal pain except pains of death, as fhall be adjudged by the perfons before whom he fhall be convicted. As there are frauds which may be relieved civilly, and not punifhed criminally; fo there are other frauds which in a fpecial cafe may not be helped civilly, and yet fhall be punifhed criminally. Thus, if a minor goes about the town, and, pretending to be of age, defrauds many perfons by taking credit for a confiderable quantity of goods, and then infifts on his nonage, the perfons injured cannot recover the value of their goods, but they may indict and punifh him for a common cheat. Perfons convicted of obtaining money or goods by falfe pretences, or of fending threatening letters in order to extort money or goods, may be punifhed with fine or imprifonment, or by pillory, whipping, or tranfportation.

CHEBRECHIN, a town of Poland, in the province of Ruffia and palatinate of Belfkow. It is feated on the declivity of a hill, and the river Wierpi waters its walls, and afterwards falls into the river Bog. The Jews there are very rich. E. long. 23. 51. N. lat. 50. 35.

CHECAYA, in Turkifh affairs, the fecond officer of the Janizaries, who commands them under the aga, and is otherwife called *protogero*. There is alfo a checaya of the treafury, ftables, kitchen, &c. the word fignifying as much as lieutenant, or the fecond in any office.

CHECK, or CHECK-*Roll*, a roll or book, wherein are contained the names of fuch perfons as are attendants and in the pay of the king, or other great perfonages, as their houfehold fervants.

Clerk of the CHECK *in the king's houfehold*, has the check and controul of the yeomen of the guard, and all the ufhers belonging to the royal family, noting their abfence or defects in attendance, or diminifhing their wages for the fame, &c. He alfo, by himfelf or deputy, fuperintends thofe that are to watch in the court, and has the fetting of the watch, &c.

Clerk of the CHECK *in the royal dock-yards*, an officer who keeps a mufter or regifter of all the men employed aboard his majefty's fhips and veffels, and alfo of all the artificers and others in the fervice of the navy at the part where he refides.

CHECK, in falconry, a term ufed of a hawk, when fhe forfakes her proper game, to fly at pyes, crows, rooks, &c. that crofs her in her flight.

CHECKY, in heraldry, is when the fhield, or a bordure, &c. is chequered, or divided into chequers or fquares, in manner of a chefs-board. This is one of the moft noble and moft ancient figures ufed in armory; and is always compofed of metal and colour. But fome authors would have it reckoned among the feveral forts of furs.

CHEEK, in anatomy, that part of the face fituated below the eyes on each fide.

CHEEKS, a general name among mechanics, for almoft all thofe pieces of their machines and inftruments, that are double, and perfectly alike. Thus the cheeks of a printing-prefs are its two principal pieces: they are placed perpendicular, and parallel to each other; ferving to fuftain the three fommers, viz. the head, fhelves, and winter, which bear the fpindle, and other parts of the machine. See PRINTING-*Prefs*.

The *cheeks of a turner's lathe*, are two long pieces of wood between which are placed the puppets, which are either pointed or otherwife, ferving to fupport the work and the mandrils of the workman. Thefe two pieces are placed parallel to the horizon, feparated from one another by the thicknefs of the tail of the puppets, and joined with tenons to two or three pieces of wood placed perpendicularly, called the *legs of the lathe*.

Cheeks of the glazier's vice, are two pieces of iron joined parallel at top and bottom; in which are the axles, or fpindles, little wheel, cufhions, &c. whereof the machine is compofed.

The cheeks of a mortar, or the *brackets*, in artillery, are made of ftrong planks of wood, bound with thick plates of iron, and are fixed to the bed by four bolts; they rife on each fide of the mortar, and ferve to keep her at what elevation is given her, by the help of ftrong bolts of iron which go through both cheeks, both under and behind the mortar, betwixt which are driven coins of wood; thefe bolts are called the *bracket-bolts*, and the bolts which are put on in each end of the bed, are the traverfe-bolts, becaufe with handfpikes the mortar is by thefe traverfed to the right or left.

CHEEKS, in fhip-building, are two pieces of timber, fitted on each fide of the maft at the top, ferving to ftrengthen the maft there. The uppermoft bail or piece of timber in the beak of a fhip is called the *cheek*. The knees which faften in the beak-head of the fhip are called *cheeks*; and the fides of any block, or the fides of a fhip's carriage of a gun, are called *cheeks*.

CHEESE, a fort of food prepared of curdled milk feparated by preffure from the ferum or whey, and afterwards dried for ufe.

Cheefe differs in quality according as it is made from new or fkimmed milk, from the curd which feparates fpontaneoufly upon ftanding, or that which is more fpeedily produced by the addition of runnet. Cream alfo affords a kind of cheefe, but quite fat and butyraceous, and which does not keep long. Analyzed chemically, cheefe appears to partake much more of an animal nature than butter, or the milk from which it was made. It is infoluble in every liquid except fpirit of nitre, and cauftic alkaline ley. It is a common opinion that old

cheeſe digeſts every thing, yet is left undigeſted itſelf; but this is without any ſolid foundation. Cheeſe made from the milk of ſheep digeſts ſooner than that from the milk of cows, but is leſs nouriſhing; that from the milk of goats digeſts ſooner than either, but is alſo the leaſt nouriſhing. In general it is a kind of food fit only for the laborious, or thoſe whoſe organs of digeſtion are ſtrong.

Every country has places noted for this commodity; thus Cheſter and Glouceſter cheeſes are famous in England; and the Parmeſan cheeſe is in no leſs repute abroad, eſpecially in France. This ſort of cheeſe is entirely made of ſweet cow's-milk; but at Rochefort in Languedoc, they make it of ewe's milk; and in other places it is uſual to add goat or ewe's milk in a certain proportion to that of the cow. There is likewiſe a kind of medicated cheeſe made by intimately mixing the expreſſed juice of certain herbs, as ſage, baum, mint, &c. with the curd before it is faſhioned into a cheeſe.

CHEMISTRY

IS a ſcience, the object of which is to aſcertain the nature and properties of bodies, or which explains the intimate mutual action of all natural bodies.

The methods, by which this knowledge is principally acquired, are analyſis and ſyntheſis; the former ſignifying the ſeparation or decompoſition of the conſtituent parts of a compound ſubſtance, the latter the formation or compoſition of a compound body by the artificial reunion of its conſtituent principles.

HISTORY OF CHEMISTRY.

THE origin of Chemiſtry is by no means evident; it is involved in equal obſcurity with that of other arts and ſciences. The ancient nations ſeem however to have poſſeſſed conſiderable knowledge of this kind.

The art of working metals, which dates from the moſt remote antiquity; the luſtre which the Phœnicians gave to certain colours; the luxury of Tyre; the numerous manufactures which that opulent city included within its walls—all announce a degree of perfection in the arts, and ſuppoſe a conſiderable extent and variety of chemical knowledge. But the principles of this ſcience were not then united into a body of doctrine; they were concentrated in the workſhops of the manufacturers, where they had their origin; and obſervations alone, tranſmitted from one operator to another, enlightened and conducted the ſteps of the artiſt. Such, no doubt, has been the origin of all the ſciences. At firſt they preſented unconnected facts; truths were confounded with error; time and genius could alone clear up the confuſion; the progreſs of information is however always the fruit of ſlow and painful experiment. It would be difficult, therefore, to point out the preciſe epocha of the origin of chemical ſcience; but we find traces of its exiſtence in the moſt remote ages. Agriculture, mineralogy, and all the arts which are indebted to it for their principles, were cultivated and enlightened. We behold the original nations, immediately ſucceeding the fabulous ages, ſurrounded by all the arts which ſupplied their wants. Chemiſtry may therefore be compared to that famous river whoſe waters fertilize the lands they inundate, but the ſources of which are ſtill unknown. The ancient Egyptians appear however to have the ſtrongeſt claim to the invention of this ſcience. Thoth or Athotis, who became king of Thebes, and was ſurnamed Hermes or Mercury, is conſidered as the firſt of this nation who cultivated the ſcience of chemiſtry. After him we find Siphoas, an Egyptian monarch, diſtinguiſhed as a philoſopher and chemiſt. The period in which he lived has been ſuppoſed to be about 1900 before the Chriſtian æra. He has been named Hermes or Mercury Triſmegiſtus by the Greek writers, who have alſo conſidered him as the inventor of natural philoſophy. But though, in fact, we know little reſpecting the Egyptian chemiſts, the ſcience appears to have made conſiderable progreſs among them, ſince they practiſed many of thoſe arts which depend on chemiſtry, ſuch as the art of forming imitations of the precious ſtones, of caſting and working metals, of painting upon glaſs, &c. But Egypt, which ſeems to have been the nurſe of chemiſtry reduced to principles, was not however ſlow in turning the applications of this ſcience towards a chimerical end. The firſt ſeeds of chemical ſcience were therefore ſoon changed by the paſſion for making gold. In an inſtant all the labours of operators were directed towards *alchemy* alone; and the induſtry of ſeveral centuries was conſecrated to the enquiry after the philoſopher's ſtone. The principal operators in this way, however, were Geber and Rhazes, among the Arabians; Roger Bacon and Sir George Ripley, in England; Arnold of Villeneuve, in France; Raymond Lully, in Majorca: and Baſle Valentine, in Germany. It muſt be allowed that the *alchemiſts* have retarded the progreſs of chemiſtry; yet on many accounts they are unqueſtionably entitled to eſteem. In their writings, the profoundeſt views of genius are every where to be obſerved, but allied with the moſt extravagant ideas. The moſt ſublime truths are degraded by applications of the moſt ridiculous nature; and the aſtoniſhing contraſt of ſuperſtition and philoſophy, of light and darkneſs, compels the reader to admire them, even at the inſtant that he cannot withhold his cenſure.

Chemiſtry is indeed indebted to alchemy for ſome truths, and for ſeveral profeſſors of the art: but the obligation is ſmall, in compariſon to the maſs of uſeful knowledge that might have been afforded during the courſe of ſeveral centuries; if, inſtead of endeavouring to form the metals, the operations of chemiſts had been confined to analyſing them, ſimplifying the means of extracting them, combining them together, working them, and multiplying and rectifying their uſes and modes of application.

The paſſion for making gold was ſucceeded by the ſeductive hope of prolonging life by means of chemical knowledge. The perſuaſion was readily admitted, that a ſcience which afforded remedies for many diſeaſes, might eaſily ſucceed in producing an univerſal medicine. Thus, the alchemiſts, after having exhauſted themſelves in the ſearch after the philoſopher's ſtone, ſeem to have redoubled their efforts to arrive at an object ſtill more chimerical and viſionary. At this period the *elixirs of life*, the *arcana*, and the *polychreſt medicines*, had their origin.

The chimerical notion of an univerſal medicine agitated the minds of men in the ſixteenth century; and at that time immortality was promiſed with the ſame effrontery that a quack now announces his remedy for every diſeaſe. The people are

eafily feduced by flattering promifes; but the man of obfervation can never be led to think that chemiftry can fucceed in reverfing that general law of nature which condemns all living beings to renovation, and a continual circulation of decompofitions and fucceffive generations. This fect, therefore, gradually became an object of contempt; and its difgrace was finally completed by the enthufiaft Paracelfus, who, after having flattered himfelf with immortality, died at the age of forty-eight, in an inn at Saltfburg.

Hitherto, however, chemiftry had not been cultivated in a philofophical manner. Many of the arts which depend on it had indeed been defcribed, medical formulæ had been invented, and the nature of metals examined, but principally with a view to the making of gold, or the difcovery of an univerfal medicine. Nothing further had even been attempted. A variety of chemical facts were known, but no endeavours had been made to methodize or form them into a general fyftem. The execution of this difficult but important tafk was referved for the fuperior genius and induftry of thofe who appeared on the ruins of the two fects we have already mentioned. Among whom Barnet, Bohnius, Kunckel, Boyle, Glafer, and Glauber, deferve to be particularly noticed. They examined the crude and indigefted aggregate, and feparated from the confufed mafs of phenomena, of truth and error, thofe parts which tended to enlighten and improve the fcience. But it is to the celebrated, though unfortunate Becher, who appeared nearly about this time, that chemiftry is particularly indebted. He withdrew it from the too narrow limits of pharmacy; he fhowed its connection with all the phenomena of nature; and the theory of the formation of metals, the phenomena of fermentation, the laws of putrefaction, were all comprehended and developed by his fuperior genius. Chemiftry was now directed to its true object: and J. Erneft Stahl, who was born with a natural fondnefs for chemiftry, and with a genius not inferior to any of thofe who had preceded him, fucceeded Becher, and reduced to certain general principles all the facts with which his predeceffor had enriched the fcience. He fpoke a language lefs enigmatical; he claffed all the facts with order and method; and purged the fcience of that alchemic infection, to which Becher himfelf was too much attached. The name of this philofopher therefore marks the commencement of a new æra in the annals of chemical fcience. There will however be fome caufe for furprife at the flow progrefs of chemical fcience, when the greatnefs of the claims of Stahl are compared with the few additions that have been made to his doctrine, until the middle of the prefent century. Some reafon for this will, however, be met with on confulting the labours of the chemifts who have fucceeded him; as we fhall find moft of them chained down to his fteps, and blindly fubfcribing to his opinions. Whenever a well-made experiment caft a gleam of light unfavourable to his doctrine, they feem to have given themfelves much trouble in forming an interpretation of it conformable to his ideas. Thus, the increafe of weight which metals acquire by calcination, though a fact little favourable to the idea of the fubtraction of a principle without any other addition, was incapable of injuring this doctrine.

The ftrong defire of reducing every thing to firft principles, and of eftablifhing a theory upon incomplete experiments, and facts imperfectly underftood, has alfo been highly prejudicial to the progrefs of this fcience.

It muft therefore be allowed, that although the labours of Stahl, Boerhaave, Macquer, Dr. Black, Mr. Cavendifh, Dr Prieftley, and fome others, had contributed in a high degree to improve and advance the fcience of chemiftry, ftill much remained to be accomplifhed, and particularly with refpect to the nature of gaffeous fubftances.

Stahl, from being wholly engaged in demonftrating the exiftence of phlogifton, and in tracing it through its various combinations with other bodies, feems to have totally neglected or overlooked the influence of *air* in moft of thofe phenomena which he particularly afcribed to the energy of the inflammable principle. The neceffity of referring many chemical phenomena to the operation of that fluid, had however already been pointed out by Boyle and Hales; and Dr. Prieftley, by repeating the experiments of the latter, had difcovered a number of fluids, which, though they had the appearance of air, differed from it in many refpects. From the calces of metals he had even extracted a fpecies of air much purer than atmofpheric air. The ingenious and accurate Mr. Bayen had alfo examined the calces of mercury, and found that they were reducible without phlogifton, and that during the calcination they emitted a confiderable quantity of an aëriform fluid.

But it is to the fuperior ingenuity and acutenefs of Mr. Lavoifier that we are indebted for the difcovery, that during the procefs of calcination a portion of air conftantly enters into combination with the body which is calcined. The difcovery of this important fact led him to doubt the exiftence of phlogifton, and to afcribe all the phenomena which Stahl had referred to the feparation or combination of what he called phlogifton, to the fixation or difengagement of air. The great number and variety of facts which fucceffive difcoveries have brought in fupport of this doctrine, would feem to point out its fuperior claims, and prove it to be not only more fully demonftrated than that of Stahl, but alfo to agree better with that accuracy and method which prevails in natural philofophy.

It is neceffary to obferve farther that, as difcoveries have become infinitely multiplied in chemiftry, the neceffity of remedying the confufion which has fo long prevailed, has been feen, and has indicated the neceffity of a reform in the language of the fcience. The relation is fo intimate between words and facts, that the alteration which takes place in the principles of a fcience ought to be attended with a fimilar alteration in its language. It is no more poffible to preferve a vicious nomenclature with a fcience which becomes enlightened, extended, and fimplified, than to polifh, civilize, and inftruct uninformed man without making any change in his natural language. Thofe chemifts who have written on any fubject have been ftruck with the inaccuracy of the words in common ufe, and have confidered themfelves at liberty to introduce any change; confequently chemical language has become infenfibly longer, more confufed, and more unpleafant. Thus, the carbonic acid has been known, for feveral years, under the names of fixed air, aërial acid, mephitic acid, cretaceous acid, &c. and our pofterity may probably hereafter difpute whether thefe various denominations were not applied to different fubftances. It was therefore become neceffary to reform the language of chemiftry. The imperfections of the ancient nomenclature, and the difcovery of many new fubftances rendered this change indifpenfibly neceffary; and it was particularly neceffary to defend this change from the caprice and fancy of individuals, and to eftablifh the new language upon invariable principles. The only means of infuring this purpofe was that of erecting a tribunal in which chemifts of acknowledged merit might difcufs the words received without prejudice and without intereft; in which the principles of a new nomenclature might be eftablifhed and purified by the fevereft logic; and in which the language fhould be fo well identified with the fcience, and the word fo well applied to the fact, that the knowledge of the one fhould lead to the knowledge of the other. This very important and neceffary undertaking was accomplifhed by the French chemifts, Meffrs. De Morveau, Lavoifier, Berthollet, and De Fourcroy, in 1788.

PART I.

INTRODUCTION.

AS the progrefs made in any Science muft depend upon the folidity of its principles, and upon the method of ftudying them; it may not be improper, in this place, to explain the manner in which the examination of thefe have been conducted. Chemical inquiries concerning the nature of bodies have generally been made in two different ways, viz. either by proceeding from the fimple to the compound bodies, or by defcending from the compound to the fimple.

The firft of thefe methods appears to be the leaft objectionable. We fhall therefore begin by giving an account of the feveral bodies in their moft elementary ftate, or reduced to that term beyond which analyfis can effect nothing; and, after having explained their various properties, combine thefe bodies with each other, which will afford a clafs of fimple compounds: and hence we fhall rife by degrees to the knowledge of bodies, and the moft complicated phenomena. In the examination of the feveral bodies to which we fhall direct our attention, it will be neceffary to proceed from the known to the unknown, and to confider particularly elementary fubftances. But as it is impoffible to treat of all thofe fubftances which the prefent ftate of our knowledge obliges us to confider as elementary, we fhall confine ourfelves to the exhibition of fuch as are of the greateft importance in the phenomena of the globe we inhabit, fuch as are almoft univerfally fpread over its furface, and fuch as enter as principles into the compofition of the re-agents moft frequently employed in our operations; fuch, for inftance, as we continually find in the examination and analyfis of the component parts of the globe. Of this number are light, heat, fulphur, and carbone. Light modifies all the operations of the chemift, and moft powerfully contributes to the production of all the phenomena which appertain to bodies either living or inanimate. Heat, diftributed in different proportions among all the bodies of this univerfe, eftablifhes their various degrees of confiftence and fixity; and is one of the great means which art and nature employ to divide and volatilize bodies, to weaken their force or adhefion, and by that means prepare them for analyfis. Sulphur exifts in the products of the three kingdoms; it forms the radical of one of the beft known, and moft generally employed acids; it exhibits interefting combinations with moft fimple fubftances; and, under thefe feveral points of view, it is one of the fubftances the moft neceffary to be known in the firft fteps of chemical fcience. The fame may be faid of carbone; it is the moft abundant fixed product found in vegetables and animals. Analyfis has alfo difcovered it in fome mineral fubftances. Its combination with oxigene is fo common in bodies, and in the operations of art and nature, that there are fcarcely any phenomena which do not prefent it to our view, and which confequently require the knowledge of its properties.

SECT. I. *Theory of Chemiftry.*

IN conformity to the definition which has been given of the Science of Chemiftry, the theory of it fhould confift in a complete knowledge of the phenomena refulting from the various combinations and decompofitions to which its different objects are expofed. From the great variety and diverfity of thefe objects, and the multiplicity of facts which their different combinations and decompofitions fupply, and which conftitute the prefent fyftem of chemical fcience; it would, however, be impoffible to convey an adequate knowledge of the whole. The only thing that can therefore be done, is to furnifh an account of the principal and moft interefting phenomena which prefent themfelves on the mixture of particular fubftances, or of the appearances which thefe exhibit on expofure to the more powerful chemical agents.

The objects of chemiftry are fo extremely numerous, that they may be faid to comprehend all the fubftances that compofe the globe which we inhabit, whether buried in its interior parts, or found on its furface. They are not, however, all capable of being examined with equal facility. Fire, one of the moft active bodies in nature, is fo incapable of being fubjected to experiment, that its nature is ftill far from being perfectly underftood. Its importance as a chemical agent would, however, feem to demand further inveftigation.

SECT. II. *Of Elementary Subftances.*

PHILOSOPHERS in all ages have been of opinion, that notwithftanding the great diverfity of the bodies of nature, they are all compofed or conftituted of a few primary fimple fubftances, to which they have given the name of *principles* or *elements*.

If, however, we attentively confider the fyftems which have been fucceffively formed by them, relative to the number and nature of the elements of bodies, we fhall be aftonifhed at the great variety which prevails in their opinions on the fubject. In the more early periods every one appears to have taken his own imagination as his guide; and no reafonable fyftem feems to have been eftablifhed until the time when Ariftotle and Empedocles acknowledged as elements, air, water, earth, and fire. Their opinion was well received for many ages; and it muft be allowed that it was calculated to feduce the mind. For, in fact, there are enormous maffes, and inexhauftible ftores, that prefent themfelves to our view, of thefe four principles, to which the deftruction or decompofition of bodies feemed to refer all the feveral component parts which formation or creation had taken from them. The importance and authority of thofe great men who had adopted this fyftem, and the analyfis of bodies which prefented only thefe four principles, alfo afforded grounds for admitting the doctrine. As foon therefore as chemiftry had advanced fo far as to difcover the principles of bodies, the cultivators of that fcience prefumed to mark the number, nature, and character of the elements; and every body that was unalterable by the chemical methods of decompofition then employed, was confidered by them as a fimple or elementary principle. By thus taking the limits of analyfis as the term for indicating the elements, the number and the nature of thefe muft vary according to the changes and the progrefs of the fcience. This has accordingly happened, as may be feen by confulting the authors who have written on the fubject, from the time of Paracelfus to the prefent period.

If, however, immutability of properties, unity and fimplicity, be the genuine characteriftics of elements; and if that fimplicity of character belong only to fuch bodies as we cannot reduce by decompofition, it muft be obferved, that of the four elements there are two, air and water, which art has at length found means to decompofe and feparate into feveral principles; that elementary earth is merely the creature of fancy; as there are a variety of earthy fubftances all equally fimple and incapable of decompofition; and that there are many natural bodies, fuch as fulphur, carbone, and the metals, which no art has yet been able to decompofe, which muft therefore, in the prefent ftate of our knowledge, be confidered as fimple fubftances or bodies. From thefe confiderations, it appears, that the true principles, or primary elements of natural bodies,

escape the observation both of our senses and of those instruments which we employ to aid the imperfection of them: that many of those substances which have been called elements on account of their bulk, their influence on the phenomena of nature, and their being found to exist in many of its productions, are far from being simple and unchangeable: and that, in truth, none of the bodies with which we are acquainted is a simple substance, though we may ascribe that character to such as we have not hitherto been able to decompose. It is therefore evident that the denomination of *elements* ought to be effaced from a chemical nomenclature; or rather it ought not to be used but as an expression denoting the last term of our analytical results; and it is always in this sense that it is employed in the present Treatise.

Sect. III. *Of Fire.*

Although we cannot agree to receive the word *element* in the same sense in which it has been generally understood, or consider the four bodies which have been mentioned as the first principles of all others, and the simplest productions of nature; yet it may not be improper to inquire into their nature before we proceed to others; as a knowledge of their properties is necessary to enable the reader to understand our account of the properties of other substances, and as they cannot be conveniently arranged in any other way.

Of the four substances which have been called elements, not one displays greater activity or simplicity than *fire*. The more ancient philosophers, who in this particular have been uniformly followed by their successors, gave this name to a substance which they supposed to be fluid, active, penetrating, consisting of particles actuated by a lively and incessant motion, and the first principle of all fluidity and motion. It is however probable, that in all languages, and among all nations, the first use of this word was to denote the impression which hot bodies make upon the skin; and that it was significant of the light which issues from bodies in combustion, as well as synonymous with the word *heat.* Many have considered it in this view, admitting the existence of fire only where heat is felt or combustion carried on. Lord Bacon was among the first that began to doubt the existence of fire as a particular fluid; and observed, that natural philosophers, in defining it, had always mistaken a property for a substance. Boerhaave, in his excellent Treatise on Fire, though inclined to a contrary opinion, seems to have been sensible of this difficulty. In order to discover the properties of this pretended element, he examined what effects it produces on those bodies in which it is believed to exist. Like former philosophers, however, he has rather given the history of hot, luminous, rarefied, and burning bodies, than of fire.

Notwithstanding this difficulty which still remains, it would seem impossible to comprehend many of the different phenomena which occur, without admitting a peculiar fluid or subtile igneous matter which is capable of insinuating itself between the particles of bodies and of separating them from each other.

Whether fire, however, be in reality a substance or a quality, it is evidently the principal agent employed by nature to counteract the power and natural effect of attraction. From the natural effect of attraction we should possess nothing but solid and compact bodies; if the *caloric*, or that exquisitely elastic fluid which is unequally dispersed in bodies, did not incessantly tend to destroy this adhesion of the particles. It is to this principle that we are indebted for the differences of consistence under which bodies present themselves to our notice. The various substances that compose this globe are therefore subjected, on the one hand, to a general law which tends to bring them together; and, on the other, to a powerful agent which tends to remove them from each other: it is upon the respective energy of these two forces that the consistence of all bodies depends. When the affinity prevails, they are in the solid state; when the caloric is most powerful, they are in the state of vapour, or gas; and the liquid state seems to be the point of the equilibrium between these two powers.

It is necessary, however, to observe, that there are two things to be considered with respect to fire, viz. heat and light. These two principles, which have been too frequently confounded, seem to be very distinct in their nature; as they are scarcely ever proportional to each other, and as each can exist independent of the other. In order, however, more fully to examine the theories respecting them, we shall consider each separately, and in a particular manner.

Sect. IV. *Of Caloric and Heat.*

Bodies, when heated, exhibit different phenomena, which have led to a supposition that heat is a distinct substance. Lord Bacon, Mr. Boyle, Sir Isaac Newton, and some other learned men, have, however, thought heat to be only a certain modification of which bodies are susceptible. It is very evident that both natural philosophers, and other men, have generally considered its presence as a sure indication of the presence of fire; have frequently confounded it with that element; and sometimes considered it as one of the distinguishing properties of fire.

The leading properties of heat are, to penetrate through all bodies; to diffuse itself equally, and to tend to an equilibrium; to dilate all substances into which it enters, causing them to pass from a solid to a fluid state, and from that to assume the form of elastic fluids, or gases.

It is generally communicated to bodies in one or other of these three ways; by contact, by motion, or by combination. Every one must have observed, that when two fluids different in temperature, the one sensibly warm, and the other sensibly cold, are mixed together, the former loses part of its heat, which is communicated to the latter, so that the temperature of both becomes the same. It is equally well known, that when two solids, one warm, the other cold, approach each other, the latter robs the former of part of its heat, and the temperatures become equal. As to the calling forth of heat by motion; the friction of any two solid substances, such as two hard stones, two pieces of wood, ivory, or metal, produces a heat which often rises to inflammation. The production of heat by combination is no less evident. The union of concentrated acids with water, quicklime, pure alkalis, or metals, is productive of a strong heat: the combination of certain fluids, such as oil and nitre, is so powerful this way as even to cause inflammation.

The laws respecting the communication of heat were, however, considered as analogous to those of motion, until the labours of Dr. Black of Edinburgh, Dr. Irvine of Glasgow, Dr. Crawford of London, and Kirwan in Ireland, as well as those of many foreign chemists, particularly Mr. Wilcke of Stockholm, and Lavoisier and De la Place of Paris, afforded new and more accurate ideas on this subject. The researches of these excellent philosophers have shown, that nothing was less understood, or involved in greater difficulties, than the progress and communication of heat among bodies unequally heated: but their experiments, though very ingenious, are, probably, not yet sufficiently numerous. It is, however, highly probable that they may lead to the establishment of a general theory, that may extend to all the phenomena of chemistry; in every one of which heat acts a part, either by its absorption or disengagement.

The niceſt and moſt accurate obſervations have, however, hitherto been inſufficient to afford any determinate or ſatisfactory notions of the nature of heat; hence both chemiſts and natural philoſophers are ſtill divided in their opinions on the ſubject. Some follow Lord Bacon and Mr. Boyle, in conſidering heat as nothing more than a modification of which all natural bodies are ſuſceptible; which has no ſeparate exiſtence, but conſiſts in the oſcillation of the minute particles of bodies. This was alſo the opinion of Mr. Macquer. The philoſophers by whom it has been maintained, ſupport it on the following facts: heat accompanies all the phenomena of motion, and appears ſubject to the ſame laws: it is increaſed with the increaſe of motion, and diminiſhed by its diminution. Excepting its communication or paſſage from one body into another, in which it follows laws different from thoſe of motion; in all other reſpects there is a ſtriking analogy between the two; and when this cauſe acts with leſs force, or entirely ceaſes to act, heat is inſtantly diminiſhed, and ſoon totally loſt. In explanation of this hypotheſis, its ſupporters obſerve farther, that even bodies of the greateſt denſity are full of ſmall cavities or pores, the ſum of which, if they were taken together, would perhaps occupy a larger ſpace than the ſolid matter of the body that contains them. Theſe void ſpaces afford room for the particles to move one againſt another in a continual oſcillation. The oſcillations are not obſerved, becauſe both the particles and the pores are ſo ſubtle and minute as to elude our ſenſes. In ſhort, the philoſophers who regard heat as an internal motion, urge, that no experiment has hitherto demonſtrated its exiſtence in a ſeparate ſtate, and that it makes no addition to the gravity of bodies.

But, on the contrary, Dr. Boerhaave, and ſome other philoſophers, as well as many modern chemiſts, among whom are probably to be reckoned, Dr. Black, Dr. Irvine, and Dr. Crawford, are of opinion, that heat is a particular fluid, diffuſed through all nature, of which every body contains more or leſs. They diſtinguiſh that fluid as exiſting in two different ſtates, in combination, and at liberty. In the former ſtate, it neither affects our ſenſes nor the thermometer, but remains quieſcent in thoſe bodies of which it conſtitutes a principle; it is then more or leſs in a ſtate of confinement. In the decompoſition of the bodies it is often diſengaged, and eſcapes into a ſtate of liberty: it now becomes capable of acting on bodies expoſed to its influence; and its force is meaſurable by a graduated thermometer. As all bodies that paſs from a ſolid to a fluid ſtate, and from thence into a vaporous form, excite cold in the ſurrounding atmoſphere, they ſuſpect that ſuch bodies abſorb a great quantity of heat; and when fluids, by aſſuming a concrete form, generate heat, they think that heat is then diſengaged from thoſe ſubſtances, and paſſes from a ſtate of combination into a ſtate of liberty.

Heat may therefore, from hence, be diſtinguiſhed into two kinds, or rather as exiſting in two different ſtates; in the one, it is intimately combined with other principles, and is denominated *latent heat*, becauſe it is not perceptible to the ſenſes; in the other, it is only diffuſed without combination. This laſt kind of heat may be expelled by preſſure: thus, when a bar of iron is ſtruck, the ſtroke compreſſes its particles, and cauſes the heat to iſſue out, in the ſame manner as water iſſues from a wet ſponge when it is preſſed together with the hand. Combined heat cannot be ſeparated from the bodies of which it forms a part, but by means of new chemical combinations.

Both Scheele and Bergman have conſidered heat as a diſtinct ſubſtance, and the former has examined with great attention all the phenomena which it diſplays as a chemical agent ſuſceptible of combination. He has even thought himſelf warranted by his experiments to conclude, that it is a combination of vital air, which he calls *empyreal fire*, and fixed fire or phlogiſton, and that it differs from light only in the relative quantity of the laſt principle. But however ingenious and accurate his experiments may be, the inductions which he has drawn from them concerning the nature and principles of heat do not appear to be naturally deducible from the facts. His analyſis of heat cannot therefore be conſidered as by any means demonſtrated to be juſt. Some philoſophers are of opinion, that light and heat are the ſame ſubſtance, only exiſting in different ſtates. That this ſubſtance becomes light, when its particles being collected together, and poſſeſſing all their attractive force, are violently darted to a diſtance. That it aſſumes the character of heat, when the ſame particles exiſt in a ſtate of diviſion, move gently, and tend towards an equilibrium. That heat may be converted into light, and light again into heat. But notwithſtanding their ſimilarity in ſome reſpects, there are many facts that oppoſe this opinion. It muſt be acknowledged, that light often produces effects very different from thoſe of heat; as on the nitric acid, the oxigenated muriatic acid, the oxides or calces of metals, and the leaves of vegetables dipped in water; all of which bodies afford vital air or oxigenous gas when expoſed to the rays of the ſun, which can be obtained from ſcarce any of them by the operation of heat. Thus the artificial light of our fires in paſſing through veſſels, changes the nature of the products which it diſengages. The French chemiſts, Meſſ. Lavoiſier and De la Place, ſeem to think that both the former opinions may be in ſome degree true: they conſider heat as a diſtinct ſubſtance, which by its preſence in natural bodies occaſions an oſcillation of their component particles.

From what has been already obſerved reſpecting the nature of heat, it would appear, that, notwithſtanding the various hypotheſes that have been advanced, there are only two principal opinions entertained concerning it by philoſophers in general; one of which is, that heat conſiſts of a peculiar motion or vibration of the parts of bodies, ſo that the temperature is higher the ſtronger the vibration: the other, that heat is a ſubſtance or fluid, whoſe greater or leſs quantity produces a higher or lower temperature.

Although the nature of heat be not, however, certainly known, the phenomena to which it gives riſe in chemical combinations and decompoſitions are not the leſs certain on that account, or leſs worthy of careful obſervation. It is evident, from a vaſt variety of facts, that whether a body or a modification, it is of itſelf liable to no alteration, nor is ever loſt; and the conſideration of this has induced Meſſ. Lavoiſier and De la Place to form an axiom or general principle concerning its appearance or diſappearance. As this axiom is of great importance, it may not be improper to inſert it in this place:

"If in a combination, or in any change of ſtate whatſoever, there be a diminution of free heat, the whole of that heat will again appear when the ſubſtances are reſtored to their former ſtate; and, on the contrary, if in any combination or change of ſtate there be an increaſe of free heat, this additional heat will diſappear when the ſubſtances return to their original ſtate."

This principle they generalize ſtill farther, ſo as to make it extend to all the phenomena of heat; and they then expreſs it in the following manner: "All the variations of heat, whether real or apparent, which any ſyſtem of bodies can ſuffer, are reproduced in an inverſe order when the ſyſtem returns to its original ſtate."

Sect. V. *General Properties of Heat.*

In order, however, to afford a more exact idea of the nature of heat, and of the manner of its application in modern chemiſtry, it may be obſerved, that when metals or liquids are heated, they ſuffer a dilatation in every direction, are reduced

to vapour, and at laſt become inviſible when the moſt powerful heat is applied to them: that bodies which poſſeſs the principle of heat, part with it more or leſs readily; and if we attentively obſerve them during the time they are cooling, a ſlight movement or undulation may be perceived in the ſurrounding air; an effect which may be compared to the phenomenon exhibited upon the mixture of two liquors of unequal weight and denſity.

Profeſſor Chaptal, an ingenious French chemiſt, thinks it difficult to conceive this phenomenon without admitting of a peculiar fluid, which paſſes firſt from the body which heats to that which is heated, combines with the latter, produces the effects which have been mentioned, and afterwards eſcapes to unite with other bodies, according to its affinities, and the law of equilibrium, to which all bodies tend. This fluid of heat, which is termed caloric by modern chemiſts, is contained in greater or leſs quantities in bodies, according to the greater or leſs degrees of affinity exiſting between it and them. It may, however, be diſplaced or diſengaged by various means; the principal of which is by the method of affinities: for inſtance, water poured upon the ſulphuric acid expels the heat, and takes its place; and while there is a diſengagement of heat, the volume of the mixture does not increaſe in proportion to the bulk of the two ſubſtances mixed. This ſhews that penetration takes place, which cannot be explained but by admitting that the integrant parts of the water take the place of the caloric, in proportion as it is diſſipated. Another method of precipitating caloric, as we have already obſerved, is by friction and compreſſion, in which caſe it is expreſſed or ſqueezed out of the body. The whole of the heat which may be produced by friction, is not, however, in fact, afforded by the body itſelf; becauſe, in proportion as the interior heat is developed, the external air acts upon the body, calcines or inflames it, and gives out heat itſelf during its fixation. Fermentation, and, in general, every operation which changes the nature of bodies, may diſengage caloric, becauſe the new compound may demand and receive a greater or leſs quantity. It is from this cauſe that chemical operations ſometimes produce heat, and ſometimes cold. The forms under which caloric preſents itſelf, are either a ſtate of liberty, or a ſtate of combination, as already obſerved: in the former it is not combined in any manner with any other body; but in the latter it is fixed in bodies by affinity, or electrive attraction, ſo as to form part of the ſubſtance of the body, and even part of its ſolidity.

In the firſt caſe, the caloric always endeavours to obtain an equilibrium; not that it is diſtributed equally among all bodies, but it is diſperſed among them according to the degrees of its affinity. Whence it follows, that the circumambient bodies receive and retain a quantity more or leſs conſiderable. Metals are eaſily penetrated by this fluid, and tranſmit it with equal facility; wood and animal ſubſtances receive it to the degree of combuſtion, and liquids, until they are reduced to vapour. Ice abſorbs all the heat communicated to it, without giving it out to other bodies until it has acquired the fluid ſtate.

The power of quickly tranſmitting heat in the production of a common temperature, is not, however, the ſame in different bodies. It may, therefore, be neceſſary to take notice of this circumſtance, and of what has been called the difference of *capacity* for heat in bodies. If a number of ſtraight wires of equal ſizes, but different metals, be covered each with a thin coat of wax, and their ends be all plunged in the ſame heated fluid—for example, melted lead—the fuſion of the coat of wax will ſhew that heat is more quickly tranſmitted through ſome metals than others. Thus alſo it is found, that the end of a glaſs rod may be kept red-hot for a very long time, without any inconvenience to the hand which holds the other end; though a ſimilar metallic rod, heated in the ſame manner, would very ſoon become too hot to be held. Bodies that quickly alter their temperature by communication, are ſaid to be better conductors of heat than ſuch as alter more ſlowly.

It is evident, however, that if two bodies be perfectly equal and alike in all reſpects, and have the ſame temperature, they muſt poſſeſs equal quantities of heat; and that generally the quantities of heat in bodies of the ſame kind, at the ſame temperature, will be in proportion to their quantities of matter or their weights. If two ſuch equal and ſimilar bodies, that differ in temperature, be brought together, they will by communication acquire a common temperature, and their quantities of heat by that means will be rendered equal. The quantities of heat alſo to be added to or taken from bodies of the ſame kind, to produce equal changes in their temperature, muſt be in proportion to their quantities of matter. The changes in the form of bodies by heat do not ſeem however to depend either upon their denſity, hardneſs, or ſpecific gravity. But when two equal bodies of different kinds produce a common temperature by communication, it ſeldom happens that it proves to be an arithmetical mean between the two original temperatures. In ſuch caſes it is evident that the heat which was communicated from one to the other, has not altered their temperatures equally, but has raiſed or lowered that of the one more than it has lowered or raiſed that of the other. And as the proportion between the number of degrees through which one of two bodies is thus raiſed, and the other lowered, is found by experiment to be the ſame, however different the two original temperatures may have been, provided no change of form or chemical combination has been produced in either of them; it is a general conſequence, that the quantity of heat required to alter the temperature of one of the bodies a ſingle degree, or any other equal part, will be greater or leſs than would be required to produce the ſame change in the other body, in proportion as the changes produced by the communicated heat were leſs or greater. The whole heat in each body, when they have the ſame temperature, muſt conſiſt of the ſame number of degrees: the proportion between the whole heats of the bodies will therefore be the ſame as between the heats required to raiſe each of them a ſingle degree: that is to ſay, the comparative heats of bodies, at the ſame temperature, will be in the inverſe proportion of the number of degrees their temperature is altered by the ſame quantity of heat. To illuſtrate this, ſuppoſe a pint of mercury, at the temperature of 136°, be mixed with a pint of water at 50°, the mean temperature will be 76°. The water therefore has been heated 26°, and the mercury has been cooled 60°, by the loſs of the heat it imparted to the water. The abſolute heat in one degree of the mercury will conſequently be proportionally leſs than that of one degree of the water; becauſe the very ſame heat which has raiſed the water 26 degrees in temperature, would raiſe the mercury 60, if it could be returned again: and the whole heat contained in the mercury will be to that of the water in the ſame proportion of 26 to 60. But in the preſent experiment equal bulks were uſed; and mercury is about 13 times as heavy as water. An equal weight of mercury would contain only one-thirteenth part of the heat. Twenty-ſix, divided by 13, quotes 2: whence the comparative heats of mercury and water are in the proportion of about 2 to 60, or 1 to 30; that is to ſay, a pound of mercury, at the ſame temperature, contains no more than one-thirtieth part of the heat contained in a pound of water. The term *comparative heat* is generally uſed to denote the proportion of the abſolute quantity of heat in one body to that of another equal maſs of matter at the ſame temperature, conſidered as a ſtandard. The ſtandard made uſe of is pure water, in a fluid ſtate. By ſome writers this is called ſpecific heat. The diſpoſition, or property, by which bodies ſeverally require

more or lefs heat to produce equal changes in their temperature, is called their capacity for heat. Thefe capacities are confidered as the unknown caufe of the differences in their comparative heats, to which they are confequently proportional.

By experiment it has been found, that the capacity of the fame body for heat is leaft when folid, greater when fufed or fluid, and greateft of all when it becomes converted into vapour, or elaftic fluid. Alfo, when bodies unite by virtue of chemical attraction, their capacities are feldom the fame as the fum of the capacities of the bodies, but almoft always either greater or lefs. It may be proper to notice a few of the confequences of this doctrine. The capacities of ice and fluid water are found to be as 9 to 10. Ice cannot therefore be converted into water, unlefs it be fupplied with as much heat as is fufficient to anfwer the difference of capacity. Thus, if equal quantities of ice and water, both at the temperature of 32°, or the freezing point, be expofed in fimilar veffels, at the fame diftance from a fire, both will receive heat alike; and the ice will be melted into water at 32°, while the water in the other veffel will have its temperature raifed to 178°. Here it is obvious that the fame heat which raifed the water 146 degrees, was merely fufficient to fupply the increafed capacity of the ice; for which reafon this laft had not its temperature raifed at all. If the experiment be more accurately made, by mixing equal weights of water at 178°, and ice at 32°, the fame confequence will follow; for the ice will be melted, and the common temperature will be 32°; becaufe the ice in melting receives no augmentation of temperature, but abforbs the whole 146° of heat from the water, by virtue of its increafed capacity when it becomes fluid. It is alfo the fame when water is frozen by the lofs of its heat, communicated to a cold atmofphere, or other contiguous bodies; the procefs of cooling goes on till ice begins to be formed; but, during the whole time of the converfion of the water into ice, the temperature remains ftationary, becaufe the diminifhed capacity of the ice caufes it to give out heat, the continual evolution of which fupplies the refrigerating bodies with as much as their energy of cooling might otherwife have taken to caufe a diminution of the temperature. When the whole is frozen, this fupply of extricated heat ceafes; and therefore the caufe that cooled the water at firft, goes on in cooling the ice, until the common temperature be produced.

In the various experiments wherein the capacities of the fame bodies are changed, and the difference between the quantities of heat in the fame body in both ftates, at one common temperature, is known in degrees of the thermometer, we may derive the advantage of finding the abfolute quantities of heat in degrees of the thermometer, or the number of degrees which any particular point or temperature is remote from the true zero, or point of abfolute privation of all heat. To illuftrate this curious pofition, the experiments on ice and water, juft related, may be made ufe of. The whole quantities of heat, in thefe two ftates, are as 9 to 10. It is plain, therefore, that when water freezes, it muft give out one-tenth of its whole heat; and this tenth part, by the experiment, is found to anfwer to 146° of Fahrenheit's thermometer. Confequently its whole heat is ten times 146°, or 1460° of the fame thermometer, when its temperature is 32° above zero. Whence the natural zero is at 1428°.

No direct experiment has hitherto been made to fhew the capacity of fteam with relation to water. From an indirect trial of Dr. Crawford's, it appears to be as 15 to 10. It is accordingly found that fteam, in its condenfation into water, gives out as much heat as would raife an equal quantity of non-evaporable matter, of the fame capacity as water, 914 degrees. This heat it muft have taken up at its formation. Whenever water is heated, we may confequently confider the heat as difpofed of in two ways. One part raifes the temperature of the fluid water, and the other part is employed in fupplying the elaftic vapour that flies off with the heat which its increafed capacity requires at that temperature. The greater the quantity of fteam is produced, the larger will be the proportion of the heat employed in this laft way. Now, there is a difficulty attends the formation of elaftic vapour, in proportion as its efcape is rendered more difficult. If the water be heated in a clofe veffel, no fteam will be formed; if the fteam efcape by a fmall hole, there will be lefs formed than if the whole furface of the water were uncovered; and if the fuperincumbent atmofphere be removed, as in the vacuum of an air-pump, the production will be greateft of all. As the heat of the water goes on increafing, the production of fteam will likewife increafe, until the quantity be fo great as by its augmented capacity to carry off the whole heat that is communicated. At this period the increafe of temperature will therefore ceafe, and the temperature will become ftationary. This point is called the boiling-water point. It varies, however, a little, as the preffure of the atmofphere varies, being loweft when that is leaft; becaufe the maximum of fteam is produced at a lower temperature when the obftacle to its efcape is lefs. It has been fuggefted, and with fome probability, that there would be no interval of fluidity between the folid and vaporous forms, if it were not for the preffure of the furrounding atmofphere.

The production of cold by evaporation, and the effect of freezing mixtures, may be eafily accounted for on this doctrine.

It is only poffible to appreciate the degree of heat by its effects. The inftruments which have been fucceffively invented to calculate it, are known by the names of *thermometers, pyrometers, &c.* They have been applied to the ftrict determination of the feveral phenomena exhibited in confequence of the abforption of caloric in various bodies. The thermometer confifts of a glafs ball, with a long narrow tube or neck, and is partly filled with mercury; a fluid preferable to all others, from its unchangeablenefs, the regularity of its expanfions, and its not foiling the tube. The expanfions or contractions of the mercury are fhewn by the rife or fall of its furface, which is meafured by a graduated fcale ufually fixed to the tube. See Thermometer.

The exactnefs of the correfpondence between the degrees of the thermometer, and the actual variations of the heat of fluids, was firft accurately determined by M. De Luc. By mixing equal quantities of water at different temperatures, he found that the thermometer very nearly indicated the arithmetical mean between the two temperatures, and confequently that its indications really correfpond with the quantities of heat.

The rarefaction or dilatation of fluids, or of metals in the fluid ftate, by the feveral degrees of heat, has been long meafured by thermometers formed of glafs; but this very fufible fubftance can only be ufed to afcertain degrees of heat inferior to that which renders the glafs itfelf fluid. For calculating the higher degrees of heat, feveral means have been fucceffively propofed. Mr. Leidenfroft has proved, that the hotter a metal is, the more flowly drops of water will evaporate from its furface; and has propofed this principle for the conftruction of pyrometers. A drop of water in an iron fpoon, heated to the degree of boiling water, evaporates in one fecond; a fimilar drop, poured on melted lead, is diffipated in fix or feven feconds; and upon red-hot iron in thirty. Mr. Ziegler, in his *Specimen de Digeftore Papini*, has found that 89 feconds were required to evaporate a drop of water at 520 degrees of Fahrenheit; and that one fecond is fufficient at the 300th degree. This phenomenon, which is probably more interefting to chemiftry than pyrometry, would feem to depend upon the adhefion and decompofition of the water upon the metal.

One of the moft ingenious and accurate pyrometers that has hitherto been invented, is that which was prefented to the Royal Society by Mr. Wedgwood. It is conftructed upon the principle, that the pureft clay fhrinks in the fire in proportion to the heat applied to it; and confifts of two parts, one called the *gauge*, which ferves to meafure the degrees of diminution or fhrinking; the other containing the fimple pieces of pure clay, which are called *thermometer pieces*. See PYROMETER.

At the time of ufing this inftrument, one of the pieces is expofed in the fire-place, the heat of which is to be determined; and when it has acquired the whole intenfity, it is taken out, and fuffered to cool, or for greater fpeed it is plunged in water; after which it is prefented to the gauge, and its degree of contraction eafily afcertained.

Thefe different inftruments are not however applicable to all cafes. We cannot, for inftance, calculate with ftrictnefs the heat which efcapes from living bodies, or determine with precifion the temperature of any fubftance. Other methods have therefore been invented. By M. Wilcke of Stockholm it has been propofed to eftimate the heats of bodies by obferving the quantities of fnow they can melt in a given time. But a better method, and an apparatus which is more convenient, has been invented by Lavoifier and De la Place of Paris. It is conftructed upon the principle that ice abforbs all the heat communicated to it, without communicating it to other bodies until the whole is melted; fo that in this way may be calculated the degrees of heat communicated, by the quantity of ice which is melted. It was found neceffary, in order to afford ftrict refults, to difcover the means of caufing the ice to abforb all the heat difengaged from the bodies under examination, and to cover it from the action of every other fubftance which might facilitate its fufion, as well as to collect with great care the water produced by the fufion. The apparatus conftructed by thefe two celebrated chemifts for this purpofe, confifts of three circular veffels nearly infcribed in each other; fo that three capacities are produced. The interior fpace or cavity is formed by an iron grating, upon fupports of the fame metal, in which the bodies fubjected to experiment are depofited; the upper part of it being clofed by means of a cover. The middle fpace, next to this, is intended to contain the ice which furrounds the interior compartment, and which is fupported and retained in its place by a grate, on which a cloth is fpread. In proportion as the ice diffolves, the water flows through the grate and the cloth, and is collected in a veffel placed below. The external fpace or compartment of the apparatus contains ice intended to prevent the effect of the heat of the furrounding atmofphere. See Plate 86.

When this ufeful machine is employed, the middle or fecond fpace is filled with pounded ice, and likewife the cover of the internal fphere: the fame thing is done with regard to the external fpace, as well as to the general covering of the whole machine: the interior ice is fuffered to drain; and, when it ceafes to afford water, the covering of the internal fpace is raifed, to introduce the body upon which the experiment is intended to be made. Immediately after this introduction, the covering is put on, and the whole apparatus remains untouched until the included body has acquired the temperature of thirty-two, or the freezing temperature of water, which is the common temperature of the internal capacity. The quantity of water afforded by the melting of the ice is then weighed; and this is an accurate meafure of the heat difengaged from the body, becaufe the fufion of the ice is the effect of this heat only. Experiments of this nature continue a confiderable length of time; and it is of great confequence, that there fhould be no communication between the middle, or fecond, and the external fpace of the machine; and alfo, that the air of the apartment fhould not be lower than that of the freezing point; becaufe the interior ice would then receive a degree of cold lower than that temperature.

In refpect to fpecific heat, it is proper to obferve, that it is merely the proportional quantity of heat neceffary to raife bodies of equal mafs to the fame number of degrees of temperature; fo that, when the fpecific heat of a folid body is required, its temperature muft be elevated a certain number of degrees, at which inftant it muft be placed in the internal fphere, and there left until its temperature is reduced to thirty-two, or the freezing point of Fahrenheit's thermometer. The water is then collected, and this quantity divided by the product of the mafs of the body; and the number of degrees of its original temperature above thirty-two, will be proportional to its fpecific heat. When fluids are examined, they are inclofed in veffels whofe heat has been previoufly determined. The operation is then the fame as for folids; excepting that the quantity of water afforded muft be diminifhed by a deduction of that quantity which has been melted by the heat of the veffel. If it be required to determine the heat which is difengaged during the combination of various fubftances, they muft be all reduced, as well as their containing veffels, to the temperature of thirty-two. The mixture muft then be placed in the internal fphere; and the quantity of water collected is the meafure of the difengaged heat. In order to determine the heat of combuftion and refpiration, as the renewal of air is indifpenfable in thefe two operations, it is neceffary to eftablifh a communication between the internal part of the fphere and the furrounding atmofphere; and in order that the introduction of frefh air may not caufe any perceptible error, thefe experiments ought to be made at a temperature little differing from thirty-two, or at leaft the air which is introduced, ought previoufly to be brought to this ftate or temperature.

With a view to determine the fpecific heat of gafes, it is neceffary to eftablifh a current through the internal part of the fphere, and to place two thermometers, one at the place of introduction, and the other at the place of efcape. By a comparifon of the temperatures exhibited by thefe two inftruments, a judgment is formed of the heat abforbed, and the melted ice is meafured.

All the different means made ufe of for the admeafurement of heat, are founded on the general principle, that different bodies abforb heat in greater or lefs quantities. If this fact were not already generally admitted, it might be eftablifhed on the following facts: Dr. Franklin having expofed to the rays of the fun two fmall pieces of cloth, of the fame texture but of different colours, upon the furface of fnow, perceived, a few hours afterwards, that the red cloth was buried in the fnow, while the other which was white had not fuffered any depreffion. M. de Sauffure has alfo obferved, that the peafants of the mountains of Switzerland are careful to fpread a black earth over the furface of grounds covered with fnow, when they are defirous of melting it, to fow their feed. So likewife children burn a black hat in the focus of a fmall lens which would fcarcely heat a white one expofed in the fame manner.

Thefe are fome of the phenomena of heat when it is difengaged in a ftate of liberty. We fhall now therefore confider thofe which it prefents when it efcapes from a ftate of combination:

It is evident that heat is fometimes difengaged in a ftate of fimple mixture, as in the phenomena of vapours, fublimations, &c. If heat be applied to water, thefe two fluids will unite, and the mixture will be diffipated in the atmofphere; but it would be an abufe of words to call fo weak an union by the name of combination; for, as foon as the heat becomes in a fituation to combine with other bodies, it abandons the water,

which return to a liquid ſtate. This body, during evaporation, continually carries with it a portion of heat; and hence, probably, reſult the advantages of tranſpiration, perſpiration, &c. But heat very frequently contracts a true chemical union with the bodies which it volatilizes: this combination is even ſo perfect, that the heat is not perceptible, but is neutralized by the body with which it is combined, in which caſe it is called *latent heat*, as we have before obſerved.

The different inſtances in which heat enters into combination, and paſſes to the ſtate of latent heat, may be reduced to the two following:

I. Every body which paſſes from the ſolid to the liquid ſtate, abſorbs a portion of heat, which is no longer ſenſible to the thermometer, but exiſts in a ſtate of true combination. In proof of this the academicians of Florence filled a veſſel with pounded ice, and plunged a thermometer in it, which deſcended to thirty-two on Fahrenheit's ſcale. The veſſel was then immerſed in boiling water, and the thermometer did not riſe during the whole time of the liquefaction of the ice. It is evident therefore that the fuſion of ice abſorbs heat. Mr. Wilcke of Stockholm poured a pound of water, heated to the ſixtieth degree of Reaumur, upon a pound of ice. The melted mixture poſſeſſed the temperature of 0, of the ſame thermometer. Sixty degrees of heat had therefore entered into combination. The experiments of the Chevalier Laudriani have alſo ſhewn that the fuſion of metals, ſulphur, phoſphorus, alum, nitre, and many other ſubſtances, abſorb heat.

Cold is produced in the diſſolution of all thoſe ſalts which are accuſtomed to cryſtallize. On this ſubject Reaumur has made a ſeries of very intereſting experiments, which confirm thoſe of Mr. Boyle. Fahrenheit alſo cauſed the thermometer to deſcend very low, by melting ice by ſtrong nitrous acid. But the moſt extraordinary experiments that have been attempted in this country, are thoſe made by Mr. Walker, apothecary at Oxford, and inſerted in the Philoſophical Tranſactions for the year 1787. The mixtures which produced the greateſt degrees of cold in theſe trials, were, 1. Eleven parts of muriate of ammoniac, or common ſal ammoniac; ten parts of nitrate of pot-aſh, or common nitre; ſixteen parts of ſulphate of ſoda, or Glauber's ſalt; with thirty-two parts by weight of water: the two firſt ſalts ſhould be dry, and in powder. 2. The nitric acid, muriate of ammoniac, and ſulphate of ſoda, lowered the thermometer to eight degrees under 0. Mercury has alſo been frozen, without uſing either ice or ſnow, by the ſame able experimenter. It is therefore an incontrovertible principle, that all bodies which paſs from the ſolid to the liquid ſtate, abſorb heat, and retain it in ſo accurate a combination as to afford no ſign of its preſence, in which caſe it is therefore fixed, neutralized, or latent.

II. All bodies, by paſſing from the ſolid or fluid ſtate to the aëriform ſtate, abſorb heat, which becomes latent; and it is by virtue of this heat that ſuch bodies are placed and maintained in that ſtate; and on this principle is probably founded the proceſs uſed in China, India, Perſia, and Egypt, to cool liquors uſed for drink. The water intended for this purpoſe is put into very porous veſſels, and expoſed to the ſun, or to a current of warm air, in order to cool the fluid which they contain.

It may alſo be concluded from the experiments of Mr. Richmann, which have been inſerted in the firſt volume of the Imperial Academy of Peterſburgh; that a thermometer taken out of water, and expoſed to the air, always deſcends, even when its temperature is equal or ſuperior to that of the water; that it afterwards riſes, until it has acquired the temperature of the atmoſphere; that the time of deſcending is leſs than that which it employs to riſe again; and that when the thermometer, withdrawn from the water, has ariſen to the common temperature, its bulb is dry; but that it continues wet during the whole time of its ſtanding beneath this common temperature. To theſe conſequences may be added others deduced from ſeveral curious experiments made by the celebrated doctor Cullen. 1. That a thermometer ſuſpended in the receiver of the air-pump, deſcends two or three degrees during the time of exhauſtion, and afterwards riſes to the temperature of the vacuum. 2. That a thermometer plunged in alcohol, in the receiver of the air-pump, always deſcends, and the lower in proportion as the bubbles are ſtronger which iſſue from the alcohol; if it be withdrawn from this liquor, and ſuſpended wet beneath the receiver, it falls eight or ten degrees while the air is pumping out. It is alſo well known that if the ball of a thermometer be wrapped in fine linen, and kept moiſt by ſprinkling with ether, and the evaporation be facilitated by agitation in the air, the thermometer will deſcend to the freezing point.

From this it is plain that the heat which has entered into combination with bodies during their tranſition from the ſolid to the liquid ſtate, or from this laſt to the aëriform ſtate, may be again exhibited by cauſing theſe ſubſtances to return again to the ſtates of liquefaction or ſolidity. In a word, every ſubſtance which paſſes from the liquid to the ſolid ſtate, ſuffers its latent heat to eſcape, which at this inſtant becomes free or thermometrical heat. The celebrated Fahrenheit, having left water expoſed to a colder temperature than that of ice, the water remained fluid: but it congealed by agitation; and the thermometer, which marked ſeveral degrees beneath the freezing point, ſuddenly roſe to that temperature. Facts of a ſimilar nature have alſo been mentioned by other writers.

It has been ſhewn by Mr. Baumé, in his inquiries and experiments relating to ſeveral ſingular phenomena exhibited by water at the inſtant of its congelation, that ſeveral degrees of heat are always developed at that inſtant. Gaſeous ſubſtances are maintained in the aëriform ſtate merely by the heat which is combined with them; and when to theſe ſubſtances, thus diſſolved in caloric, another body is preſented, to which they have a very ſtrong affinity, they abandon their heat to unite with this laſt ſubſtance; and the caloric, thus expelled or diſengaged, appears under the form of free or thermometrical heat. This diſengagement of heat, by the concretion or fixation of gaſeous ſubſtances, was obſerved by the celebrated Scheele, as is evident from the valuable experiments which form the baſis of his Treatiſe on Air and Fire. Since the time of this excellent chemiſt, rigorous calculations have been made of the quantity of latent heat exiſting in different gaſes. The reſearches of Doctor Black, Doctor Crawford, Mr. Wilcke, Mr. De la Place, and Mr. Lavoiſier, on this ſubject, are all of them highly deſerving of the attention of the chemical inquirer.

Sect. VI. *Of Phlogiſton.*

Although modern chemiſtry has rejected the doctrine of phlogiſton, it may not be improper to give ſome account of it in this place. The property which certain bodies poſſeſs of producing fire, that is, light and heat, in conſequence of continued motion, or by coming in contact with other bodies in a ſtate of ignition, has been ſuppoſed to be a diſtinct principle, which Stahl has conſidered as pure fire, or the matter of fire fixed in combuſtible bodies, and has given it the name of *phlogiſton* or the *inflammable principle*, in order to diſtinguiſh it from fire in a free or active ſtate. Its properties, when combined, he conceives to be totally different from thoſe which it diſplays when at liberty: it then gives neither heat nor light, though in the latter ſtate theſe are its conſtant attendants: but, when freed from confinement, it inſtantly regains its characteriſtic properties, and its preſence is indicated by both heat and light. Such was the opinion of this great man concerning the nature of combuſtible bodies. It is indeed natural to ſuppoſe, that thoſe ſubſtances which, when ſtrongly heated or forcibly ſtruck, become inflamed, and continue to burn till they

be confumed, owe this property to their latent fire ; and that the combuftion of fuch bodies is nothing but the difengagement of the fire, and its paffing to a ftate of liberty. Accordingly, Stahl thought all combuftible bodies contained fire in a fixed or combined ftate, on which principle their inflammability depended. He alfo confidered this principle as being perfectly the fame in all the fubftances into which it entered, whatever their nature, or however different they might be from one another. The combuftibility of any body appeared to him a fufficient proof that it contained a quantity of phlogifton. Thus, in his opinion, fulphur, charcoal, metals, oils, and phofphorus, owed all their properties to phlogifton ; and that their differences in point of form, colour, confiftency, gravity, &c. depended on the variety of the principles to which the phlogifton was united ; for the phlogifton itfelf was always the fame, and could fuffer no variation but by being difmiffed from a combined into a free ftate. In order however to diftinguifh the properties of phlogifton or fixed fire, he inftituted a comparifon between bodies into the compofition of which it enters, and others that feem deftitute of it. The former, he obferved, to poffefs in general, colour, fmell, fufibility, volatility, and combuftibility; while the latter were found to be commonly deftitute of colour and fmell, fixed in a greater or lefs degree, incapable of fufion, and ftill more incapable of combuftion. He likewife obferved, that fuch bodies as evidently appeared to be phlogifticated, loft moft of their properties when deprived of their phlogifton, but regained them when it was reftored.

This doctrine was however chiefly applied to fulphur and metallic fubftances : the phenomena which thefe afforded were the leading facts on which it was eftablifhed. Metals he confidered as compounds of certain earths with phlogifton. When calcined, their phlogifton he fuppofed was difengaged, and efcaped into a ftate of freedom; and that they loft, of confequence, their fufibility, ductility, and inflammability: but that thefe properties might be reftored by heating them with oils, charcoal, or any other phlogifticated fubftance, fo as to reftore to them what they before poffeffed of that principle. Notwithftanding the plaufibility of this theory, it has been oppofed with fuccefs by modern chemifts.

The principal difficulties which occurred in confidering the theory of phlogifton were, 1. That the properties which Stahl attributed to that principle did not always appear in the bodies in which he fuppofed it to exift. Charcoal, and particularly that of refinous bodies, which he confidered as pure phlogifton, is neither odorous, volatile, nor fufible . there are even fome fpecies of charcoal which are fcarce combuftible. The diamond, an extremely fixed, tranfparent, inodorous, and infufible fubftance, is perhaps the moft combuftible body known, as it burns entirely, without leaving any refidue ; and even alcohol, ether, and feveral of the effential oils, are entirely without colour. 2. That many bodies, upon lofing their phlogifton, acquire new properties, which, according to the theory of phlogifton, were confidered as depending upon that principle. Moft metals, for inftance, when calcined, affume a deeper colour. 3. That this chemift paid fo much attention to combuftible bodies, hoping from the examination of their nature, to determine the character of phlogifton, that he appears to have forgot that air is effentially neceffary to combuftion. But if combuftion be nothing more than the mere difengagement of phlogifton, it is plainly an act of decompofition, in which the combuftible body lofes one of its principles : but how is it poffible for a body, after having loft one of its component principles, to poffefs confiderably more abfolute weight than before ? An hundred pounds weight of lead affords an hundred and ten of *minium* ; the weight of the fulphuric acid obtained by the combuftion of fulphur, is greater than that of the fulphur from which it was obtained : and, in the fame manner, Mr. Lavoifier has found that eighteen ounces of pure water are produced by burning fixteen ounces of fpirit of wine.

The folidity of this objection, together with the difficulty that has been found in every attempt to demonftrate the exiftence of phlogifton, have induced Mr. Lavoifier and other modern chemifts to deny that there is fuch a fubftance in nature ; and fince they began to enquire how far the prefence of air is neceffary to combuftion, they have made feveral important difcoveries ; the principal of which is, that a certain quantity of atmofpheric air is conftantly abforbed by burning bodies, and that it is the acquifition of this air, which becomes fixed or combined, that increafes the abfolute gravity of metals, fulphur, phofphorus, inflammable gas, and fpirit of wine, when expofed to combuftion. This increafe of gravity has been found to correfpond precifely with the weight of the air abforbed ; a circumftance which has induced them to adopt a new theory, founded folely on the abforption of air; in which phlogifton is rejected.

The bodies which Stahl called phlogifticated, according to this new doctrine, are fubftances which have a ftrong tendency to combine with vital air; for on this tendency the combuftibility of bodies folely depends. Therefore, the different phenomena which Stahl afcribed to the difengagement of phlogifton are produced by combinations with pure air : fuch are combuftion, calcination, refpiration, and the formation of the fulphuric and phofphoric acids, by the combuftion of fulphur and phofphorus. And according to the pneumatic theory, all thofe phenomena in which the doctrine of Stahl reprefents the phlogiftic principle as entering into new combinations, are produced by the difengagement of air. Such are the reduction of metals, effected by the mutual action of metallic calces and charcoal, the decompofition of acids by combuftible bodies, and particularly the decompofition of the fulphuric and the nitrous acids by iron, charcoal, &c. This theory therefore fuppofes all thofe bodies which Stahl thought to be compounds, with phlogifton for one of their principles, to be fimple fubftances, having fo ftrong an affinity with pure air, that they attempt to enter into combination with it whenever they are expofed to its contact. Combuftion is, therefore, nothing but the combination of air with the combuftible body ; and all operations in which bodies have been thought to regain their phlogifton, are merely the difengagement of pure air, or its paffing out of one body into another.

Mr. Lavoifier fuppofes farther that light, heat, and all the other remarkable phenomena of combuftion, depend rather on a certain action of the air than on the peculiar nature of combuftible bodies ; that the flame which then arifes is occafioned by the difengagement of the light which was combined with the pure air, not of that which exifted in the combuftible body.

Sect. VII. *Of the Chemical Effects of Heat on Bodies.*

We have already obferved many of the properties and effects of heat, but there are others which ftill remain to be noticed. A moft ftriking effect of heat is its diminifhing the aggregation of bodies by feparating their particles. As the force of aggregation, and that of the attraction of compofition, are always in the inverfe ratio of one another, as fhall be fhown hereafter, it will be readily underftood that heat, in deftroying aggregation, muft be fingularly favourable to combination. And the action of heat, when confidered in this point of view, is liable to four different modifications, according to the nature of the bodies on which it exerts its power.

1ft. There are fome bodies on which heat produces no alteration, nor any effect but dilatation. Subftances of this nature are unalterable and *apyrous*. Thus rock-cryftal, however long expofed to the utmoft violence of fire, fuffers no alteration : it lofes neither its hardnefs nor tranfparency, and appears after

its expofure with all its former denfity and beauty. But there are very few bodies fo little alterable as this fubftance.

2d. It entirely deftroys the aggregation of moft bodies, caufing them to pafs from a folid to a fluid ftate. This phenomenon is named *fufion*; the bodies on which it is produced are called *fufible*. There are various degrees of fufibility, from that of platina, which is extremely difficult to melt, to that of mercury, which remains always in a fluid ftate. When this fufibility is caried to an exceffive degree, it becomes volatilization. A body becomes volatile, or diffufes itfelf through the atmofphere, when it is caufed to pafs, by a ftrong rarefaction, from the liquid ftate to that of an elaftic fluid. It is then diffipated by heat, and elevated in the atmofphere, where it remains fufpended till cold reftore to it part of its denfity and fpecific gravity. Bodies which may be reduced to this ftate are named *volatile*; thofe incapable of it are, by way of oppofition, called *fixed*. There are many degrees between fixity and volatility. It even feems impoffible to fuppofe any body abfolutely fixed. Perhaps the only reafon why any appear fo, is, becaufe we cannot apply to them a degree of heat fufficiently intenfe. The fame remark may be made on infufibility; it is never abfolute. The reafon why rock cryftal appears infufible, is, becaufe a proper degree of heat cannot be applied to it. In fpeaking therefore of the infufibility or fixity of certain fubftances, it is to be underftood only in reference to the heat which it is in our power to fubject them to. This effential volatility is to be carefully diftinguifhed from that which is merely apparent, and takes place only in confequence of the communication of motion by a current of flame or vapour. Thus, for inftance, zinc, in a ftate of calcination, is carried up by the flame that is raifed during the time of its combuftion.

3d. When heat acts on bodies confifting of two principles, one volatile, the other fixed, it generally feparates them by volatilizing the former. Such bodies are thus decompofed, but without fuffering any alteration; for, by reuniting their principles, they can be reproduced with all their original properties. This feparation of principles is a true or fimple analyfis. Heat applied to bodies confifting of two fubftances, between which there is a wide difference in refpect of volatility, reduces the volatile principle to vapour, but leaves the fixed uninjured. But in order that this true analyfis may take place, it is requifite that both the volatile and the fixed principle of the compound be unalterable by the degree of heat applied to them; or that they be expofed only to fuch a degree of heat as they can bear without lofing any of their properties. The volatilized fubftance having then undergone no greater alteration than the fixed, they may be reunited fo as to form the fame compound which they conftituted before their feparation. When this can be effected, the analyfis is true or fimple. As bodies do not generally confift of two principles, one of which is volatile, the other fixed, and as it is often extremely difficult, and fometimes even impoffible, to apply to compounds of this kind precifely that degree of heat which will volatilize the one without alteration, and leave the other uninjured; it may be naturally inferred, that the number of the bodies on which heat acts in this manner muft be very inconfiderable. For this reafon, chemifts have now much lefs frequently recourfe to the operation of fire than formerly. The fubftances on which heat produces this effect are faid to be *decompofable without alteration*; and fome mineral fubftances, fuch as cryftallized falts and folutions of neutral falts, come under this clafs or denomination.

4th. When the body expofed to the action of fire confifts of feveral volatile and feveral fixed principles, the volatilized principles enter into mutual union; and the fixed are combined with one another; and fuch is the refult of this decompofition, that though the products be reunited with the refidues, the original compound will not be produced. This is therefore a falfe or complicated analyfis. The bodies on which heat acts in this manner are faid to be *decompofable with alteration*. Moft natural fubftances belong to this clafs. They are too complex in their compofition, and confift of too many principles, to be decompofed without fuffering alteration. As the force of the affinity of compofition acts upon all bodies, and is even promoted by heat, when any of the principles of a compound are volatilized by the action of fire, they re-act upon one another, unite, and form a new order of combination different from that in which they before fubfifted: the fame thing takes place on the fixed principles of the body. Thus, when a piece of wood, bark, or any other vegetable fubftance, is expofed to the action of fire, the water, the falts, and the oil, unite together, and conftitute an acid, elaftic fluid, and a brown oil, &c. which did not exift in the wood in that form. The action of heat, therefore, produces a total alteration on fuch fubftances: the phenomena which attend it indicate a falfe or complicated analyfis, the refults of which might lead chemifts into miftakes were they not aware of the uncertainty with which it is attended. It is certain that art can never reproduce wood or bark, by mixing together the phlegm, oil, acid, and carbone obtained in this analyfis, and that the principles which it affords have fuffered great alterations. Unfortunately the bodies fufceptible of thefe alterations are the more numerous clafs; for under it all animal and vegetable, and moft mineral fubftances are to be ranked. But modern difcoveries may probably enable us to determine the true nature of the principles of fuch fubftances, by examining fuch of them as are difengaged. However, only the effects of fuch a ftrong heat as is ufually employed in the operations of art have been yet noticed: but a gentle and continued heat, fuch as that which is exerted in the operations of nature, gives rife to a number of important phenomena, which deferve the chemift's attention. Upon this probably depends the fpontaneous decompofition and recompofition of minerals, and various other changes that take place in the bowels of the earth.

To this powerful agent it is alfo neceffary to have recourfe, in order to form an idea of the alterations to which animal and vegetable fubftances are liable; of the motion of the fap in plants, and the mild fermentation which conducts them to maturity; of the formation of oils, the *fpiritus rector*, mucilages, and the colouring principle; or of the compofition, the decompofition, the reciprocal changes, and the putrefaction of animal humours. All thefe important phenomena depend, more or lefs, on chemical operations; and that heat which is diffufed over the globe is the great principle by which they are produced.

It is proper, as the various effects of heat depend on its power of feparating the particles of bodies, to confider this firft effect, and to attempt to eftimate its influence. Water in the ftate of ice is foftened by a certain degree of heat; melted, and reduced to fluidity by a greater; and by a ftill greater degree reduced to vapour, or an elaftic fluid: fo that water in a ftate of vapour may be faid to contain three fums of heat;—that which conftitutes ice of a certain denfity; that which reduces ice to the ftate of a liquid, rarefied to a certain degree; and, laftly, that which rarefies the liquid to an elaftic fluid. When we attempt to apply this theory to all natural bodies, they appear to be all capable of paffing through thefe feveral ftates if expofed to a fufficient heat. The only difference among them, in point of this property, is, that fome may be reduced by a lefs degree of heat, while others require a greater. It is only for want of a fufficient heat that we cannot reduce rock-cryftal to a liquid or a vaporous ftate: nor is it more difficult to conceive the poffibility of this event, than to conceive an habitu-

ally elaftic fluid, fuch as air, acquiring an extreme folidity, as happens to this very fubftance in various unions and combinations.

On thefe principles, it is eafy to explain the formation of the elaftic fluids which are difengaged in many of the operations of nature and art. It uniformly happens, whenever a body receives and abforbs a fufficient quantity of heat to caufe it to pafs into that ftate of fluidity which conftitutes an aëriform fluid; and therefore all fluids that poffefs this property owe it to heat. But it is alfo requifite, that the preffure of furrounding bodies, efpecially the preffure of air, do not oppofe this extreme dilatation; or that the dilatation be fo great as to overcome the refiftance which it meets with in the gravity of the air. Hence a body, whether nearer to or more diftant from the ftate of elaftic fluidity, may be eafily reduced to that ftate by relieving it of the preffure of the atmofphere, as elaftic fluidity always takes place *in vacuo*. Hence evaporation is moft quick and copious on the tops of lofty mountains. And hence too it becomes neceffary to mention precifely, with what degree of preffure any body was reduced to an elaftic fluid, or at leaft what preffure it can bear in that ftate: for it is alfo to be obferved, that all the bodies which can with more or lefs eafe be reduced to the ftate of vapour or elaftic fluidity, do not maintain themfelves in that ftate with equal conftancy; nay, fuch are the differences among them in this refpect, that they have been divided into *permanent and non-permanent*. The former remain long in the ftate of elaftic fluidity; nor do they pafs from it, till by fome new combination they are deprived of the fubftantial heat by which they were maintained in that ftate. The latter, which may be denominated vapour, lofe their elaftic fluidity by degrees of preffure or cold which may be eafily eftimated, and readily communicate to furrounding bodies that portion of heat which conftitutes them aëriform fluids. Of this kind are water, alcohol or fpirit of wine, and ether; thefe three fluids are reduced into vapours, and remain in that ftate when the barometer ftands at 28 inches,—water at 185° Fahrenheit, fpirit of wine at 167°, and ether at 92°, &c. It appears then, that the ftate of elaftic fluidity is a mode of the exiftence of bodies occafioned by the combination of heat with their other principles; that every elaftic fluid is a compound, confifting of a bafe of more or lefs folidity, and of caloric or the matter of heat; that the bafe of every elaftic fluid requires a certain degree of heat to reduce it to vapour or elaftic fluidity; and that it is doubtlefs in confequence of their poffeffing thefe properties, that elaftic fluids differ in gravity, elafticity, &c. But although we have diftinguifhed elaftic fluids into permanent and non-permanent, it is to be obferved, that this diftinction does not exift in nature. It is relative to the moderate heat and preffure of the atmofphere to which we are expofed in the climates in which we live, and over many parts of the globe. But if the cold and preffure were more confiderable, even the fluids which we at prefent confider as the moft permanent, would foon ceafe to be fo; and, on the contrary, ether and fpirit of wine would become permanent elaftic fluids at a certain height in the atmofphere, or in the warm temperature of the equatorial climates.

Sect. VIII. *Of the Application of Heat to Chemical Purpofes.*

The manner in which heat is applied to bodies in chemical proceffes, may alfo be properly confidered in this place. If the combuftible body be applied immediately to the fubftance on which the fire is defigned to act, the operation is faid to be managed with a *naked fire*. But an intermediate body is often put between the fire and the fubftance expofed to its action; hence the names *balneum mariæ*, *fand-bath*, &c.

The difference of form of the veffels made ufe of in fubjecting bodies to the action of fire, and the various phenomena exhibited by bodies under the influence of heat, have caufed a great variety of operations to be diftinguifhed by peculiar names: all of which are performed by the action of fire, and enter into the practice of chemiftry; it is neceffary therefore to give a brief explanation of each.

Roafting is a preliminary operation, which prepares mineral fubftances for undergoing a feries of fucceeding ones, dividing their conftituent particles, volatilizing fome of their principles, and producing a certain alteration on their nature. Mineral ores are expofed to this procefs with a view to feparate the fulphur and arfenic which they contain, and to diminifh the cohefion of their particles. Capfules of earth or iron, crucibles, and roafting pots, are the veffels in which it is ufually performed; and it is generally expofed to the accefs of the external air. Sometimes, however, the operation is performed in clofe veffels; and two crucibles, luted mouth to mouth, may be employed on fuch occafions. See Plate 72.

Calcination is, as it were, a more advanced ftage of the procefs of roafting. By this procefs minerals are deprived of their water and falts; it likewife reduces calcareous fubftances to the ftate of quick-lime, and metals to metallic oxides. The fame kind of veffels are ufed in this procefs as in the former.

Fufion. By this procefs a body is caufed to pafs by means of heat from a folid to a fluid ftate. The chief fubjects fufceptible of this operation are falt, fulphur, and metals. Crucibles of baked clay of various kinds and figures, with metallic cones and ingot moulds, are the inftruments for this operation. Thefe laft are employed to give the melted matter a certain form. Although fufion may often take place without changing the nature of the fufed body, this operation is frequently employed as a chemical means of decompofing and recompounding bodies. In this way all the metals are extracted from their ores; and, by this procefs, they are revived, moulded, and alloyed, with each other. By this procefs fand and alkali are combined to form glafs, and by it likewife paftes, or coloured ftones, enamels, &c. are formed.

In reduction or *revivification*, the oxides of metals are, by means of fire, with charcoal or oils, reftored to the metallic ftate which they had loft by calcination.

Vitrification is the fufion of fuch fubftances as are capable of affuming the brightnefs, tranfparency, and hardnefs of glafs. Vitrifiable earths with alkalis, and the oxides of metals, are the principal fubftances fubjected to this operation.

Cupellation is the purifying of perfect metals, by the extraction of fuch imperfect metals as are intermixed with them. This is performed by the addition of a certain quantity of lead to the mixture, and the expofing of it to a due heat; which vitrifies the lead, and together with it the imperfect metals of the original mixture, leaving the perfect in a pure and feparate ftate. This operation derives its name from the veffels ufed in it. Thefe are a kind of flat crucibles, pretty like the fmall cups known under the name of *cupels*; and the fubftance of which they are compofed, being the earth of bones, is fufficiently porous to abforb and retain the lead that is fcorified by the heat.

Cementation. Cement is a name given to powdered fubftances, with which other fubftances expofed to their action are carefully covered over. Thus, iron is covered over with powder of charcoal, that it may be converted into fteel; and glafs with plafter or filex, to change it into a kind of porcelain. The procefs by which this is effected is cementation, and frequently requires the action of a very ftrong heat.

Stratification is an operation nearly fimilar to the preceding. It confifts in arranging feveral folid fubftances, in horizontal layers, and intermixed with certain pulverized bodies, to alter

their nature, either in a crucible or in fome other fuitable veffel capable of bearing the action of fire. This has received the name of *ftratification*, becaufe the fubftances are difpofed in ftrata or layers, one rifing above another. Copper and filver are treated in this manner with fulphur, in order to effect their combination; and this peculiar arrangement of fubftances is often employed preparatory to fufion, calcination, vitrification, and other proceffes of that kind.

Detonation is peculiar to nitre, and the mixtures into which that fubftance enters. It is the explofion of fuch bodies when heated in open or clofe veffels. Decrepitation differs from detonation only as producing a fainter noife, which is merely a kind of crackling found: it is peculiar to certain falts; which from a ftate of folution are cryftallized fo rapidly, that the cryftals formed burft into minute pieces. This has been chiefly obferved of common falt, or muriate of foda. Fulmination is a more quick and lively detonation; fuch as takes place on fulminating gold, fulminating powder, and in the combuftion of inflammable gas and vital air, and fome other fubftances of the fame kind.

Sublimation is the volatilizing of dry, folid, and often cryftallized fubftances, by means of fire. The veffels ufed in fublimation are glazed earthen pots, earthen crucibles with glafs heads, and pots of earth or porcelain, arranged one above another, and joined by the infertion of their necks one into another, which are known by the name of *aludels*, &c. Sulphur, arfenic, cinnabar, many mercurial preparations, fome vegetable fubftances, more efpecially camphire and flowers of benzoin, are the fubjects of fublimation.

Evaporation is the action of heat on liquids, to diminifh their fluidity and quantity, and to obtain the fixed bodies diffolved in them in a feparate ftate. Thus, we evaporate the water of the fea and of falt fprings, in order to obtain the falt which they contain. In this operation the liquid, by heating, becomes combined with caloric, which renders it volatile, while the particles of the falt being brought nearer to each other, and within the fphere of their mutual attraction, unite into the folid ftate. As it has been pretty generally fuppofed that the air had great influence upon the quantity of fluid evaporated, it will be proper to point out the errors which this opinion has produced. There certainly is a conftant flow evaporation from fluids expofed to the free air; and, though this fpecies of evaporation may be confidered in fome degree as a folution in air, yet caloric has a confiderable influence in producing it, as is evident from the refrigeration which always accompanies this procefs; hence we may confider this gradual evaporation as a compound folution made partly in air, and partly in caloric. But the evaporation which takes place from a fluid kept continually boiling, is quite different in its nature, and in it the evaporation produced by the action of the air is exceedingly inconfiderable in comparifon with that which is occafioned by caloric. This latter fpecies may be termed *vaporization* rather than *evaporation*. This procefs is not accelerated in proportion to the extent of evaporating furface, but in proportion to the quantities of caloric which combine with the fluid. Too free a current of cold air is often hurtful to this procefs, as it tends to carry off caloric from the water, and confequently retards its converfion into vapour. Hence there is no inconvenience produced by covering, in a certain degree, the veffels in which liquids are evaporated by continual boiling, provided the covering body be of fuch a nature as does not ftrongly draw off the caloric. In this cafe, the vapours efcape through fuch opening as is left, and at leaft as much is evaporated, frequently more than when free accefs is allowed to the external and furrounding air. The beft utenfils for this purpofe are probably made of the bottoms of glafs retorts and matraffes, as their equal thinnefs renders them more fit than any other kind of glafs veffel for bearing a brifk fire, and fudden alterations of heat and cold, without breaking. Small flafks or phials of thin glafs are alfo very good veffels for evaporating fmall quantities of fluid, as they are very cheap and ftand the fire remarkably well.

Diftillation is an operation nearly fimilar to evaporation, but performed in clofe veffels. It is employed to feparate volatile from fixed principles by means of heat. The diftillatory veffels are alembics and retorts. The firft confift of a lower veffel named a *cucurbite*, intended to contain the body to be diftilled, and an upper part or capital exactly fitted to it; the purpofe of which is to receive the volatilized fubftance, and condenfe it by the coldnefs of its temperature (which is maintained by the contact of the external air, or of water furrounding it): when water is ufed, the veffel containing it, into which the upper part of the alembic is immerfed, is called a *cooler*, or *refrigeratory*. From the lower part of the capital there proceeds a kind of beak or fpout, through which the vapours pafs into a pipe, where they are condenfed into a liquid: from this pipe the liquid thus obtained is conveyed into other veffels, which are commonly of a fpherical form, and are named *receivers*. Thefe receivers are of various forms and names, as matraffes, balloons, &c. A retort is a kind of glafs, ftone, or metal bottle, of a conical form, with its extremity bent, fo as to make an acute angle with its body; and on this account it received the name *retort*.

Rectification is a fecond procefs of diftillation, the object of which is to purify a liquid fubftance. In it, heat is employed to carry off the pureft and moft volatile part, leaving the more fixed matter, which debafed it, in a feparate ftate; as is done, for inftance, in preparing fpirit of wine, ether, and fuch-like fluids.

Concentration is the direct contrary of rectification; its object being to volatilize part of the water, and thus improve the ftrength of the fluid remaining. The matter to be concentrated muft therefore be of fuperior gravity to water. This operation is performed on fome acids, particularly on the fulphuric and the phofphoric; it is alfo employed on folutions of alkalis and neutral falts.

Digeftion is the expofing of fubftances which we wifh to act gently on one another to a gentle and long continued heat. It is chiefly ufed to extract thofe parts of vegetable fubftances which are foluble in fpirit of wine or other fluids. Digeftion is now chiefly confined to dyeing ftuffs, elixirs, and liquors for the table; it is always fuccefsfully employed to extract the principles of vegetables and animal matters, without altering them. It is likewife ufeful in feveral operations on mineral fubftances.

Infufion is a well-known procefs: it confifts in pouring warm or boiling water on fubftances of which we wifh to extract the moft foluble parts, and of which the contexture is fo flight as to be eafily penetrable, fuch as thin bark, wood in fmall thin pieces, leaves, flowers, &c. It is of great ufe for feparating fubftances that are eafily foluble, and is often employed in chemical operations.

Decoction, or the continued ebullition of water with fuch fubftances as are liable to be affected by its impreffion, is ufed to feparate thofe parts of bodies which are not foluble by a more moderate degree of heat. It produces confiderable alterations on vegetable and animal matters; frequently effecting an entire change of their properties. It coagulates the lymph; melts greafe and rofin, and hardens the fibrous parts of a vegetable or animal. If the chemift be well acquainted with its effects, he may employ it with confiderable advantage in different inftances.

Lixiviation is that procefs which is employed in chemiftry and manufactures, for feparating fubftances that are foluble in

water from ſuch as are inſoluble. In this operation, by means of warm water, the ſaline and ſoluble particles of bodies, for inſtance, the reſidues of diſtillation and combuſtion, coals, and ſuch natural earths as are intended to be analyſed, are diſſolved. The proceſs, therefore, very naturally derives its name from the *lixivial* ſalts which are obtained by means of it. It is merely a ſolution effected by means of heat, and nearly ſimilar to infuſion; the only difference is, that the latter is applied to vegetable and animal matters; while lixiviation is only employed to obtain ſubſtances poſſeſſing ſome of the properties of minerals. When this operation is performed with ſmall quantities of materials, it may be conveniently managed in jugs or matraſſes of glaſs, and by filtering the liquor through paper in a glaſs funnel; but when in large quantity, it muſt be lixiviated in a kettle of boiling water, and filtrated through paper ſupported by a cloth in a wooden frame.

Theſe are the different operations of chemiſtry in which heat is called in to act a part.

Sect. IX. *Of Light.*

Concerning the independent exiſtence of light, or the cauſe by which we ſee; that is, whether light be a body, or a property, philoſophers are by no means perfectly agreed. If light be a body, it muſt conſiſt of particles of extreme minuteneſs projected with a very great degree of velocity from luminous bodies; if on the other hand it be nothing more than a modification or property, it muſt ſubſiſt in ſome other matter univerſally diffuſed through every part of known ſpace. The philoſophers who maintain this laſt opinion, conceive the univerſe to be occupied by a fluid of extreme rarity and elaſticity, permeating all bodies; the undulations of which, tranſmitted in all directions, from the luminous body, or exciting cauſe, produce the ſenſation and other effects of light. Much ingenious reaſoning has been employed on this ſubject, but we have not yet obtained poſſeſſion of any deciſive facts.

It has been obſerved that, whenever light paſſes through a ſpace occupied by a medium of uniform denſity, it deſcribes a right line. Theſe lines, or rather priſms, are called the rays of light. They rebound, or are reflected by bodies againſt which they ſtrike. It is ſufficiently aſcertained that this reflection is cauſed by a repulſive power in the body itſelf, exerted at a conſiderable diſtance; ſo that the light is driven back without coming into contact with the matter which repels it. When light is made to paſs near a body in ſuch direction, or under ſuch circumſtances, as that it may come nearer than the limit of repulſion, it is attracted, and alters its courſe by deviating towards the attracting body. If the body poſſeſs a very narrow ſurface, ſuch for example as the edge of a knife, this deviation in the ray of light may be meaſured by attending to the courſe of the ray after it has paſſed the body. But if the ſurface be broader, the attractive power uſually cauſes the light to paſs into the body, where it is abſorbed and loſt, if the body be opaque; or paſſes through, if the body be tranſparent. The change produced in the courſe of a ray of light, by the attraction of a body into which the light does not enter, is called inflexion; but when the light does enter the body, this change is called refraction. It is found that the light of the ſun, from which we derive the ſenſation of whiteneſs, is compoſed of an admixture of rays poſſeſſing the property of exciting ſenſations of every poſſible colour, each according to its reſpective nature. The attractive and repulſive powers of bodies differ in their intenſities with regard to theſe ſeveral rays, and accordingly they are ſeparated from each other by reflection, refraction, or inflection. A like ſeparation is alſo made in the rays of light by the thickneſs or diſtance between the two ſurfaces of the medium through which they paſs. This is more particularly obſervable in thin plates of glaſs, or water blown into bubbles. The colours of bodies depend on a power poſſeſſed by them of reflecting ſome of the rays of light, and abſorbing others; and this power in all probability depends upon the principles which have been here mentioned.

The velocity of light is extremely great. By the moſt eminent aſtronomers it has been calculated to paſs from the ſun to the earth in little more than eight minutes, which gives a velocity of about 167000 geographical miles in one ſecond. Yet however great its ſubtlety and velocity, it does not move invariably in a right line. Such bodies as meet and obſtruct its paſſage, cauſe it to deviate from its original direction. When paſſing obliquely out of a rare into a denſe medium, it is refracted like any other ſolid body, and Des Cartes and Newton have diſcovered its refrangibility to be directly contrary to that of other bodies. Other bodies recede from the perpendicular line whenever they paſs into a denſer medium; but light, on ſuch an occaſion, approaches nearer to the perpendicular. Light, on reaching the ſurface of the earth, diſcovers to animals the preſence of material bodies, and enables them to diſtinguiſh them into opaque, tranſparent, and coloured. Its preſence is ſo neceſſary to render theſe properties perceptible, that in darkneſs bodies become totally undiſtinguiſhable. Difference of opacity, tranſparency, and colour in bodies, depends, therefore, both on the manner in which they are affected by light, and in which they affect that ſubſtance. A body is tranſparent when the rays of light paſs eaſily through it; which depends no doubt on the form of its pores. As many tranſparent ſubſtances have great hardneſs and ſpecific gravity, the particles of light which penetrate through them muſt be extremely ſubtle. As the particles of light paſs through thoſe ſubſtances, they are refracted in the ratio of their denſity, if they be ſtones, ſalts, or vitreous ſubſtances: but tranſparent bodies of the combuſtible claſs reflect the particles of light in a different ratio. Thus, yellow amber has a much greater refrangent power than a ſaline cryſtal of equal denſity.

It was by examining the various refractions and reflections of light that Sir Iſaac Newton was at length enabled to decompoſe, or rather to diſſect, this body, ſo far as to diſcover that the rays which compoſe a beam of light were each of a peculiar colour. Before his time our ideas of the cauſe of colours were very obſcure and indiſtinct. The refraction and reflection of each ray of light are determined by particular laws; and therefore when a ſtream of light is directed ſo as to fall on the angle of a triangular glaſs priſm, and the priſm turned round on its axis, the rays which compoſe the ſtream of light being refracted according to different laws, are ſeparated in paſſing the glaſs, and, if reconveyed on a plane white ſurface, form a long ſpectrum conſiſting of the ſeven following colours; red, orange, yellow, green, blue, purple, and violet. The ſurfaces of opaque variegated bodies produce the ſame effects as the priſm on light. Such ſeems to be the cauſe of that diverſity of colours which conſtitutes ſo conſiderable a part of the beauties of nature. When all the rays which fall upon any opaque body are reflected, without ſuffering any abſorption or ſeparation by that ſurface, they ſtrike our eyes with all their luſtre, and the colour produced is a white: but if the ſame rays fall on a ſurface by which they are all abſorbed, the eye then beholds a deep ſhade; which being a direct contraſt to the former, conſtitutes black, or rather abſolute negation of colour. In ſhort, as every beam of light conſiſts of ſeven different coloured rays, of various degrees of refrangibility, what diverſifies the colours of natural bodies is the various diſpoſition of the particles of their ſurfaces; ſome of which reflect one ray, abſorbing all the reſt, others another, and ſo on. Colour depends, therefore, on the nature of the ſurfaces

of bodies, and tranfparency on the form of their pores; and both are occafioned by the modifications produced on light, either by the fuperficies or the interior parts of the bodies on which it falls. A blue or red colour is produced by the decompofition of a beam of light, and the abforption of all its rays, excepting the blue or the red. Thefe are the chief properties of light, when confidered in a free ftate. But it muft be examined not only in this free and infulated ftate, but alfo, like all other bodies with which we are acquainted, as fubject to the laws of chemical attraction. The phenomena of light are not confined to the modifications which it fuffers from the furfaces of bodies. Subftances expofed to its influence, by being plunged in its ftreams, often fuffer an alteration and entire change of nature, without any other known caufe; and it is reafonable to think that fuch changes are produced by the operation of light, which is enabled to effect them by being capable of chemical attraction. Art, indeed, has not yet been able to determine whether thefe alterations be occafioned by the decompofition of light, or by that of the bodies in contact with it, or by the mutual decompofition of both; which laft is highly probable: but they are too numerous and too ftriking to be paffed over unnoticed.

The influence of light on vegetation; has long been obferved, and that without it that procefs cannot take place. Thofe engaged in the cultivation of plants have alfo remarked, that, fuch as grow in the fhade are of a paler colour; and that when in hot-houfes, where the light comes to them only from one part, they incline towards the aperture as if to fhew the neceffity of this beneficial fluid. Gardeners take advantage of this circumftance to fupply our tables with white and tender herbs and pulfe; for they bind their leaves fo clofely together, that the exterior defend the interior from the contact of the light. The colour of herbs is pale or deep in proportion as they are lefs or more expofed to the rays of the fun; and in confequence of this the nations of the eaft obtain from the wood, bark, or roots of trees, many of the moft valuable colouring matters both for permanency and luftre, which all the ingenuity of European dyers has never been able to imitate.

It is well known that colour is not the only property that vegetables derive from the influence of light. From the fame fource they acquire tafte, fmell, combuftibility, maturity, and the refinous principle. Thus light contributes to the ripening of fruits and feeds; and in the more torrid climates vegetables in general are highly odorous, fapid, and refinous. Light exerts fo powerful an energy on the organization of vegetables, that when the rays of the fun fall upon them, their leaves pour from their fuperior pores copious ftreams of vital air; but when hid from the influence of that planet, they exhale a deleterious mephitic, or rather a real acid, of the fame nature with that which is extracted from chalk. This important difcovery was firft made by Dr. Prieftley. M. Ingenhoufz has profecuted it much farther; and from the experiments and obfervations of both, it appears how powerful the influence of light is on vegetation. The influence of light is alfo evident on animals; as Mr. Dorthes has obferved, worms and grubs, which live in the earth or in wood, are of a whitifh colour; and that birds and flying infects of the night are diftinguifhable from thofe of the day by the want of brilliancy of colour, as well as the difference marked between thofe of the north and the fouth. In a great number of chemical operations, light is found to act with the fame energy as in thefe more general inftances. There is not one fubftance in nature, that, if put into a clofe glafs veffel, and expofed to the rays of the fun, will not fuffer fome alteration from their influence. Thefe alterations are moft remarkable in mineral acids, oxides or metallic calces, vegetable powders, and volatile animal oils. Not a fingle metallic oxide, though more efpecially that of mercury, but fuffers a change of colour, affuming generally a deeper fhade, from being expofed to the rays of the fun. Painters' colours, which are kept for fale in glafs bottles, afford a good inftance of this. Mineral acids expofed to the fun become fuming, higher coloured, and more volatile; metallic falts become black; animal oils affume a brown, dufky colour. Every one of thefe changes merits the moft careful attention of chemifts; fome of them have been defcribed by Scheele, and fince attended to more particularly by Mr. Berthollet an ingenious French chemift.

Sect. X. *Of Sulphur.*

Modern Chemiftry places this fubftance among the elements, although its conftituent principles have been fuppofed, by former chemifts, to have been afcertained. By the ancients the word *fulphur* was employed to denote every combuftible and inflammable fubftance, as is evident from the expreffions, fulphur of metals, fulphur of animals, fulphur of vegetables, &c. which are every where to be met with in their writings.

Since the time of Stahl it has, however, been confidered as a body capable of burning with a blue flame; dry, very brittle, of a citron yellow colour, entirely without fmell, except during combuftion, and of a peculiar tafte, which is weak, though very perceptible. On being rubbed it becomes electric; and when a large piece of it is expofed to a moderate but fudden heat, for inftance, by being compreffed in the hand, it crackles and breaks into pieces. Sulphur abounds in nature; fometimes it is found pure, and fometimes in combination with other fubftances. It is frequently united with metals, which are then in the ftate of *pyrites*. Sometimes it exifts in combination with calcareous matters in the ftate of earthy fulphur or liver of fulphur. Fetid calcareous ftones and fwine-ftone appear to be of this nature. Modern difcoveries have extended the empire of this mineral ftill farther. It feems to be daily formed in animal and vegetable matters beginning to putrefy; though thefe fpecies of fulphur belong not properly to the mineral kingdom. The fulphur employed in the arts is, however, extracted by diftillation from metallic compounds or pyrites, of which it is a principle. It fuffers no alteration from the contact of light. When heated in clofe veffels, it becomes foft, and melts; and when afterwards cooled, it generally affumes a red, a brown, or a greenifh colour, and a needle-form. The procefs by which Mr. Rouelle cryftallized it, was by fuffering the furface to congeal, and afterwards pouring off the fluid beneath: the under furface of the cruft then exhibited the fulphur in needles croffing each other in various directions. When melted fulphur is gently heated, it volatilizes in fmall pulverulent parcels of a citron yellow, which are called *flowers of fulphur*. This operation is employed fuccefsfully to purify fulphur, as it is the pureft part which is volatilized. For performing this operation, common fulphur in powder is put into an earthen cucurbite, which is fitted with earthen pots inferted one into another. The uppermoft of thefe pots is terminated by a reverfed funnel; the opening of which forms a flight communication between the interior part of the cucurbite and the air. The cucurbite is then heated till the fulphur become liquid; which at that degree of heat is fublimated, and fixed on the fides of the veffels. Flowers of fulphur, when prepared in the large way, often contain a little fulphuric acid, which is formed by the combuftion of a fmall quantity of the fulphur, in confequence of the veffel's containing a fmall portion of air. But they may be entirely purified by wafhing them; and the fulphur made ufe of in medicine, and in nice chemical experiments, fhould be prepared in this manner. If fulphur be heated in fuch a way that air has accefs

to it, it kindles and burns with a blue flame as soon as the heat causes it to melt, if the heat to which it is exposed be inconsiderable; but when exposed to a strong heat, it gives a lively white flame. In the first of these instances it diffuses a suffocating smell; and by collecting the vapours which exhale from it, we obtain a portion of very strong sulphureous acid. When it burns rapidly it has no smell, and the residue is not sulphureous, but sulphuric acid. The celebrated Stahl supposed sulphur to be a compound of this acid with phlogiston, and imagined, that when burnt it lost its inflammable principle, and was of consequence reduced to an acid. He collected such a number of proofs in support of his opinion, that succeeding chemists were induced to adopt it. But since modern chemists have begun to attend to the influence of air in combustion, a circumstance which Stahl seems, as has been before observed, to have totally neglected, they have many of them been struck with the difficulty of the attempts to prove the existence of phlogiston and with the facility with which the objections against that doctrine may be answered by means of the late discoveries concerning the nature of air. An opinion directly opposite to that of Stahl's, concerning the nature and the combustion of sulphur, has therefore been advanced.

The facts on which this new opinion is founded are these: Hales observed, that sulphur absorbs a great quantity of air when it burns, and M. Lavoisier has shown that it is subject to the same laws with other combustible bodies, viz. that it cannot burn, except vital air have access to it; that during its combustion it absorbs the purest part of that air; that that part of atmospheric air, which remains after it has contributed to the combustion of sulphur, can no longer serve the same purpose: that the sulphuric acid produced by the combustion of sulphur is equal in weight not only to the quantity of sulphur, but also to the portion of air that has been consumed; and consequently that sulphur must combine with the base of pure air, or oxigene, in order to form sulphuric acid: that acid is therefore a compound of oxigene with sulphur; and the last of these is not a compound body, but one of the principles of the sulphuric acid. It forms the acid by combining with the base of vital air or oxigene; and this combination takes place when it is exposed to combustion. Heat is necessary to make it burn; for, by dividing it, and destroying its aggregation, it promotes its combination with oxigene; but when once burnt, or combined with oxigene, it is no longer susceptible of inflammation, consequently becomes an incombustible substance. This substance absorbs various quantities of oxigene, and becomes more or less acid, according to the manner in which it is burnt. On this depends the difference between the slow and the rapid combustion of sulphur, and between the sulphureous and the sulphuric acids, which are produced by these combustions. It was supposed by Stahl, that when sulphur burnt slowly, it did not lose all its phlogiston; and that the sulphuric acid was odorous and volatile in consequence of its retaining part of it. It has, however, been since experimentally proved, that when sulphur burns slowly, it does not absorb the full quantity of oxigene with which it is capable of uniting; but that, when it burns rapidly, it absorbs as much of that principle as is necessary for the formation of the sulphuric acid. The sulphureous acid, in combination with alkaline matters, passes into sulphuric acid by absorbing gradually the base of vital air from the atmosphere. The same theory serves equally to explain what happens when sulphur is formed by the combination of the sulphuric acid with certain combustible matters, as in the instances with sulphate of potash and of soda, ammoniacal, calcareous, magnesian, aluminous, and barytic sulphate, when heated with coal. The combustible body seizes the oxigene contained in the sulphuric acid, and leaves only the sulphur, which is its other principle. Whenever, therefore, the sulphuric acid is converted into sulphur by a combustible body, the latter is constantly reduced to the state of a burnt body, as may be seen in the history of several of the metals. On this account also a large quantity of carbonic acid is obtained, when sulphur is artificially produced, as the oxigène of the sulphuric acid is united with the pure carbonaceous matter. Sulphur is neither liable to any alteration from air nor soluble in water. If, after being kept in fusion till it becomes thick, it be poured into water, it then becomes red, and retains a certain degree of softness, so that it may be kneaded in the hand; but in a few days it loses these properties. Water dropped on sulphur does not seem to be decomposed, nor contribute to the combustion of the sulphur; from which it appears, that the base of vital air or oxigene has a greater affinity with hydrogene than with sulphur. This assertion is confirmed by the manner in which hydrogenous gas acts on the sulphuric acid, as it robs it of its oxigene.

Combinations of Sulphur. This substance does not act at all on siliceous earth; but it combines with aluminous earth, though not without great difficulty. This earth, however, when it is very much attenuated, appears to reduce it to the state of an hepar or fetid sulphur, as may be observed in the preparation of pyrophorus. A compound of sulphur with alkaline matters is generally called *alkaline sulphur*, *hepar* or *liver of sulphur*. This compound is of a lighter or a deeper brown colour, like the liver of animals: vital air decomposes, and water dissolves it, causing it to give out a fetid smell; the acids precipitate the sulphur, extricating from it a peculiar gas, which was formerly named *hepatic gas*; but to which, in allusion to its nature, the name of *sulphurated hydrogenous gas* is given at present. There are six species of alkaline sulphures produced by barytes, magnesia, lime, the two fixed alkalis, and ammoniac or volatile alkali. Pure barytes does not act strongly on sulphur; when they are heated together in water, the product is a weak sulphurated or hepatic liquor: but in the dry way, the two bodies enter into a much more intimate combination. Therefore, when a mixture, consisting of eight parts of the sulphate of barytes in powder with one part of coal, is exposed in a crucible to a strong heat, an incoherent mass is obtained without fusion, which readily dissolves in warm water, and has the smell and all the other characteristics of an hepar. The solution is of an orange or golden yellow colour; and Mr. Fourcroy has discovered that it crystallizes by cooling. Barytic sulphur in crystals is of a yellowish white colour: when exposed to the air, it attracts moisture from it, assumes a deeper colour, and is decomposed; for the sulphur is precipitated, and barytic sulphur formed. This sulphur, when precipitated by acids, gives out an elastic fluid, known by the name of *sulphurated hydrogenous gas*, which has been mentioned above, and the peculiar properties of which we shall afterwards examine. When the sulphate of barytes is precipitated by the sulphuric acid, the precipitate is found to consist of both sulphur and the sulphate of barytes; but when the nitric or the muriatic acid is employed, the nitrate or muriate of barytes remains in solution, and only the sulphur is deposited.

By the assistance of heat sulphur combines with pure magnesia. The neutral salt, which is called *carbonate of magnesia*, is commonly used for this combination, as dissolving most readily in water. A small portion of the carbonate of magnesia, with an equal quantity of flowers of sulphur, is put into a bottle full of distilled water. This vessel being entirely emptied of air, and closely stopped, is exposed for several hours to the heat of a *balneum-mariæ*; the water is then filtered; it has the fetid smell of rotten eggs; it communicates an high colour to solutions of metals; it gives by spontaneous evaporation small crystalline needles, and is a genuine magnesian sulphure. The

magnefia may be precipitated by one of the fixed alkalis, which have a greater affinity than it with fulphur. The acids feparate the fulphur in the form of a white powder; from which its exiftence in this mixture is certainly known.

The union of lime with fulphur is much more rapid and eager than with either barytes or magnefia. When a little water is poured on a mixture of quicklime with fulphur in powder, the heat difengaged by the action of the water on the lime occafions a combination between the lime and the fulphur. If more water be added, the mixture affumes a reddifh colour, and exhales a fetid odour. It retains in folution the fulphur in combination with the lime. It is difficult to prepare this calcareous fulphure in any other way than the humid. When the lime is not very quick, and does not produce much heat on coming into contact with water, it is often found neceffary to affift the combination by a moderate fire. This compound is of a lighter or a deeper red, according to the caufticity of the lime. Calcareous fulphure, moiftened with a little water, and diftilled in a pneumato-chemical machine, is decompofed in part, and affords a large proportion of fulphurated hydrogenous gas. If evaporated to drynefs, and calcined in a crucible till it ceafe to fume, what remains after the operation is calcareous fulphate formed by lime and the fulphuric acid produced by the flow combuftion of the fulphur. Calcareous fulphure is very foon altered by air; as its gas flies off it lofes its fmell and colour. When diffolved in a large quantity of water, it fuffers the fame alteration; efpecially if it be fhaken, as has been obferved by M. Monnet, in his Treatife on Mineral Waters: what remains after thefe alterations is calcareous fulphate. If preferved in bottles, partly empty, it depofites a blackifh cruft on the fides of the bottles, and crufts or pellicles are from time to time formed, which fink to the bottom of the liquor: but if the veffel containing it be clofely ftopped, it remains long unaltered. Calcareous fulphure is decompofed by the pure fixed alkalis, which have a greater affinity with fulphur than fulphur has with lime. Acids precipitate the fulphur in the form of a very fine white powder, which has received the name of precipitated fulphur, or *magiftery of fulphur*. The carbonic acid affects this precipitation, as well as the reft of the acids. The manner in which neutral falts act on calcareous fulphure is not yet well afcertained.

The action of the two fixed alkalis, in a pure or cauftic ftate, is very remarkable on fulphur. They form with it thofe fulphures which are moft permanent and leaft liable to decompofition. It has been found that the fixed alkalis, when dry and very cauftic, act upon fulphur even cold. All that is requifite to promote this phenomenon is to triturate folid pot-afh or foda in a mortar with powdered fulphur. The mixture becomes foft, affumes a yellow colour, exhales a fetid odour, and forms a fulphure. But when it is diffolved in water, the folution is only of a pale yellow colour, and does not contain fo great a quantity of fulphur as the fame fulphure prepared with heat. Alkaline fulphure is prepared in two ways, the dry, and the humid way. According to the firft procefs: equal parts of pure and folid pot-afh or foda and powdered fulphur are put into a crucible; heat is then applied till the mixture be entirely heated: when in fufion, it is poured on a plain marble furface; and when cooled, it difplays a deep red colour, like the liver of an animal. Mr. Gengembre has made an important obfervation on alkaline fulphure prepared in the dry way, which is, that this compound is not at all fetid, or exhales any fulphurated hydrogenous gas while it continues dry. The two fixed alkalis, when pure and cauftic, act precifely in the fame manner on fulphur, diffolving it likewife in the dry way. Thefe combinations of the cauftic alkalis with fulphur have, however, been yet but very little examined; alkaline fulphure has been almoft always compofed with fixed alkali, faturated with the carbonic acid. There are, however, confiderable differences between thefe two fulphures; thofe which are made with effervefcent fixed alkali require more time to be taken up in the preparation; for fixed alkali is lefs active in this ftate than when pure. But the moft important difference fubfifting between fulphures made up with cauftic fixed alkali, and thofe made up with effervefcent fixed alkali in the dry way, is the comparative ftate of their faturation. The former are more fetid, and browner, when diffolved, and the gas which they afford is much more inflammable than that given out by the others. The latter are of a paler colour, which is often a greenifh grey; their fmell is fainter, and their compofition lefs lafting. It appears that the fixed alkalis retain a portion of carbonic acid when in union with fulphur; for the gas of thefe fulphures, in which fulphur is united with alkaline carbonate, is not inflammable till after being wafhed in lime-water, which carries off the acid. In the prefence of this acid therefore, and in its power of enfeebling the cauftic qualities of alkali, we find the caufe of thofe appearances which diftinguifh cauftic fulphures from fuch as are not cauftic. Solid alkaline fulphure, compofed with either of the cauftic fixed alkalis, is extremely fufible: air decompofes it like calcareous fulphure. When heated in clofe veffels, after being moiftened with a little water, it affords a large proportion of fulphurated hydrogenous gas. After being melted, it may be cryftallized by cooling; but its cryftallized form has not yet been well defcribed. While hot and dry, it is of a brown colour; in proportion as it cools, and attracts moifture from the air, it lofes that colour, and becomes paler; in a fhort time air caufes it to affume a greenifh yellow colour; it is again diffolved into a liquid, and becomes, after fome time, fulphate of pot-afh or of foda. It diffolves eafily in water; and immediately begins to exhale a peculiar fetid odour. The odorous gas, which before had no exiftence, is now formed by the re-action of the water. This folution has a deep red, or a green colour, according as the alkaline fulphur has been recently or long prepared. Alkaline liver of fulphur or fulphure prepared in the humid way, by heating in a matrafs cauftic fixed alkali diffolved in water, with a quantity of fulphur in powder equal to half its weight, exhibits the fame properties as this folution; and an account of both may be given at once under the common name of *liquid alkaline fulphure*. Highly concentrated, liquid alkaline fulphure depofites by cooling irregular needles. It is liable to decompofition by the action of heat: when diftilled in a pneumato-chemical machine, it gives fulphurated hydrogenous gas. Air likewife decompofes it; and it is then covered with pellicles; depofites fulphur, and becomes turbid. Bergman and Scheele have fhown that this decompofition depends on the vital air diffufed through the atmofphere. In fact, when a little liquid alkaline fulphur is put into a bell-glafs containing vital air, the oxigene is entirely abforbed, and the vital air decompofed. Scheele has propofed this as an eudiometer; and it is probable that it may anfwer the purpofe very well.

When the liquid alkaline fulphure is very pure, none of the earthy fubftances act upon it; but when it has been prepared with carbonate of pot-afh or foda, lime-water renders it turbid. The acids decompofe it by combining with the alkali, and precipitate the fulphur in the form of a fine white powder. Mr. Prouft has obferved, that the nitric acid produces a detonation, when it is poured on folid alkaline fulphure. If a large quantity of the oxigenated muriatic acid be poured on a folution of alkaline fulphure, it does not produce any precipitate, or at leaft but a very trifling one; becaufe it diffolves the fulphur again, in confequence of its oxigene being nearly free, and uniting fo rapidly with that combuftible body as to convert it into fulphuric acid. The certainty of this fact may be farther proved by pouring a portion of the muriate of barytes into

the mixture; as a copious precipitation of the ſulphate of barytes is then produced. All the acids, when they decompoſe this ſulphure, cauſe it to give out a gas, which is capable of being collected in a proper machine.

To obtain this gas, an acid muſt be poured on alkaline ſulphure in powder: a lively efferveſcence is then produced, which would not take place in the ſame manner if the acid were poured into a ſolution of the alkaline ſulphure. This phenomenon, which has not yet ſufficiently engaged the attention of chemiſts, depends upon two circumſtances. 1. Solid alkaline ſulphure does not contain hepatic gas or ſulphurated hydrogene ready formed, as has been ſuppoſed by Mr. Gengembre; but when an acid is poured upon it, the water which holds the acid in ſolution contributes to the formation of hepatic gas. As a large quantity of this gas is inſtantly produced, which finding no body to retain it in ſolution, it flies off, occaſioning at the ſame time a conſiderable efferveſcence; ſo if the experiment be made in a tubulated flaſk, with its tube inſerted into a bell-glaſs filled with water, the elaſtic fluid may be eaſily collected. 2. The ſolution of alkaline ſulphure contains a good deal of gas ready formed; but part of it has been already diſengaged, when the ſulphur was diſſolved; and when an acid is added, the portion of gas which it diſengages is gradually diſſolved in the water; ſo that it produces no ſenſible efferveſcence, or at leaſt a very inconſiderable efferveſcence, and no great quantity of gas can be in any way procured.

The ſulphurated hydrogenous gas, which is the ſame in all earthy or alkaline ſulphures, and is always an evidence of their exiſtence, has been long known by its fetid ſmell and its action on metals and metallic oxides, eſpecially thoſe of lead and biſmuth, which it very ſoon blackens. It burns with a light blue flame; and if ſet on fire in a large bell-glaſs, ſuitable for the purpoſe, it clouds the ſides of the veſſel, as it burns, with a depoſite, which is certainly ſulphur. Vital air decompoſes this gas; for whenever it comes into contact with atmoſpheric air, there is a portion of ſulphur ſeparated from it. For this reaſon the ſulphureous waters, mineralized by it, do not contain genuine alkaline ſulphur; though ſulphur be ſeen ſwimming on their ſurfaces, and found depoſited in the arches or baſons in which it is contained. The ſulphureous depoſites which may be obſerved in flaſks containing ſolutions of alkaline ſulphur, are likewiſe owing to this decompoſition of ſulphurated hydrogenous gas by vital air. Bergman has attributed this inſtance of decompoſition to the ſtrong affinity between pure air and phlogiſton. Hepatic gas he conſiders as a combination of ſulphur, phlogiſton, and the matter of heat. When one of theſe principles is ſeparated, the other two can no longer remain in union. Mr. Gengembre, ſtruck with the phenomenon, that ſulphurs neither contain nor exhale ſulphurated hydrogenous gas, except when diſſolved in water, or made up in the humid way, ſuppoſed that the fluid might probably contribute to its formation by undergoing a decompoſition; that while its vital air united with one part of the ſulphur, its hydrogene, which is at the ſame time diſengaged, diſſolved likewiſe a ſmall portion; and that this ſolution conſtituted ſulphurated hydrogenous gas. He imitated the formation of this gas by melting ſulphur above mercury, under a bell-glaſs filled with hydrogenous gas, by the action of the rays of the ſun collected in a lens nine inches in diameter. The ſulphur was partly diſſolved, and communicated to the gas all the characteriſtic properties of hepatic gas. But as ſulphur by itſelf does not decompoſe water, and as oxigene has a greater affinity with hydrogene than with ſulphur, Mr. Gengembre imagines, that alkali promotes the decompoſition of water by ſulphur, in conſequence of its tendency to unite with the body produced by the combination of ſulphur with oxigene; that is, with the ſulphuric acid. In ſupport of this opinion he obſerves, that the more power acids have to retain their oxigene, ſo much the more ſulphurated hydrogenous gas do they diſengage from alkaline ſulphures, becauſe the water is then decompoſed rather than the acid. Such, in his opinion, is the reaſon why the muriatic acid affords one half more of this gas than the nitric acid; as has been remarked by Scheele and Sennebier. Scheele's proceſs for obtaining a conſiderable quantity of ſulphurated hydrogenous gas, by diſſolving, in a dilution of the ſulphuric acid in water, an artificial pyrites, conſiſting of three parts of iron and one of ſulphur, ſtrongly confirms this opinion. It appears then, that vital air decompoſes ſulphurated hydrogenous gas by combining with the hydrogene to form water, while the ſulphur is precipitated.

Sulphurated hydrogenous gas is readily enough diſſolved by water; and the ſolution is a perfect imitation of mineral waters. The earths and the alkaline ſubſtances ſeem to have no power of action upon this gas. The ſulphuric acid does not decompoſe this gas; but the ſulphureous acid robs it of its ſulphur, becauſe the oxigene of this gas being partly in a free ſtate, unites more readily with the hydrogene of the gas. The red nitrous acid in which the oxigene is but very feebly retained, acts with great ſtrength in decompoſing this gas, and precipitates the ſulphur. This acid is therefore very happily employed as a teſt to determine whether ſulphur exiſts in mineral waters.

Alkaline ſulphure decompoſes earthy neutral ſalts as well as ſolutions of metals. Liquid ammoniac has ſcarce any power of acting on concrete ſulphur. Boerhaave has however aſſerted, that when that liquor ſtands long over flowers of ſulphur, it tinges them with a golden colour. To make theſe two bodies enter into combination, one of them muſt be in the ſtate of vapour when they are brought into contact. For this purpoſe, a mixture, conſiſting of equal parts of quick-lime and muriate of ammoniac, and half a part of ſulphur, is ſubmitted to diſtillation. In this proceſs, which muſt be carefully conducted, a reddiſh yellow liquor is obtained, of a pungent and fetid alkaline ſmell, which is a genuine ammoniacal ſulphur; it exhales a whitiſh ſmoke when brought into contact with air, from which property it has received the name of *Boyle's fuming liquor*. Heat decompoſes this ammoniacal ſulphur: in a certain ſpace of time, a great many ſmall needle-formed cryſtals, a line or two in length, are viſible in it: they appear to be concrete ammoniacal ſulphure in cryſtals. A thin, blackiſh, and often golden cruſt is formed on the ſides of the veſſels. Lime and fixed alkali decompoſe the fuming liquor; the acids too precipitate the ſulphur with great facility, and diſengage ſulphurated hydrogenous gas in an highly inflammable ſtate. From theſe decompoſitions there reſult different ammoniacal ſalts, according to the nature of the acid employed. Mr. Fourcroy has found that highly concentrated ſulphuric acid poured on ammoniacal ſulphure produces much agitation and a loud report; but that the ſame effects are not produced by the moſt fuming nitrous acid when poured upon ammoniacal ſulphure that has been ſome time prepared. Mr. Prouſt, however, affirms, that when nitrous acid is poured on two drams of Boyle's fuming liquor, it produces as violent a ſhock as two grains of fulminating powder could produce; but that this phenomenon does not take place unleſs the ammoniacal ſulphure have been recently prepared. The carbonate of ammoniac likewiſe combines with ſulphur; and when theſe two bodies, both in a vaporous ſtate, come into contact, they combine to form a concrete ammoniacal ſulphur. It is obtained by diſtilling a mixture conſiſting of equal parts of carbonate of pot-aſh or lime and muriate of ammoniac, together with half a part of ſulphur. This ſulphure is of a brown red colour, and in cryſtals; when diſſolved, it exhales ſome white vapour: heat decompoſes it; air alters it, and deſtroys its colour. It is liable

to decompofition by acids, &c. The fulphurated hydrogenous gas which it affords, contains carbonic acid. It is to be obferved, that this concrete ammoniacal fulphure is nothing but a carbonate of ammoniac, contaminated with a little of Boyle's liquor; for it is impoffible for ammoniac to hold fulphur in folution when combined with the carbonic acid, as this acid readily precipitates the fulphur of ammoniacal fulphure. Several of the acids have a ftronger or a weaker power of action on fulphur. If fulphuric acid be boiled on fulphur, the acid acquires an amber colour, and a fulphureous fmell; the fulphur melts and fwims like oil: when cooled, it is formed into concrete globules of a lighter or a deeper green, according as the fulphur has been for a longer or a fhorter time in folution. A fmall portion of the fulphur remains diffolved in the acid, but may be precipitated, as Mr. Baumé has fhown, by means of alkali. This experiment, and feveral others of the fame nature, have led Mr. Berthollet to think that the fulphureous is nothing but the fulphuric acid, holding fulphur in folution. And his opinion actually agrees with all the modern experiments which have any relation to this matter; for they concur in fhowing, that the fulphureous differs from the fulphuric acid only by containing a greater proportion of fulphur. The flaming red nitrous acid acts powerfully on fulphur; and Mr. Prouft has obferved, that when red nitrous acid is poured on melted fulphur, it occafions detonation and inflammation. Mr. Chaptal has alfo made a feries of experiments on the fame fubject. By diftilling nitrous acid on fulphur, he diffolved it fo as to produce fulphuric acid: it therefore appears that oxigene has a greater affinity with fulphur than with azote or radical nitre. The common muriatic acid effects no alteration on this combuftible body; but the oxigenated muriatic acid acts upon it with more energy. Sulphuric neutral falts are incapable of acting on fulphur; but nitric falts caufe it to burn rapidly, even in clofe veffels. The theory of this important phenomenon is very fimple. Nitre decompofed by heat affords a very confiderable quantity of vital air: fulphur is a very combuftible fubftance, or, which is the fame thing, has a ftrong tendency to combine with oxigene; nitre affords the principle neceffary to its combuftion; fo that the atmofpheric air is no longer requifite to make it flame. The products obtained by this operation are very different, according as the nitre and the fulphur are employed in different proportions. If a mixture confifting of eight parts of fulphur and one of nitre be fet on fire in a clofe veffel, the fulphur burns with a very lively white flame, and is converted into fulphuric acid.

If, however, inftead of an eighth part of nitre, we burn equal parts of fulphur and of nitre; then, inftead of fulphuric acid in a free ftate, the product obtained is fulphate of pot-afh, formed by the combination of that acid with the fixed alkaline bafe of nitre. The falt obtained in this manner was called *Glafer's polychreft falt.*

Sect. XI. *Of Carbone.*

It is neceffary to place this fubftance among fimple bodies, as no experiment has yet fatisfactorily fhown the poffibility of decompofing it.

Carbone or charcoal is the black refidue of vegetable matters, whofe volatile principles have been entirely diffipated by heat. None but organic matters, containing the combuftible fubftance known by the name of oil, afford charcoal. The production of this fubftance was formerly afcribed to the decompofition of this oily fubftance; but it is now a fact pretty well known, that the carbonaceous matter exifts ready formed in the vegetable, and that what is accomplifhed by the operation of fire, is merely the feparation of the volatile principles that exifted in union with it.

Carbone is generally black, brittle, fonorous, and light; and, if well made, has neither fmell nor tafte. If the vegetable of which it has been formed was very compact, and contained but a fmall proportion of fluid fubftance, it ftill retains a vegetable form. But when the plant decompofed is tender, and contains a good deal of juice, the fluids, as they are difengaged, deftroy the organic texture of the vegetable, and leave a friable coal, which does not exhibit the form of a decompofed vegetable. Different vegetable matters afford carbone in greater or lefs abundance, according to the folidity and the form of their texture. Wood affords much more of this fubftance than herbs, and gums more than refins, and refins ftill more than fluid oils. Every different vegetable matter appears to contain this fubftance in a particular proportion.

When it is required to procure carbone in a ftate of great purity, it muft be dried by ftrong ignition in a clofed veffel: this precaution is neceffary; for the laft portions of water adhere with fuch avidity, that they are decompofed, and afford hydrogenous gas and carbonic acid.

Carbone exifts likewife in fmall quantities in the animal kingdom: it appears in the form of a light fpongy mafs, difficultly confumed in the air, and mixed with a great quantity of phofphates, and even of foda. It is a body poffeffed of fingular properties, but which are in general very little known, though of the higheft importance to chemiftry.

Mr. Lowitz and many other chemifts have obferved a remarkable property in this fubftance of rendering different faline, mucilaginous and other bodies, clear and tranfparent. The phyfical properties of this fubftance are, however, different, according to the nature and the ftate of the vegetables from which it is produced. It is fometimes hard, but at other times friable, and fomewhat pulverulent. Pure oils afford a coal in very fine, and feemingly levigated molecules, called lamp-black. The gravity of carbone varies very confiderably, and its colour is fubject to as many varieties as its other phyfical properties; it is either of a lighter or a deeper, a fparkling or a dull colour. But the chemical properties of this product of fire, are deferving of much further examination.

Carbone, when expofed in clofe veffels to the utmoft violence of fire, fuffers no alteration. When heated in a pneumato-chemical machine, it affords no hydrogenous gas, unlefs it happen to contain moifture: an intenfe heat reduces it to vapours. When heated in contact with air, it burns to afhes; but with fingular phenomena, which are to be carefully diftinguifhed from thofe of other combuftible matters. As foon as it takes fire, it becomes red, and exhibits a white flame, which is more confiderable in proportion to the mafs of carbone. No fort of fmoke iffues from it; but it is reduced into carbonic acid, an elaftic fluid, which, from the experiments of Mr. Lavoifier, appears to be merely a combination of the carbonaceous principle with the oxigenous, in the proportion of three parts of the latter to one of the former. It is on this account that carbone confumes flowly, and leaves nothing but a cinder, more or lefs white, partly of a faline, and partly of an earthy nature. Different forts of carbone are of different degrees of inflammability; and this diftinction is the moft ufeful to the arts of all the facts refpecting it. Some kinds of carbone burn readily with flame, and are quickly confumed: others are difficult to kindle, burn flowly, and remain a long time red-hot, before they are reduced to afhes. Some of them, for inftance thofe of oils, burn indeed with the utmoft difficulty. This property they feem to owe to the obftinate adhefion of the carbonaceous principle to the fixed falts of the vegetables.

This fubftance, when expofed to the air, attracts moifture; probably becaufe it is very porous; and alfo on account of its containing falts in a latent ftate. When moiftened, it affords

hydrogenous gas, which is produced by the decompofition of the water; for when this fluid is paffed through an earthen tube, filled with red-hot carbone, the two bodies are converted into hydrogenous gas and aëriform carbonic acid. Nothing now remains but a little afhes. Mr. Rouelle has obferved, that fixed alkali diffolves a pretty confiderable quantity of carbone by fufion. See CHARCOAL.

Combinations of Carbone.—The fulphuric acid, when expofed to a ftrong heat with powdered carbone, is decompofed by this combuftible body, which has a ftronger affinity with oxigene than fulphur has. But the nitric acid is decompofed with much more rapidity by carbone. Dr. Prieftley has obferved, that there is a good deal of nitrous gas produced from this mixture; and Macquer has found that the nitric acid, by the affiftance of a certain degree of heat, produces a very difcernible effervefcence with this body. Mr. Prouft is alfo faid to have fucceeded in kindling carbone with acid of nitre, the weight of which was one ounce four drams and twenty-three grains, in a bottle containing an ounce of diftilled water. As the refult of his experiments is very curious, an account of it may not be improper:

"A coal of the extract of *carthamus*, reduced to powder, and newly calcined, detonized in a very lively manner with the nitrous acid; and the combuftion was fo rapid as to raife the powder in the form of a very beautiful fky-rocket. He calcined likewife very fine powder of common charcoal; and the detonation fucceeded very well.

"Into a glafs retort, perfectly dry, he introduced about a dram of powder of carbone; after which he poured into the fame retort about as much nitrous acid: the nitrous acid no fooner reached the bottom of the retort, than a detonation was produced with the utmoft rapidity. There proceeded out of the mouth of the retort, as he held it in his hand, a ftream of flame, more than four inches in length, carrying with it fome of the powder, and very dark-coloured vapours of the nitrous acid: the vapours were condenfed into a green and fomewhat fuming liquor, which proved to be nitrous acid weakened by the water which entered into the compofition of that which detonized firft. He poured a new quantity of nitrous acid on the coal which ftill remained in the retort, and continued to inflame it in the fame way, till the whole quantity was exhaufted.

"This experiment he repeated with calcined lamp-black, and the fame phenomena were exhibited. In the retort there remained only a very fmall portion of afhes, fometimes half vitrified, and fticking to the bottom of the retort.

"All carbone is ufually impregnated with a confiderable quantity of moifture. He found that charcoal calcined in the evening was next day unfit for this detonation, having acquired, during the intervening fpace, a fenfible quantity of moifture. But what is very fingular, thefe experiments are fo capricious, that they do not always fucceed, even with the fame carbone, and the fame acid, intermixed in the very fame proportions. By the following expedient, he thinks fuccefs may be fecured: when the acid is poured on the middle of the charcoal, it does not take fire at all; but, when the acid is made to trickle down the fides of the crucible or capfule, till it reach the bottom, then detonation infallibly follows, and the powder is raifed and kindled by the nitrous acid. When the nitrous acid is all confumed, the detonation ceafes of courfe, and the reft of the carbone remains black."

Carbone combines with oxigene, and forms the carbonic acid; but this combination does not take place unlefs their action be affifted by heat.

Concerning the action of the other acids on carbone we are not well informed.

This fubftance, by the help of heat, decompofes all fulphuric falts, forming in confequence fulphures with various bafes.

Carbone caufes nitre to detonize; and the nitre burns it by means of the vital air which that faline fubftance affords by the action of heat.

Sulphure of pot-afh diffolves carbone with great facility, both by the dry and the humid way: it even combines with it more readily than any other fubftance. For this difcovery we are indebted to Mr. Rouelle.

Carbone is capable of combining with metals. It combines with iron in its firft fufion, and mixes with it likewife in the cementation by which fteel is formed. When combined with iron in a fmall proportion of the metal, it conftitutes plumbago. It is likewife capable of combining with tin by cementation; to which metal it gives brilliancy and hardnefs.

Metallic oxides are alfo revived when expofed, in contact with this body, to a heat more or lefs intenfe. This phenomenon is owing to the near affinity between oxigene and pure carbonaceous matter. The action of vegetable fubftances on carbone has not been much examined. It is only known, that carbone, mixed with fat oils, renders them fufceptible of inflammation by the nitrous acid; a fact which confirms Mr. Rouelle's opinion concerning the inflammation of oils by that acid.

SECT. XII. *Of Chemical Affinities.*

It is impoffible to enter upon the ftudy of nature, without taking notice of that wonderful mutual force by which all natural bodies are attracted towards each other. On this great and univerfal law, all thofe phenomena depend which the philofopher contemplates with curiofity, and which the moft ignorant cannot behold without admiration. This force actuates the moft minute bodies as well as the moft enormous maffes of matter. But it acts by laws, either effentially different, or at leaft differently modified, according to the mafs, confiftency, and diftances, of the bodies fubject to its influence.

Natural philofophy has taught us, that when two folid bodies of the fame kind come into contact they adhere together with a degree of force proportioned to the extent and fmoothnefs of the furfaces in union. Thus, two panes of glafs, or two fections of a metal fphere, if preffed together, unite with a degree of tenacity which renders a confiderable effort neceffary to feparate them. This force produces all the phenomena obferved in chemiftry. It becomes, therefore, an object of the higheft importance to ftudy all its laws, and inquire what variations it undergoes from diverfity of circumftances. The greater part of chemifts have denominated this force *affinity* or *relation*; becaufe it has been thought to depend on an analogy or conformity of principles in the bodies between which it fubfifts. Bergman has given it the name of *chemical attraction*: and though its phenomena are different from thofe of the planetary attraction firft obferved by Newton, yet, as both probably depend upon the fame principle, we may follow Bergman in the ufe of the name. Chemical attraction may take place between bodies of the fame nature, or between bodies of different natures. Two kinds of affinity may therefore be diftinguifhed, with refpect to the nature of bodies. 1. The affinity of aggregation, or that which exifts between two principles of the fame nature. 2. The affinity of compofition, or that which retains two or more principles of different natures in a ftate of combination.

Of the Affinity of Aggregation.—It is evident, when two bodies of the fame nature, for inftance two globules of mercury, placed at a certain diftance from each other, tend, by virtue of this force, to unite, and do actually enter into union, that they

muſt form a ſphere greater in bulk, but preciſely the ſame in nature. In that event, therefore, this force affects only the phyſical, or obviouſly apparent qualities of bodies; it joins ſeparate portions of ſimilar matter, by confounding together ſeveral diſtinct maſſes; it forms a body of greater bulk, and unites a number of ſeparate parts into one *whole*. It is denominated the *attraction* or *affinity of aggregation*, in order to diſtinguiſh it from that which takes place between bodies of different natures. It produces an aggregate in which the phyſical qualities of the bodies united undergo a new modification, without any ſenſible change being produced on their chemical qualities. The *aggregate* is nothing more than a coherent body, the parts of which are retained in union by the force of aggregation. It muſt be diſtinguiſhed from the maſs called an *heap*; for though an heap conſiſt of parts all of a ſimilar nature, yet thoſe parts are diſpoſed looſely, and without coherence. It is likewiſe to be diſtinguiſhed from a *mixture*; which conſiſts of a quantity of diſſimilar particles blended together without adherence. This may be farther explained by a familiar example: flowers of ſulphur, or ſulphur in powder, whoſe parts have no adheſion, and may be ſeparated by the ſlighteſt effort, compoſe an heap, the parts of which are not affected by the affinity of aggregation. This mixed with another heap, with one for inſtance conſiſting of nitre in powder, gives what is called *a mixture by confuſion*. But if, by the help of fuſion and cooling, you ſubject this heap to the power of aggregation, the molecules or integrant parts of the ſulphur will then be drawn towards each other during its liquefaction, and will mix and unite in ſuch a manner as to form, when cooled, an uniform maſs or ſolid, which will be a true aggregate.

The affinity of aggregation is ſtronger, the nearer the integrant parts approach to each other; ſo that every thing which tends to ſeparate or remove theſe integrant parts from each other, diminiſhes their affinity, and weakens their force of coheſion. Heat produces this effect upon moſt known bodies, and it is from this circumſtance that metals have no conſiſtence.

The force or affinity of aggregation alſo exiſts in various degrees, which are meaſurable by the effort neceſſary to ſeparate the integrant parts of any aggregate body. Aggregates may therefore be diſtinguiſhed into four kinds, under which all the bodies in nature may be arranged.

1. The hard or ſolid aggregate, in which the integrant parts are united by a very conſiderable force, and cannot be ſeparated without great exertion. In this genus many ſpecies or degrees are comprehended; from the hardneſs of the precious ſtones and of rock-cryſtal, to the yielding contexture of the ſofteſt wood. Its peculiar characteriſtic is to form a maſs, the conſtituent parts of which cannot ſuffer any diſcernible motion without being divided. 2. Bodies, the conſtituent parts of which may be eaſily moved backwards and forwards, ſo as to change their relative ſituation without being ſeparated, belong to the ſoft aggregate. Leſs force is requiſite to maintain the coheſion of a ſoft body than to preſerve the conſiſtency of a ſolid aggregate; and leſs re-action to deſtroy it. 3. The integrant parts of the fluid aggregate are ſo ſlightly united, that the gentleſt effort is ſufficient not only to change their relative ſituation, but even to divide them into diſtinct globules. 4. In the aëriform aggregate, the ſmallneſs of the integrant particles renders them imperceptible, and the affinity of aggregation is the leaſt poſſible. The air of the atmoſphere affords an example of this kind. But theſe four kinds of aggregate are, properly ſpeaking, only different degrees of the ſame force: it is, however, abſolutely neceſſary to diſtinguiſh accurately between them; becauſe they have an important influence on the operations and phenomena of chemiſtry, which is diverſified according to their differences. It may be proved in the moſt ſatisfactory manner, that they are only ſo many different degrees of the ſame force; for many bodies are capable of aſſuming each of theſe four ſtates ſucceſſively. Water, in the form of ice, is a ſolid aggregate; its hardneſs is greater in proportion as its temperature is lower; when expoſed to the temperature of 32° Fahrenheit, it aſſumes a kind of ſoftneſs before paſſing into a fluid ſtate. Its exiſtence in this laſt ſtate is univerſally known: and philoſophers have calculated what degree of expanſive force is neceſſary to reduce it to vapour; in which ſtate it becomes an aëriform aggregate.

In order to deſtroy or weaken the affinity of aggregation, all that is neceſſary is, to oppoſe to the coheſion of the aggregate an external force more than ſufficient to counterbalance that which preſerves the union of its component parts; the external force applied muſt therefore be proportioned to the adheſion of the parts. This law muſt always be obſerved in the preparatory operations; the purpoſe of which is to deſtroy the affinity of aggregation.

Art, which can apply a variety of means to counteract, and even deſtroy the force of aggregation, can alſo afford others to reſtore it, and cauſe it to act with all its former energy. All the manipulations which it employs for this purpoſe, conſiſt in placing the bodies, whoſe force of aggregation is to be reſtored, in ſuch a ſtate of diviſion and fluidity, that their particles may be at liberty to obey the power of attraction, by applying to each other thoſe of their ſurfaces which are beſt adapted to unite; and they thus form a new aggregate, which, in regularity of figure and coheſive force, is generally equal, and ſometimes ſuperior, to natural aggregates of the ſame kind. All ſubſtances capable of paſſing through the ſeveral ſtates of aggregations above enumerated, but more eſpecially ſalts and metals, may be ſo managed during the proceſs by which they are reduced from a fluid to a ſolid ſtate, as to aſſume the form either of an irregular maſs, or of a body with regular lines, angles, and ſurfaces, which is called a cryſtal. The firſt form is obtained by keeping the particles of the fluid body, whether its fluidity may have been occaſioned by fire or water, very near each other; and cauſing the liquefaction to ceaſe ſuddenly, ſo that they may come into contact all at once, and the affinity of aggregation may cauſe them to unite into one irregular maſs. But, on the contrary, to produce cryſtallization, it is neceſſary to keep the parts of the body which you wiſh to bring into that ſtate, at as great a diſtance as poſſible from one another, that they may remain for ſome time in a kind of equilibrium, before coming into union, and may preſent to each other ſuch of their ſurfaces as are beſt adapted to unite. From this it appears, that cryſtallization is owing to the affinity of aggregation; and if the phenomena of cryſtallization be obſerved with a proper degree of attention, they will afford an idea of the manner in which the affinity of aggregation acts. See *Cryſtallization*.

Of the Affinity of Compoſition.—It is generally known, that bodies of different kinds exert a force or attraction upon each other, which is more or leſs ſtrong; and that it is by virtue of this force that all the change of compoſition or decompoſition obſerved amongſt them, are effected. The affinity of compoſition exhibits invariable laws in all the phenomena it cauſes; conſequently theſe laws may be ſtated as general principles, to which may be referred all the effects preſented to our obſervation by the action of bodies upon each other.

I. *That the attraction, or affinity of compoſition, cannot act but between bodies of different natures.*

This law is invariable, and admits of no exceptions. That two bodies may combine, and form a compound, it is indiſpenſably neceſſary for them to be different in kind. Join two bodies of the ſame nature, and you form only an ag-

aggregate, of which the bulk and extent are enlarged, but its essential properties remain unaltered; and their union is occasioned and preserved by the affinity of aggregation, conformably to the explanation already given of the nature of that affinity. For instance, two pieces of wax, rosin, or sulphur, may be united by the action of heat; and this is sufficient to explain the difference between aggregation and composition. This law holds so invariably, that the attraction of composition is never stronger than when the bodies between which it acts are, in nature, the most essentially different from one another. Thus acid salts and alkalis, though the properties of the one be directly opposite to those of the other, enter into the most intimate mutual combination, and form the most perfect compound. The same opposition subsists between the properties of alkalis and sulphur, of acid salts and oil, of acids and metals, of water and spirit of wine, &c.; but all these substances have a strong tendency to mutual union.

II. *That the attraction of composition only acts between the minutest particles of bodies.*

To form a just idea of the nature of this law, it is necessary to distinguish chemical from physical subjects. These last are bodies whose external qualities, such as weight, bulk, surface, extent, and figure, are perceptible to our senses, and may be estimated by their effects upon them. Aggregates are the bodies whose qualities are observed and compared by the naturalist. Further, chemical subjects are substances which have lost their aggregation; and which, of consequence, no longer present to the senses the physical properties of aggregates. They are minute particles, the extent of which cannot be measured, nor their bulk or form distinguished. It is not till after bodies have been reduced to this state of tenuity by the several preparatory operations which have been mentioned, that they become subject to the affinity of composition; and the chemist cannot cause them to enter into combination, without presenting them to one another in a state of division. This force seems to actuate none but the minutest particles of bodies: and in this manner does the attraction of composition appear to differ from that which acts between large masses of matter. The difference is still more striking when we consider the constant opposition between the attraction of aggregation and that of composition. This opposition is so invariable, that we may even venture to advance it as a chemical axiom, that the attraction of combination is in the inverse ratio of that of aggregation; these two forces being always in opposition, and forming a kind of counterpoise to each other. The attraction of aggregation always resists the combination of different bodies: where it acts with the greatest force, they have scarce any tendency to mutual union; and again, such substances as are least under the influence of the force of aggregation, have a strong tendency to combine with others. The various kinds of *gas*, or air, for instance, of all known substances are least under the influence of the force of aggregation; and of them there are many whose tendency to combination is so strong, that they combine with the greatest facility with almost any natural body. This happens, however, only when the heat which enters into the composition of elastic fluids is but slightly combined with a base; and the aëriform state often occasions a contrary tendency; as for instance, in pure air.

III. *That the attraction of composition can unite more bodies than two.*

This law of chemical attraction has been established by the fewest observations, and is still but imperfectly understood. A vast variety of this kind of combinations are known which are produced by the union of two bodies, and a few which are formed by the union of three bodies; but we know of scarce any instances in which four different bodies have an equal tendency to enter into mutual combination, and remain in that state. Metals are the only bodies that are known to be capable of this last species of combination; and of which two, three, or four, may be effectually blended together. It is however highly probable that there are in nature combinations made up of more than four bodies, of six, or eight, for instance, but they are unknown to the chemist. The number of the substances of which any composition consists is denoted by saying, the affinity of one, two, three, or four bodies, and so on.

IV. *That the affinity of composition may take place between two bodies; at least one of them must be in a fluid state.*

This law has been long known, and expressed in this axiom, *Corpora non agunt, nisi sint soluta.* Uniform and accurate observation has shown, that two solid substances can never enter into mutual combination. Even bodies which have the strongest tendency to unite, cannot be brought into union till either the one or the other of them be reduced to a fluid aggregate. Bodies enter into combination with more or less facility, according as they are more or less in a state of fluidity, and consequently possess more or less aggregative force: and therefore no two bodies enter into combination with such rapidity as two of the saline aëriform fluids; for instance, the muriatic acid gas and the alkaline gas. But notwithstanding two solid bodies cannot enter into combination with each other; in some instances dry substances, reduced into a fine powder, re-act upon each other with so much energy, as to unite and form a new compound. Mr. Fourcroy has discovered that caustic fixed alkali, when reduced by trituration, unites in a cold dry state with sulphur and antimony; but in this instance, the reduction of the bodies into their most minute particles by pulverization, and the moisture of the atmosphere attracted by the salt, which soon deliquiates, have a considerable share in effecting the combination, and consequently bring this phenomenon under the present head.

It is not, however, always necessary that the bodies which are to combine be both fluids; it is sufficient that one of them be in that state. When they unite, a phenomenon takes place, to which chemists have given the name of *solution*. It consists in the attenuation, division, and entire destruction of the solid body in contact with the fluid. The cause of this phenomenon is, that the attraction of combination between two substances, one of which is a liquid, the other a solid, such as the sulphureous acid, and a bit of calcareous spar, is stronger than the aggregative force which preserves the particles of the solid in exclusive union with one another. Since it is clear by the third law, that this species of attraction cannot act but on the most minute particles of bodies, the spar must necessarily lose its aggregation, and be reduced into very small particles, in order that it may combine with the *sulphuric* acid, and form *sulphate of lime*. Formerly, chemists always distinguished between the body which effected and that which suffered the act of solution: the former was the fluid, the latter the solid. But modern chemists refuse to admit this distinction, as it supposes a force in the fluid superior to what exists in the solid aggregate. Mr. Gellert has observed that the two bodies contribute equally to the act of solution; and that in the above instance, the vitriolic acid could not destroy the aggregation of the spar, had not the spar a tendency to unite with the sulphuric acid no less strong than that of the acid to combine with it. The name *solvent*, therefore, given at present to fluids, is not strictly chemical, as it conveys only the idea of a mechanical operation; but since it has been improperly introduced, the student must always remember, that when one body is said to dissolve another, no more is meant than that the

former is in a fluid ftate, and that the fluid can never poffefs greater activity or energy than the folid; but the folid may rather be confidered as poffeffing thefe qualities in a fuperior degree, fince its tendency to combination is fo powerful as to overcome its force of aggregation.

This inaccurate notion of folution, which has prevailed till of late, probably arofe from the mechanical theory by which fome chemifts have fought to explain this operation of nature. See *Solution*.

V. *That when two or more bodies are combined by this affinity, their temperature fuffers a change at the inftant of their union.*

All the combinations effected by art, are fo conftantly attended by this phenomenon, that it may be confidered as one of the laws of the attraction of compofition. The temperature of bodies may be altered in two ways, as new combinations fometimes produce cold, fometimes heat, but the latter more frequently than the former.

VI. *That two or more bodies united by the attraction of compofition, form a fubftance, the properties of which are different from thofe which each of the bodies poffeffed before their union.*

All that is neceffary to prove the exiftence of this law, is, to produce fome inftances in which the properties of compounds are totally different from thofe of either of their principles; and the phenomena of all chemical combinations come under this defcription. But, in order to fhow that bodies which enter into combination lofe their original properties; and that they acquire new properties totally different from thofe that they before poffeffed, it may be neceffary to point out fome properties of which the variations may be eafily diftinguifhed. Tafte is often a very eminent property in two diftinct bodies, which when united are almoft infipid in comparifon with what they were in that refpect before. *Sulphate of pot-afh*, or vitriolated tartar, which is produced by the combination of two potent cauftics, the fulphuric, or vitriolic acid, and pure *pot-afh*, has only a bitter tafte; which is by no means an intermediate between the cauftic poignancies of thofe two falts. Two bodies with little or no tafte, alfo frequently acquire by combination a very ftrong tafte; a few grains of the *oxigenated muriatic acid*, or a few grains of mercury given in a glafs of water, can produce no bad effects on the animal œconomy; whereas if combined fo as to form the *oxigenated mercurial muriate*, or corrofive fublimate, and adminiftered in the fame manner, they have a moft pungent tafte, and produce the moft fatal effects on the human conftitution. Bodies entering into combination are alfo liable to change of form. Two fubftances, neither of which is by itfelf fufceptible of cryftallization, often affume a regular form when combined: thus the *muriatic acid gas*, and *ammoniac* or alkaline gas, when they enter into combination, form cryftals of *muriate* of *ammoniac*. In other inftances, the form fuffers only a flight change of modification; as in the combination of certain neutral falts, in the union of fulphur with metals, and in alloyed metals; which laft have been obferved by M. l'Abbé Mongez to afford cryftals fomewhat different from thofe of pure metals. Bodies that are, in a fimple ftate, highly fufceptible of cryftallization, lofe that property when combined with other bodies. This happens to all metals when united with the *oxigenous* principle; and to fome of them when combined with acids. The confiftency of bodies is alfo affected by their combination; the confiftency of a compound being almoft always different from that of either of the fimple bodies of which it is compofed. Thus, two fluids often produce a folid by their combination; for inftance, the fulphuric acid united with a folution of pot-afh. And a fluid often refults from the combination of two folids; as from a combination of neutral falts with ice, and from the mixture of an amalgam of lead with an amalgam of bifmuth. But the quality which fuffers the moft frequent alterations in the combination of bodies is colour. Sometimes it is loft: thus the coloured muriatic acid, combined with a metal, becomes white. It oftener happens, alfo, that two bodies deftitute of colour affume when united either a fainter or ftronger colour, as when iron or copper are diffolved in almoft any of the acids, and when the oxides or calces of lead, mercury, or almoft any other metal, are united with the oxigenous principle.

Various bodies likewife, which, in a fimple ftate, are ftrongly odoriferous, become inodorous when brought into combination; as for inftance, the muriatic acid gas and the ammoniac or alkaline gas, which, in a fimple ftate, have a ftrong fuffocating fmell, form in combination the muriate of ammoniac, a neutral falt which has fcarcely any fmell. From the union of two inodorous bodies, there alfo frequently refults a ftrong-fmelling compound; fulphur and fixed alkali, each of which is in a fimple ftate almoft deftitute of fmell, form, when united, liver of fulphur, or *fulphure*, a fubftance which in a moift ftate is extremely fetid. The fufibility of bodies is fubject to the fame alterations. Two fubftances, not fufceptible of fufion, or which cannot be reduced to that ftate without the greateft difficulty, when combined acquire the property of fufibility in an high degree. The combination of fulphur with any of the metals, forms a ftriking inftance of the truth of this affertion. A variety of other facts alfo concur to eftablifh this law.

VII. *That the attraction of compofition is meafurable by the difficulty of deftroying the combination formed between two or more bodies.*

Chemifts know how to feparate bodies in union, however ftrong their mutual attraction or adherence: but the means which they employ are more or lefs eafy, or more or lefs complicated. It has been conftantly obferved, that in proportion as a compound is more or lefs perfect, its component parts are feparated with more or lefs difficulty: And the degrees of the difficulty with which any two fubftances are feparated, may be confidered as in direct proportion to the degrees of the attraction by which they mutually adhere; the one will afford a juft eftimate of the other.

It is particularly neceffary to infift on this law, as it is eafy to fall into miftakes in eftimating the differences of the attraction which unites the principles of different combinations. From the rapidity with which fome fubftances combine, it is natural to imagine that their mutual attraction muft be very confiderable. But experience fhows that this eagernefs to enter into combination, inftead of indicating a perfect compofition, is rather a proof that the attraction between the bodies is extremely weak, and can produce but a very imperfect compound. In order, therefore, to determine accurately the degree of affinity with which bodies unite and remain in union, it will be proper to confider the eafe or difficulty with which they are feparated.

VIII. *That bodies have not all the fame degree of chemical attraction with regard to one another; but the degrees of that force fubfifting between different bodies may be determined by obfervation.*

There is not uniformly the fame tendency to mutual combination in natural bodies. There are even fome bodies which abfolutely refufe to unite, or between which at leaft art cannot effect a direct combination; fuch as iron and mercury, water and oil, &c. yet it is not true that thefe bodies have no mutual attraction. Others require long time and much pains to bring them into combination. But the moft important circumftance of this variety of chemical attraction is, that as various bodies are united with various degrees of force, it is poffible to attain

ſuch an accurate knowledge of the particular degree of force that unites any two bodies, as to effect a ſeparation between them at pleaſure. This decompoſition is the grandeſt effect of the chemical art: by it the chemiſt is frequently able to perform what appears extraordinary to thoſe unacquainted with the principles on which he proceeds. To comprehend the nature of this decompoſition, ſuppoſe two bodies to be united with a force equal to four: as for inſtance, an acid and an *oxide*, or metallic calx; and let a third body, ſuch as an alkali, which has an affinity with the acid equal to five or ſix, be brought into contact with this compound; the conſequence will then be, that the alkali, whoſe tendency to combine with the acid is greater than that of the acid to remain in union with the metallic *oxide*, will deſert the latter in order to combine with the former. This is preciſely the reſult of ſuch a mixture: the metallic *oxide* appears in a ſeparate ſtate, and a new combination is formed, conſiſting of the acid and the alkali. This decompoſition is commonly known by the name of *precipitation*; as the ſubſtance ſeparated generally falls to the bottom of the fluid compound.—See *Precipitation*.

That ſubſtance which ſinks to the bottom of the veſſel in which this operation is performed, is called a *precipitate*, and the ſubſtance by the addition of which the phenomenon is produced, is denominated the *precipitant*. There are four different kinds of precipitates. *A true precipitate* is formed, when the ſubſtance which ſinks to the bottom is one of the principles of the compound decompoſed by the addition of the new body. For inſtance, when ſulphate of lime, which is a combination of lime and the ſulphuric acid, is decompoſed by means of pot-aſh, which has a greater affinity with the acid than with lime, the lime being ſeparated falls to the bottom, and conſtitutes a true precipitate. A *falſe precipitate* is produced, when the new combination of the precipitant with one of the two ſimple bodies of the compound which it has decompoſed, falls to the bottom on account of its inſolubility, while the ſeparate body remains in a ſtate of ſolution. When the *nitrate of mercury* is decompoſed by the muriatic acid, with which the oxide of that metal has a ſtronger affinity than it has with the *nitric acid*, the new combination of mercury with the muriatic acid ſinks to the bottom of the mixture, forming a falſe precipitate, above which the nitric acid remains diſſolved in water. This phenomenon entirely depends on the different degrees of the ſolubility of the different ſubſtances. In this ſecond order of precipitates it is neceſſary to obſerve an error of denomination which may tend to miſlead; for, if this name be given to the ſubſtance ſeparated from the compound by the precipitant, it cannot with any propriety be applied to the new combination then formed. But though we ſhould even confine the term *precipitate* to denote the ſubſtance ſeparated by the precipitant, it might ſtill occaſion miſtakes; as it happens in many inſtances that the inſulated ſubſtance, inſtead of ſinking, riſes, and is volatilized. Thus, when the combination of the muriatic acid with volatile ammoniac or alkali, known by the name of muriate of ammoniac, is decompoſed by quicklime, with which the acid has a greater affinity than with volatile alkali, the alkali evaporates, and no appearance of any precipitate is afforded in the mixture.

To produce theſe precipitates, it is neceſſary that the ſubſtances be in a liquid ſtate: The proceſs is then called precipitation effected in the humid way, to diſtinguiſh it from that which is accompliſhed by the action of fire, or in the dry way, either by means of fuſion or diſtillation.

Two other kinds of precipitate have alſo been noticed by modern chemiſts; the diſtinction between which is much more juſt and uſeful than that between the preceding. Theſe are *pure* and *impure precipitates*. The firſt comprehend all bodies which, after their ſeparation from thoſe compounds into which they entered, exhibit all their original properties, without appearing to have ſuffered any alteration, in conſequence either of exiſting in a compound ſtate, or of being expoſed to the act of decompoſition. Precipitates of this ſpecies are very numerous, but the impure precipitates are ſtill more ſo. That precipitates may be obtained very pure, it is requiſite that they ſhould have ſuffered no alteration by the action of the bodies with which they were combined before their precipitation; and that there ſubſiſt no affinity between them and the ſubſtance employed to precipitate them. For inſtance, when *alcohol*, or ſpirit of wine, is poured into a ſolution of ſulphate of pot-aſh, the ſpirit of wine having a ſtronger affinity with the water than the water has with the ſalt, the latter is left in a ſeparate ſtate, and becomes a pure precipitate, as it has ſuffered no alteration from the water, and has not the moſt diſtant affinity with the alcohol. But when two bodies by combination have produced mutual alterations on each other, as happens in the combination of acids with metals, the third body, ſuch as an alkaline ſalt, employed to effect a ſeparation between them, will give the metal in a ſtate very different from its original character, and will thus produce an impure precipitate. The ſame reſult takes place when the precipitant has any tendency to unite with the precipitate: thus, in the abovementioned inſtance of a metallic ſolution decompoſed by an alkali, part of the alkali entering into combination with the metallic oxide renders it an impure precipitate. Theſe two cauſes of the impurity of precipitates are almoſt always found to act together. Sometimes it is poſſible to diſtinguiſh at once whether a precipitate be pure or impure, by adding a much greater quantity of the precipitating body than is neceſſary to decompoſe the compound. This extraordinary quantity then enables the precipitant to combine with the precipitate, if there be an affinity between them, and diſſolves it ſo entirely as to make it diſappear. If a quantity of ammoniac or volatile alkali be poured upon a ſolution of copper with the nitric acid, the copper is precipitated in the form of light blue flakes. The colour of this precipitate, ſo very different from the natural brilliancy of copper, ſhows it at once to be an impure precipitate: if more ammoniac be added, this will ſtill more plainly appear. The blue flakes are again diſſolved by the ſalt, the fluid becomes gradually homogeneous and tranſparent, and aſſumes a very fine deep blue colour; a deciſive proof of the combination of the oxide of copper with the alkaline ſalt. Much of our preſent accurate knowledge of theſe impure precipitates, which occur much more frequently than the pure, is owing to the ingenious reſearches of Mr. Bayen, concerning the decompoſition of mercurial ſolutions with alkalis, and the ſtate of mercury precipitated in operations of this kind.

It cannot now be difficult to underſtand the theory of the decompoſition of compounds of two bodies by means of a third brought into contact with them. They all depend upon ſimple elective attractions. But greater difficulty will be found in acquiring a diſtinct idea of that complicated phenomenon to which chemiſts have given the name of *double elective attraction*. It frequently happens that a compound of two bodies cannot be deſtroyed by a third or fourth body individually; while, if a compound of the two laſt be brought into contact with the firſt compound, both compounds are inſtantly decompoſed. An example will render this more familiar: Sulphate of pot-aſh, or a combination of the ſulphuric acid with pot-aſh, cannot be decompoſed by either quicklime or the cold nitric acid individually; but pour into a ſolution of the former neutral ſalt a proper quantity of the *nitrate of lime*, formed by the union of the nitric acid with quicklime, the two combinations will be mutually decompoſed; the nitric acid uniting with the pot-aſh to form common nitre, while the ſulphuric acid uniting with the lime forms ſulphate of lime; which being leſs liable to ſo-

tion than the nitre, is therefore precipitated. This affinity may probably appear ſtrange and unaccountable; but it may be explained in the following manner: The ſulphuric acid cannot be ſeparated from pot-aſh, either by lime or by the nitric acid, becauſe it has a ſtronger affinity with that alkaline ſubſtance than either of the two latter bodies has with it or with the alkali. But when you preſent to the ſulphate of pot-aſh a compound of the nitric acid with lime, the nitric acid immediately exerts its tendency to combine with the pot-aſh, while the ſulphuric acid is at the ſame time attracted by the lime; ſo that the decompoſition of the ſulphate of pot-aſh is begun by the action of the nitric acid, and completed by that of the lime. To explain this double affinity ſtill more clearly, ſuppoſe the force of adheſion, which unites the ſulphuric acid with pot-aſh, to be equal to eight; the nitric acid tending to unite with that alkaline ſubſtance with a leſs degree of force, which may be eſtimated at ſeven, would be inſufficient of itſelf to decompoſe the ſulphate of pot-aſh: but the lime, by its tendency to combine with the ſulphuric acid, aids it with a force which we may conſider as equal to ſix; and theſe two forces together amount to thirteen; which ſum of forces is exerted againſt eight, to ſeparate the ſulphuric acid from the pot-aſh. This compound force will alſo be greater than that by which the union between the lime and the nitric acid is maintained.

It is evident, therefore, that there are two kinds of attraction in double elective attractions, which muſt be accurately diſtinguiſhed from each other: the firſt is that by virtue of which the principles of each of the two compounds adhere to one another, which in the above inſtance retains the ſulphuric acid in union with the pot-aſh, and cauſes the nitric acid to adhere to the lime. Mr. Kirwan has given to this force the name of *quieſcent attractions*; becauſe its tendency is to preſerve the two compounds in their firſt ſtate. The ſecond is that by which the four principles of the two compounds reciprocally change their ſituations, and are combined in a different order: it is by virtue of this affinity, that in the above inſtance the pot-aſh combines with the nitric, and the lime with the ſulphuric acid. This ſecond force may be denominated *divellent attractions*; becauſe it counteracts and deſtroys the firſt. From this uſeful diſtinction, it becomes eaſy to explain the cauſe of this double decompoſition, by exhibiting in a table, as Bergman has done, the forces of the attractions by which it is produced. Place the two compounds which mutually decompoſe one another between two braces directly oppoſite, the acids ſtanding in oppoſition to the baſes on which they act; between theſe four bodies note down the particular degrees of the attractive force which they exert upon each other; then add together the two horizontal numbers, expreſſing the quieſcent attractions; and alſo the vertical numbers which are employed to mark the divellent attractions: if the ſum of the latter exceed that of the former, a double decompoſition and a double combination will be effected. An example of this from the laſt mentioned compounds, will afford a ſufficient explanation:

Nitre, or Nitrate of Pot-aſh.

Sulphate of Pot-aſh.	Pot-aſh.	7	Nitric Acid.	Nitrate of Lime.
	8 quieſcent	divell. attrac. attrac. 4 = 12		
	Sulphuric Acid.	6 ‖ 13	Lime.	

Sulphate of Lime.

Double elective attractions have but lately been taken notice of by chemiſts, and they are far from being all known. Thoſe who are engaged in chemical reſearches, will frequently find this kind of decompoſition in circumſtances where no ſuch phenomenon was before ſuſpected to take place.

In concluding this ſubject it may be proper to obſerve, that many ingenious tabular methods have been invented, in order to exhibit at once all the more regular phenomena of chemical decompoſition. Uſeful attempts have been made in this way by Geoffrey, Rouelle, Sage, Gellert, and particularly by profeſſor Bergman. See *Elective Attraction*.

After this view of the leading phenomena of chemical attraction, and unfolding the laws by which that force appears to be regulated, it only remains to be obſerved, that in ſome inſtances thoſe laws ſeem liable to certain variations, which ſeem to ariſe from the influence of particular circumſtances; ſuch as the quantity of the ſubſtances, the temperature of the atmoſphere, motion or reſt, ſolution by water or fire, that is, in the humid or in the moiſt way, the ſtate of aggregation proper to each body, &c. Bergman has conſidered all theſe circumſtances with peculiar care; and has ſhown how far they may be expected to vary the laws of attraction. From the various facts which he has collected relative to this ſubject, he concludes, that theſe variations can be regarded only as exceptions, by no means ſufficient to weaken the evidence on which the doctrine of chemical attraction is grounded.

There are two other ſpecies of affinity which may properly be conſidered in this place; the affinity of *intermediates*, and *reciprocal* affinity. By the firſt is underſtood that by which bodies, that have no natural tendency to mutual union, are capable of being united after one of them has been combined with a third body, which ſerves as an intermediate between them: oil, for inſtance, does not combine with water; but a combination of oil with a ſalt conſtitutes a ſoap, which is ſoluble in water, the ſalt acting as an intermediate. But it is not the ſalt which renders the ſoap ſoluble, for its properties are entirely loſt in the ſoap; the ſolubility of this compound in water is owing to the new properties it has acquired. This phenomenon falls evidently under the eighth law of chemical attraction; by which it is eſtabliſhed, that compounds acquire new properties totally different from thoſe of their component principles.

Reciprocal affinity takes place when a compound conſiſting of two bodies is decompoſed by a third, and the ſeparated principle again decompoſes the new combination; ſo that the principles ſeem to act reciprocally. The ſulphuric acid has a greater affinity than the nitric acid with pot-aſh, and accordingly decompoſes a combination of theſe two principles; but the nitric acid, when left in a ſeparate ſtate, has power to divide the ſulphuric acid from the alkali; for by heating ſulphate of pot-aſh with the nitric acid, nitre is again obtained. This kind of affinity is occaſioned by two circumſtances, the influence of which diſturbs the general laws of chemical affinity. The common nitric acid muſt be warmed before it can decompoſe ſulphate of pot-aſh; and the nitre obtained by this proceſs is again decompoſed by the ſulphuric acid, as ſoon as the mixture returns to a cold ſtate.

What now remains to be ſaid on chemical attraction, is, with reſpect to the different opinions which have been maintained by philoſophers concerning the cauſe of this force.

Thoſe who firſt attempted to form a theory on this ſubject, ſuppoſed that it muſt ariſe either from the elementary particles of bodies being all of the ſame form, or from the phyſical configuration of the parts, or even from ſome occult relations of their intimate compoſition. Theſe notions naturally proceeded from the mechanical explanations which were applied to all the phenomena of nature, in the infancy of the ſcience of na-

tural philofophy. Moft of the modern chemifts, however, who have attempted to explain the caufe of chemical attraction, have obferved a ftrong analogy between this force and the general attraction difcovered by Newton. Confidering nature as fimple and uniform, they have been led to conclude, that the power poffeffed by bodies of entering into mutual union, muft depend on the fame general laws with that by which all bodies are attracted towards each other. They have compared the minute bodies on which the force of affinity acts, with thofe enormous maffes which compofe the fyftem of the univerfe; and have ventured to affirm, that it is the force of gravitation which caufes the former to approach each other, and enter into combination. Some adopting this opinion, but modifying it in a particular manner, have concluded, that chemical attraction is in the ratio of the gravity of bodies, and that thofe bodies which are of the greateft fpecific gravity always poffefs the ftrongeft affinities. This hypothefis is fometimes indeed juftified by facts, and agrees with the affinities of many of the acids; but is contradicted by the phenomena of a vaft number of decompofitions, particularly of all thofe in which metallic fubftances are concerned. Several chemifts have been even fo ftrongly perfuaded of the exiftence of an analogy between the attraction of large bodies and chemical attraction, as to imagine it poffible to meafure and calculate the former in confequence of our knowledge of the latter. Mr. de Morveau has made a number of experiments with a view to prove the truth of the above affertion. Applying to a furface of mercury metal plates of the fame dimeter, fufpended from the arm of a balance, the other arm of which carried a difh, he put weights into the difh fufficient to raife the plate of metal over the mercury; and actually found, by making comparative trials of different metals, that thefe adhered to the mercury with different degrees of force, proportioned to the affinities known to fubfift between them and that fubftance. Gold adhered with the greateft force to the mercury, a greater weight being neceffary to raife it than to raife any of the other metals: cobalt, again, which is known to have no affinity with mercury, feemed to have no adhefion with that furface, and was elevated above it with the greateft eafe. But it muft be obferved that from feveral circumftances, fuch experiments cannot but be in fome degree fallacious: the inferior furface of the fmooth plates of metal applied to the mercury, cannot but combine with that fubftance; and the amalgam formed by that event being more or lefs, according to the eafe or difficulty with which the metal unites with the mercury, this combination increafes the weight of the plate, and renders a greater force requifite to raife it above the mercury. A plate of metal adhering to a furface of mercury, cannot be raifed above it without dividing the mercury into two layers; fo that the force neceffary to raife this plate is employed rather in overcoming the mutual adherence of the particles of the mercury, than in dividing the mercury from the metal. It muft therefore be acknowledged, that if chemical attraction be the fame with general attraction, the difference of the laws by which thefe two forces are regulated, proves the former to be a particular modification of the latter. This truth becomes evident from the comparifon of thofe laws of the Newtonian attraction with which we are acquainted, with the general facts relative to chemical attraction which have of late been difcovered: the former acts only upon large bodies, and in the direct ratio of their maffes; the latter affects only minute bodies, and has no influence on fuch as are of confiderable bulk. Attraction alfo acts between bodies placed at immenfe diftances from each other: affinity never acts but between bodies in mutual contact. In defcribing the laws of chemical attraction, different facts have been ftated, from which it may be concluded, that the phenomena which thofe two great laws prefent, are ftill fo ftrikingly different, as to require much further inveftigation, in order to make a proper diftinction between them.

Sect. XIII. *Of the different Means employed in Chemiftry to overcome the Adhefion between the Particles of Bodies.*

Before we proceed to the defcriptions of the various inftruments employed in chemiftry to afcertain the nature and properties of bodies, it may be neceffary to obferve the methods ufed by chemifts to overcome the attractive power of different fubftances. As the law of affinities tends continually to bring the particles of bodies into contact, and to maintain them in their ftate of union, almoft all the efforts of the chemifts are directed to overcome this attractive power, and the means he employs may be reduced to the following: the divifion of bodies by mechanical operations; the divifion or feparation of their particles from each other by the affiftance of folvents; and that of prefenting to the feveral principles of the fame bodies, fubftances which have a ftronger affinity to them than thofe principles have to each other. The different operations performed upon bodies by the chemift, to determine their nature, alter their form, their texture, and even in fome inftances change their conftitution, are either mechanical or chemical. The mechanical operations which are neceffary to be defcribed here, do not change the nature of fubftances, but in general change only their form and bulk. Thefe operations are performed by the hammer, the knife, the peftle, &c. in mortars of ftone, of glafs, or of metal; and it is the nature of the fubftance under examination which determines the ufe of one or the other of thefe veffels. The object of thefe preliminary operations is, to prepare and difpofe bodies for new operations which may difunite their principles and change their nature: thefe laft-mentioned operations, which may be diftinguifhed by the appellation *Chemical*, are what moft effentially conftitute the analyfis.

The folution to which we are at prefent to attend, confifts in the divifion and difappearance of a folid in a liquid, but without any alteration in the nature of the body fo diffolved. The liquid in which the folid difappears, is called the *folvent* or *menftruum*. The agent of folution appears to follow certain conftant laws. It does not appear to differ from that of affinity; at leaft in all cafes the folution is more or lefs abundant, the greater the affinity of the integrant parts of the folvent is to thofe of the body to be diffolved. From this principle it follows, that, to facilitate folution, it is neceffary that bodies fhould be triturated and divided, as by this means a greater number of furfaces are prefented, and the affinity of the integrant parts is diminifhed. It fometimes happens that the affinity between the folvent and the body prefented to it has fo little energy, that it does not become perceptible till after a confiderable interval of time. Thefe flow operations, of which we have fome examples in our laboratories, are common in the works of nature; and it is probably to fimilar caufes that we ought to refer moft of thofe refults whofe caufes or agents efcape our obfervation and perception.

The operation of folution is more fpeedy in proportion as the body to be diffolved prefents a greater furface: on this principle is founded the practice of pounding, triturating, and dividing bodies intended to be diffolved.

The folution of a body conftantly produces cold; and advantage has been taken of this phenomenon to procure artificial cold, much fuperior to the moft rigorous temperature ever obferved in our climates. The principal folvents employed in our operations are water, alcohol, and fire. Bodies fubmitted to one or the other of thefe folvents prefent fimilar phenomena; they are divided, rarefied, and at laft difappear: the moft refractory metal melts, is diffipated in vapour, and paffes to the ftate of gas, if a very ftrong heat be applied to it. This laft

ſtate therefore forms a complete ſolution of the metallic ſubſtance in the caloric. The effect of caloric is often united with one of the other ſolvents, to accompliſh a more ſpeedy and abundant ſolution.

But the three ſolvents above mentioned do not exerciſe an equal action on all bodies indiſcriminately. Of the diſſolving power of theſe menſtrua tables have been formed, as we have already obſerved. The generality of authors who have treated of ſolution have conſidered it in too mechanical a point of view. Some of them have ſuppoſed ſheaths in the ſolvent and points in the body diſſolved, and by this means have endeavoured to account for the want of increaſe in the bulk of water, in proportion to the quantity of ſalt it takes up. But the Biſhop of Landaff, who has attended to the phenomena of ſolution with the greateſt care, has concluded, from his numerous experiments, that the water riſes in the veſſel at the moment of the immerſion of the ſalt; that it falls during the ſolution; and that after the ſolution it riſes above the original level. The two laſt effects appear to Mr. Chaptal to depend upon the change of temperature which the liquor undergoes. The refrigeration ariſing from the ſolution muſt diminiſh the volume of the ſolvent; but it ought to return to its firſt ſtate as ſoon as the diſſolution is finiſhed. The peculiar affinities of bodies to each other are various, therefore the conſtituent principles may be eaſily diſengaged by other ſubſtances; and it is upon this conſideration that the action of all the re-agents employed by chemiſtry in its analyſis is founded. Sometimes the chemiſt diſplaces certain principles, which he can in that ſtate examine more accurately, becauſe inſulated, and diſengaged from all their combinations; and it frequently happens that the re-agent made uſe of combines with ſome principle of the body analyſed; and a compound ariſes, whoſe characters indicate the nature of the principle which has thus entered into combination, as the combinations of the principal re-agents with various baſes which are well known. It ſometimes alſo happens that the re-agent made uſe of is itſelf decompoſed, which circumſtance renders the phenomena and the products more complicated; but from the nature of theſe products, a judgment of the component parts of the body analyſed may generally be formed.

Sect. XIV. *Of the Apparatus or Inſtruments employed in Chemiſtry.*

As the whole of the practical part of this ſcience conſiſts in placing bodies in contact with each other, in ſuch a manner as that they may exert their reſpective attractions or powers of combination without intermixture or diſturbance of other bodies not deſigned to enter the propoſed experiments, and in raiſing or lowering the temperature of ſuch bodies under examination, it is obvious that the degree of ſucceſs attending reſearches of this kind muſt depend in a great meaſure upon the inſtruments or apparatus made uſe of; and alſo that a great number of the terms uſed in chemiſtry will be either deſcriptive of theſe inſtruments or of the operations performed with them.

Among the inſtruments employed in chemiſtry, there are ſome which are of general uſe, and applicable to moſt operations; and others which ſerve only for peculiar purpoſes. This diviſion clearly points out, that at preſent we can only treat of the former, and that the others muſt be deſcribed on ſuch occaſions as render it neceſſary to conſider their uſes. The chemical inſtruments moſt frequently employed are furnaces. Theſe conſiſt of earthen veſſels appropriated to the various operations performed upon bodies by means of fire. A proper mixture of ſand and clay is commonly the material of which theſe veſſels are formed. But it is difficult, and even impoſſible, to preſcribe and determine, according to any invariable method, the proportions of theſe conſtituent parts; becauſe they muſt be varied according to the nature of the earths made uſe of. The different methods of applying fire to ſubſtances under examination, have occaſioned the conſtruction of furnaces in different forms: all of which may be here reduced to the following kinds.

I. *The Evaporatory Furnace.*—This furnace has received its name from its uſe. It is employed to reduce liquid ſubſtances into vapour by means of heat, in order to ſeparate the more fixed principles from thoſe which are more ponderous, and which were mixed, ſuſpended, compounded, or diſſolved in the fluid. The fire-place is covered by the evaporatory veſſel; and two or three grooves, channels, or depreſſions, are made in the ſides of the furnace, near its upper edge, to facilitate the drawing of the fire. The veſſel which contains the ſubſtance to be evaporated, is called the *evaporatory veſſel*. Veſſels of this kind are generally formed of earth, glaſs, or metal. Thoſe made of unglazed earth are too porous, inſomuch that liquids filtrate through their texture. Thoſe of porcelain biſcuit are likewiſe penetrable by liquids ſtrongly heated, and ſuffer gaſeous or aëriform ſubſtances to eſcape. The beautiful experiments of Mr. D'Arcet upon the combuſtion and deſtruction of the diamond, in balls of porcelain, ſerve to illuſtrate this ſubject. Mr. Chaptal has alſo confirmed his reſults by experiments in the large way, upon the diſtillation of aqua fortis, which loſes as well in quality as quantity when the proceſs is carried on in veſſels of porcelain clay. Glazed earthen veſſels cannot be uſed when the glazing conſiſts of the oxides or calces of lead or copper, as thoſe metallic matters are attacked by acids, fats, oils, &c. Neither can earthen veſſels be employed which are covered with enamel, becauſe this kind of opaque glaſs is almoſt always full of ſmall cracks, through which the liquid would introduce itſelf into the body of the veſſel. Earthen veſſels cannot therefore be properly made uſe of, excepting in operations of little delicacy, in which preciſion and accuracy are not indiſpenſably neceſſary. Evaporatory veſſels of glaſs are in general to be preferred. Thoſe which reſiſt the fire better than any others, are prepared in the laboratory, by breaking a ſphere of glaſs or a receiver into two equal parts by means of a red-hot iron; as the capſules which are made in the glaſs-houſe are thickeſt at the bottom, and conſequently very liable to break at that part when expoſed to the fire.

In manufactories evaporatory veſſels of metal are commonly made uſe of, and copper is moſt generally employed, becauſe it not only poſſeſſes the property of reſiſting fire, but has a conſiderable degree of ſolidity, together with a facility of being wrought. Alembics are made of this metal, for the diſtillation of vinous ſpirits, and aromatic ſubſtances; and alſo caldrons or pots for the cryſtallization of certain ſalts, and for ſeveral dyeing proceſſes, &c. Lead is likewiſe of conſiderable uſe, and ſhould be made choice of whenever operations are to be performed upon ſubſtances which contain the ſulphuric acid, ſuch as the ſulphates of alumine and of iron; and for the concentration and rectification of the *oils of vitriol*. Tin veſſels are alſo employed in ſome operations; the ſcarlet-bath affords a more beautiful colour in boilers of this metal than in thoſe of any other. Capitals of tin have already begun to be ſubſtituted in the room of thoſe of copper, in the conſtruction of alembics; and by this means the ſeveral products of diſtillation are exempted from every ſuſpicion of that dangerous metal. Boilers of iron are likewiſe uſed for certain coarſe operations; as, for example, in the concentration of the lixivia of common ſalt, of nitre, &c.

In ſome delicate operations evaporatory veſſels of gold, ſilver, or platina, are to be preferred; but the price and ſcarcity of theſe veſſels do not permit them to be uſed, eſpecially in the large way.

It is however from the nature of the ſubſtance to be evapo-

rated, that the choice of the veſſel moſt ſuitable to any operation muſt be determined. There is no particular kind of veſſel which can be employed excluſively on all occaſions. It may however be obſerved, that glaſs preſents the greateſt number of advantages, as it is compoſed of a ſubſtance the leaſt attacked, the leaſt ſoluble, and the leaſt deſtructible by chemical agents.

The veſſels employed in evaporation are known by the names of capſules, cucurbits, &c. according to their different forms. Theſe veſſels ought in general to be very wide and ſhallow, in order that the diſtillation and evaporation may be ſpeedy and œconomical. It is neceſſary that the evaporatory veſſel be not narrow at its upper part, that the heat be applied to the liquid in all parts, and equally; and that the column or maſs of the liquid ſhould have little depth, and a large ſurface of evaporation. Upon theſe principles Profeſſor Chaptal has conſtructed boilers for diſtilling brandy, which ſave eleven-twelfths of the time, and four-fifths of the combuſtible materials.

The operation of evaporation may be performed in three different ways. 1. By a naked fire. 2. By the ſand-bath. 3. By the water-bath. Evaporation is made by a naked fire, when there is no ſubſtance interpoſed between the fire and the veſſel which contains the liquid intended to be evaporated: as, for example, when water is boiled in a pot. It is performed by the ſand-bath, when a veſſel filled with ſand is interpoſed between the fire and the evaporatory veſſel. The heat in this caſe is communicated more ſlowly and gradually; and the veſſels, which would otherwiſe have been broken by the immediate application of the heat, are enabled to reſiſt its force. At the ſame time the heat is more equally kept up; the refrigeration is more gradual; and the operations are performed with a greater degree of order, preciſion, and facility.

But if, inſtead of employing a veſſel filled with ſand, a veſſel of water be made uſe of, and the evaporatory veſſel be plunged in the liquid, the evaporation is ſaid to be made on the water-bath: in this caſe, the ſubſtance to be evaporated is only heated by communication from the water. This form or method of evaporation is employed when certain principles of great volatility, ſuch as alcohol, or the aromatic principles of plants, are to be extracted or diſtilled. It poſſeſſes the advantage of affording products which are not changed by the fire, becauſe the heat is tranſmitted to them by the intervention of a liquid: it is this circumſtance which renders the proceſs valuable for the extraction of volatile oils, perfumes, ethereal liquids, &c. It has alſo the advantage of affording a heat nearly equal, becauſe the degree of ebullition is a term nearly conſtant; and this ſtandard heat may be graduated or varied at pleaſure, by adding ſalts to the liquid of the water-bath, as this ſingle circumſtance renders the ebullition more or leſs quick and eaſy. The ſame effect may likewiſe be produced by reſtraining the evaporation; for in this caſe the liquid may aſſume a degree of heat much more conſiderable, as is ſeen in the digeſter of Papin, ſteam engines, eolipiles, and the boilers for ſtriking the red tinge in cotton, &c.

Sublimation evidently differs from evaporation, becauſe the ſubſtance to be raiſed is ſolid. The veſſels uſed in this operation are known by the name of ſublimatory veſſels. Theſe are commonly globes terminating in a long neck; which are then called mattraſſes. In order to ſublime any ſubſtance, a part of the ball of the mattraſs is ſurrounded with ſand. The matter which is volatilized by the heat riſes, and is condenſed againſt the coldeſt part of the veſſel; where it forms a ſtratum or cake, that may be taken out by breaking the veſſel itſelf. In this manner it is that ſal ammoniac, corroſive ſublimate, and other ſimilar products, are formed for the purpoſes of commerce. This operation is uſually performed either for the purpoſe of purifying certain ſubſtances, and diſengaging them from extraneous matters; or elſe to reduce into vapour, and combine under that form, principles which would have united with great difficulty if they had not been brought to that ſtate of extreme diviſion.

II. *The reverberatory furnace.*—The title of the reverberatory furnace has been given to that conſtruction which is appropriated to diſtillation.

A furnace of this kind is compoſed of four parts. 1. The aſh-hole, intended for the free paſſage of the air, and to receive the aſhes or reſidue of the combuſtion. 2. The fire-place, ſeparated from the aſh-hole by the grate, in which the combuſtible matter is contained. 3. A portion of a cylinder, which is called the laboratory, becauſe it is this part which receives the retorts employed in the operations or diſtillations. 4. Theſe three pieces are covered with a dome, or portion of a ſphere, pierced near its upper part by an aperture, which affords a free paſſage to the current of air, and forms a chimney. The moſt uſual form of the reverberatory furnace is that of a cylinder terminated by a hemiſphere, out of which ariſes a chimney of a greater or leſs length, to produce a ſuitable degree of circulation of the air.

It is neceſſary, in order that a reverberatory furnace may be well proportioned, that the aſh-hole ſhould be large, to admit the air freſh and unaltered; and that the fire-place and laboratory together ſhould have the form of a true ellipſis, whoſe two foci ſhould be occupied by the fire and the retort. In this caſe all the heat, whether direct or reflected, will ſtrike the retort. The reverberatory furnace is uſed for diſtillation, which is that proceſs by which the force of fire is applied to diſunite and ſeparate the ſeveral principles of bodies, according to the laws of their volatility, and their ſeveral affinities. Veſſels of this kind are known by the name of retorts. They are formed of glaſs, ſtone-ware, porcelain, or metal; theſe ſubſtances being reſpectively uſed, according to the nature of the bodies intended to be expoſed to diſtillation. But whatever be the nature of the material, the form of the retort is the ſame; it reſembles an egg, terminating in a beak or tube, which diminiſhes inſenſibly in diameter, and is ſlightly inclined or bended. The oval portion of the retort, which is called its belly, is placed in the laboratory of the furnace, and is ſupported upon two bars of iron, which ſeparate the laboratory from the fire-place; while the beak or neck of the retort iſſues out of the furnace through a circular aperture formed in the edges of the dome and of the laboratory.

There is alſo a veſſel intended to receive the product of the diſtillation which is fitted to the neck of the retort, and is called the recipient, or receiver. This receiver is commonly a ſphere with two apertures; the one of conſiderable magnitude, to receive the neck of the retort; the other ſmaller, to afford vent for the vapours. This part is called the tubulure of the receiver; whence the terms tubulated receiver, or receiver not tubulated.

Although the reverberatory furnace be particularly adapted to diſtillation, this operation may be performed on the ſand-bath; and here, as in other caſes, it depends ſingly on the intelligence of the artiſt to vary his apparatus according to the neceſſity of circumſtances, and the nature of the ſubſtances upon which he operates. The conſtruction of theſe furnaces may likewiſe be varied; and the chemiſt will find it neceſſary to learn the art of availing himſelf of every apparatus he may poſſeſs, to carry his various operations into execution.

III. *The forge furnace.*—This furnace is that in which the current of air is determined by bellows. The aſh-hole, the fire-place, and the laboratory are here all united together; and this aſſemblage forms only a portion of a cylinder, pierced near the lower angle by a ſmall hole, into which the tube of the bellows enters. This part is ſometimes covered with a hemiſphere or dome, to concentrate the heat with greater efficacy, and to reflect it upon the bodies expoſed to it. The forge furnace is employed in the fuſion and calcination of metals, and generally

for all the operations which are performed in crucibles. By crucibles are underſtood veſſels of earth or metal, which are almoſt always of the form of an inverted cone. A crucible ought to ſupport the ſtrongeſt heat without melting: it ought to reſiſt the attacks of all ſuch agents as are expoſed to heat in veſſels of this kind. Thoſe crucibles which poſſeſs the greateſt degree of perfection, are made in Heſſe or in Holland. Mr. Chaptal, a French chemiſt, has made very good ones by a mixture of raw and unbaked clay from Salavas in the Vivarais. Laboratories have lately been provided with crucibles of platina, which unite the moſt excellent properties. They are nearly infuſible, and at the ſame time indeſtructible by fire. The different earthen veſſels which have been deſcribed may be fabricated by the hand, or wrought in the lathe. The firſt proceeding renders them more ſolid, the clay is better united, and it is the only method uſed in glaſs manufactories; but the ſecond method is more expeditious. The agent of ſuch decompoſitions as are effected by means of furnaces, is fire. It is afforded by the combuſtion of wood, pit-coal, or charcoal. Wood is employed in certain large works; but charcoal is preferable in our laboratories, becauſe it does not ſmoke, has no bad ſmell, and burns better in ſmall maſſes than other combuſtibles. That which is the moſt ſonorous, the drieſt, and the leaſt porous, is to be choſen.

In ſeveral operations, it is however neceſſary to defend the retorts from the immediate action of the fire, and alſo to coerce and reſtrain the expanſible vapours, which are very elaſtic, and frequently corroſive. To anſwer theſe purpoſes various lutes have been employed. It is certain that a glaſs retort expoſed to the action of the fire would break, if the operator was not to have recourſe to the prudent precaution of coating it with earth. For this purpoſe the chemiſt juſt mentioned has found it advantageous to uſe a mixture of fat earth and freſh horſe-dung. The fat earth is ſuffered to rot for ſome hours in water; and when it is moiſtened, and properly ſoftened, it is to be kneaded with the horſe-dung, and formed into a ſoft paſte, which is to be applied and ſpread with the hand upon every part of the retort intended to be expoſed to the action of the fire. The horſe-dung combines ſeveral advantages. It contains a ſerous fluid, which hardens by heat, and ſtrongly connects all the parts together; but when this juice has been altered by fermentation or age, the dung does not poſſeſs the ſame virtue; and the filaments or ſtalks of hay, which are ſo eaſily diſtinguiſhed in horſe-dung, unite all the parts of the lute together. Retorts luted in this manner reſiſt the impreſſion of the fire very well; and the adheſion of the lute to the retort is ſuch, that even ſhould the retort fly during the operation, the diſtillation may be ſtill carried on.

But when it is required to coerce or oppoſe the eſcape of the vapours which are diſengaged during any operation, it is ſufficient if the joinings of the veſſels be covered with paper glued on, or with ſlips of bladder moiſtened with the lute of lime and white of egg, provided the vapours be neither dangerous nor corroſive; but, when the vapours are corroſive, it is neceſſary to uſe the fat lute to retain them. This lute is made with boiled linſeed oil, mixed and well incorporated with ſifted clay. Nut oil, kneaded with the ſame clay, forms a lute poſſeſſing the ſame properties. It is eaſily extended in the hand, and is uſed for defending the joinings of veſſels, upon which it is afterwards ſecured by ſtrips of linen, dipped in the lute of lime and white of egg. But previous to the application of heat in any diſtillation, it is neceſſary to ſuffer the lutes to dry. Without this precaution, the vapours would riſe and eſcape; or otherwiſe they would combine with the water which moiſtens the lutes, and would corrode and deſtroy the bladder, the ſkin, the paper, and in ſhort every ſubſtance uſed to ſecure them in their places. The lute of lime and white of egg dries very ſpeedily, and muſt be uſed the moment it is made. This lute likewiſe oppoſes the greateſt reſiſtance to the eſcape of the vapours, and adheres the moſt intimately to the glaſs. It is prepared by mixing a ſmall quantity of finely-powdered quick-lime with white of egg, and afterwards beating up the mixture to facilitate the combination. It is then to be inſtantly applied on pieces of old linen, wrapped round the places of joining. But in large works, where it is not poſſible to attend to all theſe minute details, the joinings of the retort and receiver are luted together with the ſame lute which is uſed to coat the retorts. A covering of the thickneſs of a few lines is ſufficient to prevent the vapours of the marine or nitrous acid from eſcaping.

But in certain operations a diſengagement takes place of ſuch a prodigious quantity of vapours, that it is dangerous to confine them; yet the ſuffering them to eſcape would occaſion a conſiderable loſs in the product; therefore an apparatus has been contrived of great ingenuity and ſimplicity to moderate the iſſue, and to retain without riſk ſuch vapours as would otherwiſe eſcape. This apparatus is known by the name of its author, Mr. Woulfe; and his excellent proceſs conſiſts in adapting the extremity of a recurved tube to the tubulure of the receiver; the other end of which is plunged into water, in a bottle half filled, and properly placed for that purpoſe. From the empty part of this bottle iſſues a ſecond tube, which is in like manner plunged in the water of a ſecond bottle. A number of other bottles may be added, obſerving the ſame precautions; with the attention, nevertheleſs, to leave the laſt open, to give a free eſcape to the vapours which are not coercible: and, when the apparatus is thus diſpoſed, all the joinings are to be luted. It will eaſily be imagined that the vapours which eſcape from the retort are obliged to paſs through the tube adapted to the tubulure of the receiver, and conſequently muſt paſs through the water of the firſt bottle: they therefore ſuffer a firſt reſiſtance, which partly condenſes them. But as almoſt all vapours are more or leſs miſcible and ſoluble in water, a calculation is previouſly made of the quantity of water neceſſary to abſorb the vapours which are diſengaged from the mixture in the retort; and care is taken to diſtribute this proper quantity of water in the bottles of the apparatus. By this means the pureſt and moſt concentrated products may be obtained; as the water, which is always the receiver and the vehicle of theſe ſubſtances, becomes ſaturated with them. There is probably no other method of obtaining products always of an equal energy, and comparable in their effects; a circumſtance of the greateſt importance in the operations of the arts, as well as in philoſophical experiments. This apparatus has been applied to works in the large way. It has been uſed to extract the common muriatic acid, the oxigenated muriatic acid, ammoniac or volatile alkali, &c. As in this apparatus it would very often happen that the preſſure of the external air would cauſe the water of the outer veſſels to paſs into the receiver, in conſequence of the ſimple refrigeration of the retort; this inconvenience has been obviated, by inſerting a ſtraight tube into the necks of the firſt and the ſecond bottles, to ſuch a depth, that its lower end is plunged into the water, while its other end riſes ſeveral inches above the neck of the bottle. It may eaſily be conceived, as a conſequence of this diſpoſition, that when the dilated vapours of the receiver and retort are condenſed by cooling, the external air will ruſh through theſe tubes to eſtabliſh the equilibrium; and the water cannot paſs from the one to the other. Before the invention of this apparatus, it was uſual to drill a hole in the receiver, which was kept cloſed, and only opened from time to time for the eſcape of the vapours. But this method was inconvenient in many reſpects. In the firſt place, in ſpite of all precautions, it was attended with the riſk of an exploſion every moment, by the irregular diſengagement of the vapours, and the impoſſibility of calculating the quantity produced in a given time. A ſecond

inconvenience was, that the vapours which thus efcaped occafioned a confiderable lofs in the product, and even weakened the remainder; becaufe this volatile principle confifted of the ftrongeft part. A third inconvenience was, that the vapours which efcaped incommoded the artift to a very great degree.

It is therefore evident that the apparatus of Woulfe unites a number of advantages; fuch, for inftance, as economy in the proceffes, fuperiority in the product, and fafety to the operator; and the inventor is unqueftionably entitled to the beft acknowledgments of the cultivators of chemical fcience.

It is alfo neceffary that a laboratory fhould be provided with balances of the utmoft accuracy and exactnefs; for the chemift, who very frequently operates only upon fmall quantities, ought to be able, by the ftrictnefs of his operations, and the accuracy of his apparatus, to produce refults comparable with thofe of works in the large way. It frequently happens that the fimple effay of a fpecimen of an ore determines the opening of a mine: and it fcarcely need be pointed out, of how great confequence it is to remove every caufe of error from the operations of chemiftry; fince the flighteft error in the works of the laboratory may be attended with the moft unhappy confequences, when the application of the principles is made to works in a more extenfive way.

The blow-pipe is alfo a very ufeful inftrument in performing chemical operations; it confifts merely of a brafs pipe about one-eighth of an inch diameter at one end, the other tapering to a much lefs fize, with a very fmall perforation for the wind to efcape. See Blow-pipe.

Other veffels and chemical apparatus will be treated of in proportion as we fhall have occafion to make ufe of them; as it is evident that, by thus connecting their defcription with their ufe, we fhall fucceed better in rendering them intelligible to the reader, while by fuch a method his memory will be lefs fatigued and confufed. See Plate 72.

PART II.

Sect. I. *Of Aëriform Fluids or Gafes.*

FROM the variety of facts and experiments which have been already detailed, it is evident that caloric, in its combination with bodies, is capable of volatilizing many of them, and of reducing them to the aëriform ftate. The permanence in this ftate in the temperature of the atmofphere, conftitutes aëriform fluids or gafes. It is neceffary therefore, in order to reduce a fubftance to the ftate of gas, to diffolve it in caloric. This fubftance combines with various bodies, with greater or lefs facility; and there are feveral which, at the temperature of the atmofphere, are conftantly in the ftate of gas: there are others likewife which pafs to this ftate at fome degrees higher, and thefe are called volatile or evaporable fubftances. They differ from fixed fubftances, becaufe thefe laft are not volatilized but by the application and combination of a large portion of caloric. It is clear, then, that all bodies do not indifcriminately require the fame quantity of caloric to affume the gafeous ftate; and it will be found that the proportion may be deduced from the fixation and concretion of thefe gafeous fubftances. In order to reduce any fubftance to the ftate of gas, the application of caloric may be made in different ways. The moft fimple method confifts in placing the body in contact with another body which is heated. In this fituation, the heat on one hand diminifhes the affinity of aggregation or compofition, by feparating the conftituent principles to a greater diftance from each other; and on the other hand, the heat unites to the principles with which it has the ftrongeft affinity, and volatilizes them. This procefs is according to the method of fimple affinities; for in fact it confifts of the exhibition of a third body, which, prefented to a compound of feveral principles, combines with one of them, and carries it off. The method of double affinity may likewife be ufed to convert any fubftance into the gafeous form; and this is what happens when we caufe one body to act upon another to produce a combination, in which a difengagement of fome gafeous principles takes place. If, for example, the fulphuric acid be poured upon the oxide of manganefe, the acid combines with the metal, while its caloric feizes the oxigene, and rifes with it. This circumftance takes place not only in this inftance, but on all other occafions wherein, an operation being performed without the application of heat, there is a production of vapour or gas. The various ftates under which bodies prefent themfelves to our eyes, depend almoft entirely upon the different degrees of combination of caloric with thofe fame bodies. Fluids do not differ from folids, but becaufe they conftantly poffefs, at the temperature of the atmofphere, that quantity of caloric which is requifite to maintain them in that ftate; they congeal and pafs to the concrete ftate with greater or lefs facility, accordingly as the requifite quantity of caloric is more or lefs in proportion. In refpect to folid bodies, they are all capable of paffing to the gafeous ftate; and the only difference which exifts between them in this refpect is, that a quantity of caloric is required for this purpofe, which is governed by the following circumftances: by the affinity of aggregation, which connects their principles, retains them, and oppofes itfelf to a new combination; by the weight of the conftituent parts, which renders their volatilization more or lefs difficult; and by the agreement and attraction between the caloric and the folid body, which is more or lefs ftrong or powerful.

It is likewife obfervable, that all bodies, whether folid or liquid, when they come to be volatilized by heat, appear in two ftates, either that of vapour, or of gas. In the firft cafe, thefe fubftances lofe, in a fhort time, the caloric which raifed them, and again appear in their original form the moment the caloric finds colder bodies to combine with; but it is feldom that bodies thus divided refume their original confiftence. This ftate is that of vapour. In the fecond inftance, the combination of caloric with the volatilized fubftance is fuch, that the ordinary temperature of the atmofphere is infufficient to overcome the union. This is the ftate which conftitutes the gafes, or aëriform fluids. When the combination of caloric with any fubftance is fuch that a gas is produced, thefe invifible fubftances may be managed at pleafure, by the affiftance of apparatus which have lately been appropriated to thefe ufes. Thefe are known by the name of *Pneumato-chemical, Hydro-pneumatic apparatus*, &c. (See Plates *in Lavoifier's Elem. Chem. tranflated by Kerr.)* The pneumato-chemical apparatus, which is generally employed, confifts of a wooden veffel, ufually of a fquare form, and lined with lead or tin: two or three inches beneath the upper edge there is formed a groove, in which a wooden plank flides, having a hole in the middle, and a notch in one of its fides; the hole is made in the center of an excavation formed in the fhelf, of the figure of a funnel. This veffel is filled with water or mercury, according to the nature of the gafes to be operated upon. There are fome which eafily combine with water, and therefore require to be received over mercury. It is very well known that gafes may be extracted in various ways. When they are difengaged by fire, a recurved tube is adapted to the neck of the retort, one extremity of which is plunged in the water or the mercury of the pneumato-chemical veffel, and opens beneath the aperture in the fhelf, which is in the form of a funnel. The junction of the tube with the neck of the retort is

secured with the usual lute; a vessel filled with the liquid of the cistern is inverted upon the shelf over the aperture. When the gas is disengaged from the materials in the retort, it appears in the form of bubbles, which rise, and gain the superior part of the inverted vessel. When all the water is displaced, and the bottle is full of gas, it is withdrawn, by adapting a glass plate to its orifice to prevent its dissipation: it may then be poured from one vessel to another, and subjected to a variety of experiments, in order to ascertain its particular nature and properties. But when the gases are disengaged by means of acids, the mixture which is designed to afford them is put into a bottle with a recurved tube fitted to its neck; and this tube is plunged in the cistern in such a manner, that the bubbles of gas may pass, as in the former experiment, through the aperture of the funnel in the shelf of the vessel.

The processes which are employed at present to extract the gases, and to analyse them, are simple and convenient; circumstances which have highly contributed to the acquisition of the knowledge of aëriform substances.

Sect. II. *Of Hydrogenous Gas, or Inflammable Air.*

This air is one of the constituent parts of water; a circumstance which has entitled it to the denomination of hydrogenous gas or air. Its property of burning with vital air has also caused it to be distinguished by the name of *inflammable air*. This kind of gas has been procured long since; the famous philosophical candle attests the antiquity of the discovery; and the celebrated Hales obtained from most vegetables an air which took fire. It may be extracted from all bodies in which it is a constituent part; but the purest is that afforded by the decomposition of water, and it is this fluid which usually affords it in our laboratories. For this purpose the sulphuric acid is poured upon iron, or zinc; the water, which serves as a vehicle for the acid, is decomposed on the metal; its oxigene combines with it, while the hydrogenous gas escapes. This explanation, however contrary to the ancient notion, is not the less a demonstrated truth; in fact, the metal exists in the state of an oxide in its solution by the sulphuric acid, as may be proved by precipitating it with pure vegetable alkali: on the other hand, the acid itself is not at all decomposed; so that the oxigene gas cannot have been afforded to the iron but by the water. Water may be decomposed likewise still more directly by throwing it upon iron strongly heated; and hydrogenous gas may be obtained by causing water to pass through a tube of iron ignited to a white heat. This gas may also be extracted by the simple distillation of vegetables. It is likewise produced by vegetable fermentation, and animal putrefaction. The properties of hydrogenous gas are the following: it has a disagreeable, stinking odour. But Mr. Kirwan has observed, that when it is extracted over mercury, it has scarcely any smell. It contains half its weight of water, and loses its smell the moment it is deprived of this additional substance. He has likewise observed, that the volume of this gas is one-eighth larger when received over water than when received over mercury. These observations seem to prove, that the offensive smell of this gas arises only from the water which it holds in solution.

This kind of gas is not proper for respiration. It has been asserted by the abbé Fontana that he could not take more than three inspirations of this air, and the count Morrozo has proved that animals perish in it in a quarter of a minute. But on the contrary, several northern chemists have affirmed, in consequence of experiments made on themselves, that hydrogenous gas might be respired without danger; and the unfortunate Pilatre de Rozier, some years since, filled his lungs with it at Paris, and set it on fire during the expiration, which formed a very curious jet of flame. When he was informed that the abbé Fontana had objected to the accuracy of the Swedish chemists, he answered, by mixing one-ninth of atmospherical air with very pure hydrogenous gas, and respiring the mixture as usual: however, when he attempted to set it on fire, the consequence was a sudden and dreadful explosion. This opposition of opinions, and contradiction of experiments, respecting a phenomenon which seemed capable of unanswerable decision by one single trial, induced professor Chaptal to have recourse to experiments to fix his own ideas on this curious subject.

He found that birds, successively placed in a vessel of hydrogenous gas, died, without producing the smallest perceptible change upon the gas itself. Frogs placed in forty inches of hydrogenous gas died in the space of three hours and a half: while others lived fifty-five hours in oxigenous gas and atmospheric air; and when he took them out still living, the air was neither vitiated nor diminished. Numerous experiments which he made upon these animals, have led him to observe that they have the faculty of stopping their respiration, when placed in any noxious gas, to such a degree, that they inspire only once or twice, and afterwards suspend every function on the part of the respiratory organ. He has also since found that these animals are not reduced into a putrid mass by remaining in hydrogenous gas, as has been affirmed. The fact which may have imposed on those chemists who related the circumstance, is, that frogs are often enveloped in a mucus or sanies, which appears to cover them; but they exhibit the same phenomenon in all the gases. This excellent philosopher and chemist, after having tried the hydrogenous gas upon animals, determined to respire it himself; and he found that the same volume of this air might be several times respired without any danger. But he observed that the gas was not changed by these operations; whence he concluded that it is not respirable: for, if it were, it would suffer a change in the lungs, the object of respiration not being confined to the reception and emission of a fluid merely; it is a function much more noble, more interesting, and more intimately connected with the animal economy.

He thinks that we ought to consider the lungs as an organ which is nourished by the air, that digests that which is presented to it, retains the beneficial, and rejects the noxious part. Since therefore inflammable air can be respired several successive times without danger to the individual, and without any alteration or change in itself, it may be concluded indeed that it is not a poison, but it cannot be considered as an air essentially proper to respiration.

It has been found that hydrogenous gas is not combustible alone; that it does not burn but by the concurrence of oxigene: If a vessel filled with this gas be reversed, and a lighted taper be presented to it, the hydrogenous gas is found to burn at the surface of the vessel; but the candle is extinguished the moment it is plunged lower. The most inflammable bodies, such as phosphorus, do not burn in an atmosphere of this kind of gas. It is well known that hydrogenous gas is lighter than common air. One cubic foot of atmospheric air weighs seven hundred and twenty grains; a cubic foot of hydrogenous gas weighs seventy-two grains. The barometer being at 29′ 9, and the thermometer 60° Fahrenheit, Mr. Kirwan found the weight of this air to be to that of common air as eighty-four, to one thousand; consequently it was about twelve times as light. Its specific gravity varies very much, because it is difficult to obtain it constantly of the same degree of purity. That which is extracted from vegetables contains the carbonic acid and oil, which increase its weight. The levity of hydrogenous gas has caused certain philosophers to presume that it ought to arrive at and occupy the superior part of our atmosphere; and upon this supposition the most brilliant conjectures have been made respecting the influence which a stratum of this gas, predominating over the rest of the atmosphere, ought to produce in meteorology. They do not seem, however, to have been aware

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that this continual lofs of matter is not agreeable to the wife œconomy of nature. They did not obferve that this gas, during its afcent in the air, combines with other bodies, more efpecially the oxigene, and that water and other products are the refult; the knowledge of which muft neceffarily lead to that of moft meteors. The theory of balloons, or aëroftatic machines, is founded on this levity of the hydrogenous gas, or inflammatory air. See AEROSTATION.

This gas exhibits various characters, according to its degree of purity, and the nature of the fubftances which are mixed with it. It feldom happens that it can be produced pure. That which is afforded by vegetables contains oil and the carbonic acid. The inflammable air of marfhes is mixed with a greater or lefs quantity of carbonic acid; and that which is afforded by the decompofition of pyrites fometimes holds fulphur in folution. The colour of hydrogene, when fet on fire, varies according to its mixtures. One-third of the air of the lungs, mixed with the inflammable air of pit-coal, affords a flame of a blue colour; inflammable air, mixed nitrous air, affords a green colour; the vapour of ether affords a white flame. The various mixtures of thefe gafes, and the degree of compreffion to which they are fubjected, when expreffed out of an aperture in order to burn them, have, in the hands of certain operators, afforded very agreeable illuminations, well deferving the attention of the learned and curious.

This kind of gas poffeffes the property of diffolving fulphur; but in this cafe it contracts a ftinking fmell, and forms hepatic gas. Mr. Gengembre put fulphur into inverted veffels filled with hydrogenous gas, and diffolved it by means of the burning-glafs. The hydrogenous gas, by this treatment, obtained all the characteriftic properties of hepatic gas. The formation of this gas is almoft always an effect of the decompofition of water; for, in fact, the alkaline fulphures, or livers of fulphur, do not emit any difagreeable fmell while they are dry; but the moment they are moiftened, an abominable fmell is perceived, and the fulphate of pot-afh, or vitriolated tartar, begins to be formed. Thefe phenomena prove that the water is decompofed; that one of its principles unites to the fulphur, and volatilizes it: while the other combines with the alkali, and forms a more fixed product.

We can obtain fulphurated hydrogenous gas by diffolving the fulphures or hepars by acids; and thofe acids in which the oxigene is moft adherent difengage the greatcft quantity. The muriatic acid produces twice as much as the fulphuric; and that which is produced by this laft, burns with a blue flame; but that which is difengaged by the muriatic acid, burns with a yellowifh white flame. Scheele has taught us the means of obtaining this gas in great abundance, by decompofing artificial pyrites, formed by three parts of iron and one of fulphur, to which *fpirit of vitriol* is added. The natural decompofition of pyrites in the bowels of the earth alfo produces this gas, which efcapes with certain waters, and communicates virtues of a particular kind to them.

It may be obferved in concluding this account, that the moft general properties of thefe gafes are: their rendering the white metals black; their being improper for refpiration; their imparting a green colour to fyrup of violets; their burning with a light blue flame, and depofiting fulphur by this combuftion; their mixing with the oxigenous gas of atmofpheric air, and forming water; at the fame time that the fulphur, before held in folution, falls down: it is from this circumftance that fulphur is found in the channels of hepatic waters, though their analyfis does not fhew the exiftence of an atom of that fubftance held in folution; their impregnating water, and being fparingly foluble in that fluid; while heat or agitation is capable of diffipating them again. It is obvious alfo that the air which burns at the furface of certain fprings, and forms what is known by the name of *burning fprings*, confifts of hydrogenous gas holding phofphorus in folution. This gas has the fmell of putrid fifh. Several fprings of this kind have been lately difcovered. The *ignes fatui* which glide along burying-grounds, and other places, are alfo phenomena of this nature.

SECT. III. *Of Oxigenous Gas, or Vital Air.*

THE difcovery of this aëriform or gafeous fubftance was made by the ingenious Doctor Prieftley, in Auguft 1774. Since that period different means have been devifed for obtaining it from various fubftances; and its properties have fhewn that it is a production of the moft interefting nature in the knowledge of chemiftry. No part of the atmofphere exhibits vital air in its greateft degree of purity. It is always combined, mixed, or altered by other fubftances. This air, which is the moft general agent in the operations of nature, exifts in combination with various fubftances; and it is by their decompofition that it may be extracted and procured. A metal expofed to the air becomes changed; and thefe changes are produced only by the combination of the pure air with the metal itfelf. Simple diftillation of fome of thefe metals thus changed, or oxides, is fufficient to difengage this vital air; and it is then obtained in a very pure ftate, by receiving it in the hydropneumatic apparatus. One ounce of red precipitate affords about a pint of this air.

It is now pretty well known that all acids have vital air for their bafe, and that there are fome of them which yield it eafily. The diftillation of nitre decompofes the nitric acid, when about twelve hundred cubic inches of oxigenous gas are obtained from every pound of the falt. The nitric acid, when diftilled from various fubftances, is decompofed, and its conftituent parts can be obtained in a feparate ftate. It was difcovered by Doctor Prieftley, Doctor Ingenhoufz, and Mr. Sennebier nearly about the fame time, that vegetables when expofed to the light of the fun emit vital air; and it has been fince found that the emiffion of this air is in proportion to the vigour of the plant, and the vivacity of the light which is thrown upon it, and that the direct emiffion of the rays of the fun is not neceffary to produce this aëriform or gafeous dew; it is fufficient that the plant be well *enlightened*, in order that it may tranfpire pure air. M. Chaptal has collected the air in abundance from a kind of mofs which covered the bottom of a veffel filled with water, and which was fo well defended that the fun never fhone directly upon it. In order to procure the vital air which is difengaged from plants, it is fufficient to enclofe them beneath a glafs veffel filled with water, and inverted over a tube filled with the fame fluid. The moment the plant is acted on by the fun, fmall bubbles of air are formed on its leaves, which detaching themfelves rife to the upper part of the veffel, and difplace the liquid. This dew of vital air is a beneficial gift of nature, to repair inceffantly the confumption of vital air; for plants abforb atmofpherical mephitis, and emit vital air, while man, on the contrary, is kept alive by vital air, and emits much mephitis. It appears therefore that the animal and vegetable kingdoms labour for each other; and that by this admirable reciprocity of fervices the atmofphere is continually repaired, and an equilibrium maintained between the conftituent principles by which it is formed. It is neceffary to obferve, however, that the influence of folar light is not confined to the production of vital air by its action upon vegetables alone; but that it has alfo the fingular property of decompofing certain fubftances, and difengaging this air or gas. If a bottle of oxigenated muriatic acid be expofed to the fun, it fuffers all the fuperabundant oxigene which it contained to efcape, and paffes to the ftate of ordinary muriatic acid. But the fame acid, expofed to the fun in a bottle wrapped in

black paper, does not suffer any change; and, when heated in a dark place, is even reducible into gas without decomposition. The nitric acid likewise affords oxigenous gas, when exposed to the sun; whereas heat alone volatilizes it without affording any decomposition. The muriate, or marine salt of silver, placed under water, and exposed to the sun, suffers oxigenous gas to escape from it; and Mr. Chaptal has observed that red precipitate affords oxigene in similar cases, and that it becomes black in no very long space of time. Oxigenous gas may likewise be obtained by disengaging it from its bases by means of the sulphuric acid. The process to which the above ingenious chemist gives a preference, on account of its simplicity, is the following: He takes a small apothecary's phial, into which he puts one or two ounces of manganese, and pours thereon a sufficient quantity of sulphuric acid to form a liquid paste. He afterwards fits a cork to the opening of the bottle, with a hole through it, into which is inserted a recurved tube; one of whose extremities enters the bottle, while the other is placed under the shelf of the pneumato-chemical apparatus. When the apparatus is thus disposed, he presents a small coal to the lower part of the bottle, and oxigenous gas is very soon disengaged. The manganese which was employed in these experiments was discovered by Mr. Chaptal at St. Jean de Gardennenque. It yields its oxigene with such facility, that nothing more is necessary for this purpose than to incorporate it with the sulphuric acid. This gas is not perceptibly mixed with nitrigenous gas (or phlogisticated air); and the first bubble is as pure as those that are produced at last.

It is a fact pretty well known that oxigenous gas exhibits certain properties, according to its degrees of purity; and that these depend in general upon the substances which afford it. That which is obtained from the mercurial oxides almost always holds a small quantity of mercury in solution. It has been observed, by the chemist whom we have just mentioned, to have produced a speedy salivation on two persons who used it for disorders of the lungs. In consequence of which he filled bottles with this gas and exposed them to an intense cold, when the sides became obscured with a stratum of mercurial oxide, in a state of extreme division. He also several times heated the bath, over which this gas was caused to pass; and obtained, at two different times, a yellow precipitate in the bottle in which he had received the gas. This gas when extracted from plants is not equally pure with that afforded by the metallic oxides; but from whatever substances it is obtained, its general properties are the following: it is more ponderous than the air of the atmosphere; the cubic foot of atmospherical air only weighing seven hundred and twenty grains, while the cubic foot of pure air weighs seven hundred and sixty-five. According to the observations of Mr. Kirwan, its weight is to that of common air as eleven hundred and three to one thousand. One hundred and sixteen inches of this air weighed 39.09 grains; one hundred and sixteen inches of common air weighed 35.38 grains at the temperature of fifty-five degrees of Fahrenheit, and twenty-eight inches of pressure. One hundred parts of common air weighed forty-six, and one hundred parts of vital air fifty grains.

This air or gas is the only fluid proper for combustion; and this acknowledged truth caused the celebrated Scheele to give it the name of *Air of Fire*.

As the modern doctrine of combustion is of considerable importance in the science of chemistry, it may not be improper to give some account of its introduction. It is in this place however exceedingly difficult to give a good definition of combustion; for it is not one, but a number of phenomena which combustible bodies offer to our observation, when they are heated and exposed to the action of the air. The chief of them are heat, motion, flame, redness, and the change of the nature of the substance that is burnt. There are many varieties among combustible bodies; for some of them burn briskly, and afford a brilliant flame, such as oils, wood, resinous and bituminous substances, &c.: others burn away without producing a discernible flame; as for instance many of the metals, and charcoal which has been properly prepared: others again are consumed by a slow motion, scarce observable, almost without seeming to be on fire, but always with a degree of heat;—such is the combustion of some metallic substances. Combustion, however, takes place equally in all these instances; and the body which has been once burnt in any of these ways is no longer susceptible of inflammation. The residue is always heavier than the combustible body. This may be easily proved to be the case with fixed combustible bodies. But those of which the inflammable matter is of a volatile nature burn with more rapidity than the former, and their fixed residue wants much of the original weight. From this it may perhaps be thought, that these last lose much of their weight in burning; but it is only a seeming loss they suffer; and there are no combustible bodies of which the residues are not heavier than before combustion. For what remains fixed on such occasions is not the only residue of the combustible body; a considerable part of volatile combustible bodies is converted into elastic fluids, which ascend and are diffused through the atmosphere: and were we to suppose that these leave no other residue but what appears after their combustion on the spot, or in the vessel where they were burnt, we must believe, what is impossible, that they afford no residue. Ether and spirit of wine burn away without leaving the smallest particle; but the substance into which they are converted is volatilized and diffused through the atmosphere. When means are employed to collect it, it is found to possess more gravity than the combustible body from which it was produced. For we have seen that Mr. Lavoisier, by burning sixteen ounces of highly rectified spirit of wine under a chimney adapted to the worm-pipe of a still, obtained eighteen ounces of water as the product of that combustion. Oils, resins, and many other bodies, present the same phenomenon. Thus, the cinders of burnt wood are not the whole of the residue which it affords; the rest ascends in the air: one part, not being thoroughly burnt, becomes soot; and the other mixing with the atmosphere, is condensed into water, or deposits in it some other elastic fluids. It is therefore an established truth in chemistry, that all combustible bodies acquire additional weight by being burnt. But in order to understand how this addition of weight is acquired, it is necessary to attend to another of the phenomena of combustion. This process can never take place without the help of air; it is therefore always in proportion to the purity and the quantity of that fluid. Ever since the discoveries of Boyle and Hales, philosophers have been struck with this fact, and have proposed a variety of hypotheses to explain it. By Doctor Boerhaave it was thought that air contributed to combustion by operating on the surfaces of combustible bodies, so as to separate or resolve them into their component particles; but this hypothesis did not explain why the same air could not always promote combustion. Mr. Morveau however supposed this last fact to depend on the extraordinary rarefaction of the air by heat; in consequence of which, it acquired such elasticity as to prevent the combustion of inflamed bodies by forcible compression. The fine experiments of Mr. Lavoisier on the oxidation or calcination of metals with determinate quantities of air, have however sufficiently proved, that so much air is absorbed during calcination, that the oxided or calcined metal acquires precisely that quantity of weight which the air loses during this process; and that the portion of air absorbed actually remains in the metallic oxide, as the oxides of mercury may be reduced merely by expelling that fluid. This excellent chemist was led by other facts still farther. He observed, as had

before been done by Doctor Priestley, that the air which remains after the process of calcination or combustion, can no longer serve to promote the new processes of the same kind; that it extinguishes flame, suffocates animals, and, in short, has acquired a different nature. He also found that its diminution was exactly proportioned to the quantity absorbed by the combustible body. On the contrary, air extracted from metallic oxides has been found three or four times purer than atmospheric air; and that it not only promotes combustion, but even renders it much more rapid. A given quantity of the former will serve for the inflammation and total combustion of three or four times that quantity of matter which may be consumed by the help of the same portion of the latter. From thus observing that air is absolutely necessary to combustion, and that part of the air necessary to the calcination of metals remains in the calces, this philosopher was at first led to think, that combustion consisted in the absorption of pure air by the combustible body. Abstracting the water and vapours contained in atmospheric air, he considered the substance that remained as a compound of two very different elastic fluids. One of these, which is the only genuine air, and which promotes combustion by precipitating itself into the combustible body, and uniting with it, is *vital air*. It generally composes a fourth part of the atmosphere, and sometimes even a third part, when it is in its purest state. The other fluid is deleterious to animals, and extinguishes flame; and it constitutes three-fourths or two-thirds of the atmosphere: it was at first denominated *mephitic air*. When a combustible body is exposed to the air and kindled, a portion of the vital air in the atmosphere becomes fixed in that body, and its combustion continues till it has absorbed all the vital air immediately around it. The residue of the air, after it has lost this pure vital part, can no longer contribute to combustion; but it acquires this power on being again qualified with a due quantity of pure air extracted from nitre or a metallic oxide. Mr. Lavoisier proposed this elegant theory in 1776-7, which seemed to explain all the phenomena of combustion; it accounted for the additional weight acquired by metallic oxides or calces, and the extinction of flame by air that has been already employed in combustion. However, after prosecuting his experiments on this subject still further, this ingenious chemist has thought proper to modify and enlarge it by new observations. The bright flame which is observed on immersing a burning body in vital air, or on pouring that fluid on the surface of a flaming substance (which may be done by means of an ingenious machine of his invention), made him desirous of knowing whence it proceeded, and whether, according to the theory of Stahl, it were owing to the disengagement of phlogiston. He inquired into this with the more attention, because the celebrated Macquer had still persisted, notwithstanding *his* discoveries, in maintaining the phlogistic theory, and had laboured to reconcile *his* theory with that of the father of philosophical chemistry. Macquer was of opinion, that pure air became fixed in combustible bodies in consequence of their phlogiston being disengaged; and that pure air and phlogiston were reciprocally precipitated; the one from the atmosphere into the combustible body, the other from that body into the atmosphere: in every process of combustion pure air extricated phlogiston into a state of liberty, and assumed its place; and in the reduction of metals, phlogiston disengaged pure air, and occupied the room which it had formerly possessed. Mr. Lavoisier however, from remarking that the bright sparkling flame before mentioned, which affords the strongest indication of the presence of light or the matter of fire in a state of activity, seems rather to surround the exterior part of the body in combustion, than to proceed as if it were disengaged from it,—has been led to think that light and heat are separated from vital air, in proportion as it is absorbed by the body in combustion; and that vital air, like all other aëriform fluids, is a compound, consisting of a certain principle susceptible of solidity, and of fire or the matter of heat; that to its possessing the latter it owes its state of elastic fluidity; and that, being decomposed in combustion, its fixed, solid principle, by entering into combination with the combustible body, increases its weight and changes its nature; while the caloric or matter of fire that it contains is disengaged under the form of light and heat. It seems therefore, that the modern doctrine of combustion has bestowed on vital air what Stahl attributed to phlogiston. If combustion consist in the disengagement of fire, it is air, not the combustible body, which burns. With respect to the principle which, in combination with the matter of fire, constitutes pure or vital air, Mr. Lavoisier, though perhaps not perfectly acquainted with its nature, yet as it is known to form acids by entering into combination with combustible substances, has conferred on it the name of the *oxigenous* principle.

But in order to put the nature of this air or gas in a still more clear point of view, it may be necessary to lay down the four following principles, as incontestable results of all the known facts, on this subject:

1. That combustion never takes place without vital air, or oxigenous gas. 2. That in every combustion there is an absorption of vital air, or oxigenous gas. 3. That there is an augmentation of weight in the products of combustion equal to the weight of the vital air or gas absorbed; and 4. That in all cases of combustion there is a disengagement of heat and light. It cannot be doubted that the first of those propositions is a strict truth; as hydrogenous gas does not burn alone, without the assistance of oxigene; and as all combustion ceases the moment that oxigenous gas is taken away, or is by any means wanting. The second principle also contains a truth no less obvious or general. For if certain bodies, such as phosphorus, sulphur, &c. be burned in very pure oxigenous gas, it is absorbed to the last particle; and when the combustion is effected in a mixture of different airs or gases, the oxigene alone is absorbed, and the others continue unaltered. In the slower combustions, likewise, such as the rancidity of oils, and the oxidation of metals, there is equally an absorption of oxigene, as may satisfactorily be shewn by confining these bodies in a determinate mass or quantity of air.

Although the third principle be equally certain with the preceding, it probably requires more explanation; for this purpose it may therefore be necessary to distinguish those combustions whose result, residue, and product are fixed, from those which afford volatile and fugacious substances. In the first case the oxigenous gas quietly combines with the body; and by weighing the same body the moment the combustion has completely taken place, it is easily ascertained whether the increase in weight be proportioned to the oxigene absorbed. This happens in all the cases wherein the metals are oxided, or oils rendered rancid; and in the production of certain acids, such as the phosphoric, the sulphuric, &c. In the second case, it is more difficult to weigh all the results of the combustion, and consequently to ascertain whether the augmentation in weight be proportioned to the quantity of the air absorbed. Nevertheless, if the combustion be made in inverted vessels, and the whole of the products be collected, it will be found that their augmentation in weight is strictly equal to that of the air, which has been taken up or absorbed during the time of the combustion.

With respect to the fourth principle, it is that, the applications of which are the most interesting to be known and perfectly understood. In most combustions, the oxigenous gas becomes fixed and concrete. It therefore abandons the caloric which maintained it in the aëriform state; and this caloric be-

ing set at liberty, produces heat, and endeavours to combine itself with the substances nearest at hand, or which surround it. The disengagement of heat is therefore a constant effect in all the cases wherein vital air is fixed in bodies; and it follows, from this principle, that heat is most eminently resident in the oxigenous gas which maintains combustion; that the more oxigene is absorbed in a given time, the stronger will be the heat; that the only method of producing a violent heat consists in burning bodies in the purest air; that fire and heat must be more intense in proportion as the air is more condensed; and, that currents of air are necessary to maintain and expedite combustion. It is upon this principle that the theory of the effects of the cylinder lamps is founded: the current of air, which is renewed through the tube, supplies fresh air every instant; and by continually applying a new quantity of oxigenous gas to the flame, a heat is produced sufficient to ignite and destroy the smoke. It is likewise on the same principle that we explain the great difference that exists between heat produced by a slow combustion, and that which is afforded by a rapid combustion. In the latter case the same quantity of heat and light is produced in a second, which might have been produced in the other case in a much longer time. The phenomena of combustion, by means of oxigenous gas, depend likewise upon the same laws. Professor Lichtenberger, of Gottingen, soldered the blade of a knife to a watch spring by means of oxigenous gas; and Mr. Lavoisier and Erhmann have subjected almost all the known bodies to the action of fire maintained by oxigenous gas alone; and have produced effects which the burning-glass could not have effected.

Doctor Ingenhousz has shown, that if an iron wire be bent into a spiral form, and any combustible substance whatever be fixed to one of its ends, and set on fire, the wire will itself be fused by plunging it into oxigenous gas. Mr. Forster, of Gottingen, also found that the light of glow-worms was so beautiful and bright in oxigenous gas, that one single insect was sufficient to afford light to read a work, printed in a very small type.

It may be proper also to distinguish three states in the very act of combustion—*ignition*, *inflammation*, and *detonation*.

Ignition takes place when the combustible body is not in the aëriform state, nor susceptible of assuming that state by the simple heat of combustion. This is evident when charcoal which has been well prepared is burned.

Inflammation is produced when the combustible body is presented to oxigenous gas, in the form of vapour or gas: the result is flame; and the flame is more considerable, in proportion as the combustible body is more volatile. The flame of a candle is only kept up by the volatilization of the wax, or tallow, which is continually effected by the heat of the combustion, or burning.

Detonation is a speedy and rapid inflammation, which occasions a noise by the instantaneous formation of a vacuum. Most detonations are produced by the mixture of hydrogenous gas, as has been proved some time ago by Mr. Chaptal. It has also been since demonstrated, that the product of the rapid combustion of these two gases is water. Very strong detonations may be produced by burning a mixture of one part of oxigenous gas with two of hydrogene; and the effect may be rendered still more terrible, by causing the mixture to pass through soap-water, and setting fire to the bubbles which are collected on the surface of the fluid. Chemistry presents several cases in which the detonation arises from the sudden formation of some gaseous substances, such as that which is produced by the inflammation of gunpowder; for in this case there is a sudden production of carbonic acid, of nitrogene gas, &c. The production or instantaneous creation of any gas whatever, must occasion a shock or agitation in the atmosphere, which necessarily produces an explosion; the effect of these explosions increases, and becomes stronger, from the opposition of any obstacles to the escape of the gas or air.

It is also a fact at present very well ascertained, that oxigenous gas is the only gas proper for respiration; and it is this most valuable property which has intitled it to the name of vital air. See Respiration.

Sect. IV. *Of Azotic or Nitrogene Gas.*

That air which has served the purposes of combustion and respiration is no longer proper for those uses, is a fact that has been long ascertained; and the air thus corrupted has been distinguished by the names of *Phlogisticated Air*, *Mephitised Air*, *Atmospherical Mephitis*, &c. But in the new nomenclature of Chemistry it is denominated *Azotic Gas*; and Mr. Chaptal has given it the name of *Nitrogine Gas*, which is probably still more proper.

This gas, which is the residue of combustion or respiration, is always mixed with a small quantity of vital air and carbonic acid, which must be removed in order to have the azotic or nitrogene gas in a state of purity. There are several methods which may be used to obtain this gas, in a very pure state. It has been proposed by Mr. Scheele to obtain this air by exposing sulphure of alkali, or liver of sulphur, in a vessel filled with atmospherical air, as the vital air on being completely absorbed leaves the nitrogene gas pure. By exposing, in atmospheric air over mercury, a mixture of iron and sulphur, kneaded together with water, Mr. Kirwan obtained azotic or nitrogene gas so pure, that it suffered no diminution by nitrous gas. He deprived it of all humidity, by successively introducing dried blotting-paper into the vessel which contained it. Care must be taken to withdraw this air in time from the paste which affords it; otherwise it will be mixed with hydrogene or inflammable gas, which is afterwards disengaged. When by any means, such as the oxidation of metals, the rancidity of oils, the combustion of phosphorus, &c. the vital air of the atmosphere is absorbed, the residue is azotic or nitrogene gas. All these processes afford methods of greater or less accuracy for the determination of the proportions of vital air and azotic or nitrogene gas in the composition of the atmosphere.

It has also been found that this mephitis can be procured by treating muscular flesh, or the well-washed fibrous part of blood, with nitric acid in a proper machine or apparatus. But it must be carefully observed that these animal matters ought to be fresh; for, if they have begun to be changed by the putrid fermentation, they afford carbonic acid mixed with hydrogene gas. This gas has been found to be improper for respiration and combustion; but plants can live and vegetate freely in it; and it mixes with the other airs, without combining with them; but is lighter than the atmospheric air. The barometer standing at 30.46, and Fahrenheit's thermometer at 60: the weight of nitrogene gas has been determined to be to that of common air as nine hundred and eighty-five to one thousand. When mixed with vital air, in the proportion of 72 to 28, it constitutes our atmosphere. The other principles which analysis has demonstrated in the atmosphere, are only accidental, and by no means essential to it. But in order to give a more perfect idea of the nature of azotic or nitrogene gas, it may be necessary to mention a few of its properties. From its being somewhat lighter than common air, it occupies the upper part of rooms in which the air has been altered by combustion or respiration. But though so noxious to animals in the state of elastic fluidity, the azotic principle, its base, is one of the component principles of animal bodies; from which it may be extracted in great abundance. It is likewise one of the constituent parts of ammoniac or volatile alkali, and of the nitric acid. It appears to be absorbed by vegetables,

and perhaps alſo by animals. It is highly probable too that the ſame principle enters into the compoſition of all alkaline bodies, and may be conſidered as a genuine *alkaligenous* principle, in oppoſition to the baſe of vital air, to which the name of the *oxigenous* principle has been given.

Sect. V. *Of Atmoſpherical Air.*

A very ſlight knowledge of Chemiſtry will inform us that the gaſeous ſubſtances which have been treated of ſeldom exiſt alone and inſulated; but that nature preſents them every where to our obſervation in a ſtate of mixture or of combination. In the firſt caſe theſe gaſes preſerve the aeriform ſtate; in the ſecond they for the moſt part form fixed and ſolid bodies. Nature, in her ſeveral decompoſitions, reduces almoſt all the principles of bodies into gas; and theſe new ſubſtances unite together, combine, and from thence reſult compounds of conſiderable ſimplicity in their principles, but which become complicated by ſubſequent mixtures and combinations. The mixture of about ſeventy-two parts of azotic or nitrogene gas, and twenty-eight of oxigene, forms the fluid maſs in which we live. Theſe two principles are ſo well mixed, and each of them is ſo neceſſary to the ſupport of the various functions of individuals which live or vegetate upon the globe, that they have not yet been found ſeparate and diſtinct from one another. But the proportion of theſe two gaſes is ſubject to variation in the mixture which forms the atmoſphere: this difference however depends only upon local cauſes; and the moſt general proportion is that which has been mentioned above. The properties which form the characteriſtic of vital air are modified by thoſe of azotic or nitrogene gas, and theſe modifications would ſeem to be eſſentially neceſſary; for if vital air in its ſtate of purity were to be conſtantly reſpired, it would quickly conſume and deſtroy life; this pure air is therefore no more ſuitable to our exiſtence than diſtilled water. Nature ſeems not to have deſigned us for the uſe of theſe principles in their greateſt degree of perfection. It is well known that the atmoſpherical air is elevated ſeveral leagues above our heads, and that it fills the deepeſt ſubterraneous cavities. It is inviſible, inſipid, inodorous, ponderous, elaſtic, &c. This was the only gaſeous ſubſtance known before the preſent æra of chemical ſcience; for the infinite gradations of all the inviſible fluids which preſented themſelves to the obſervation of philoſophers were conſtantly attributed to different modifications of this air. See Aerology.

Sect. VI. *Of the Formation of Water.*

This fluid was conſidered by the ancient chemiſts as an elementary principle: and even when the accuracy of modern experiments had compelled chemiſts to claſs it among compound ſubſtances, a degree of reſiſtance and oppoſition was made to it, which was not manifeſted when the air, the earth, and the other matters reputed to be elementary, became ſubject to ſimilar revolutions. From the moſt careful examination of the different experiments, it would ſeem, however, that the analyſis of water is equally ſtrict with that of the air." Water is decompoſed by ſeveral proceſſes; it is formed by the combination of oxigene and hydrogene; and we find that all the phenomena of nature and art conſpire to prove the ſame truth: therefore nothing more can ſurely be required to afford an abſolute certainty reſpecting the fact. It is obvious that this fluid is contained in different bodies in a greater or leſs quantity: it may therefore be conſidered in two ſtates, viz. either in a ſtate of ſimple mixture, or in a ſtate of combination. In the firſt caſe, it renders bodies humid, is perceptible to the eye, and may be diſengaged with the greateſt facility. In the ſecond, it exhibits no character; which plainly ſhews that it is in a ſtate of mixture. It exiſts in this form in cryſtals, ſalts, plants, &c. When water exiſts in a ſtate of combination in bodies, it concurs in imparting to them hardneſs and tranſparency. Salts, and moſt ſtony cryſtals, loſe their tranſparency when they are deprived of their water of cryſtallization. There are alſo ſome bodies which are indebted to water for their fixity. The acids, for example, acquire fixity only by combining with water. Under theſe various points of view, water may be conſidered as the general cement of nature. The ſtones and ſalts which are deprived of it become pulverulent; but this fluid facilitates the coagulation, re-union, and conſiſtence of the particles of ſtones, ſalts, &c. as will be ſeen in the operations performed with plaſters, lutes, mortar, &c.

When water is diſengaged from its combinations, and becomes in a ſtate of abſolute liberty, it is one of the moſt conſiderable agents in the operations of this globe. It bears a part in the formation and decompoſition of all the bodies of the mineral kingdom; it is neceſſary to vegetation, and to the free exerciſe of moſt of the functions of animal bodies; and it haſtens and facilitates the deſtruction of theſe bodies, as ſoon as they are deprived of the principle of life. Water for a certain time was thought to be a fluid earth; and the diſtillation, trituration, and putrefaction of this fluid, which always left an earthy reſidue, afforded credit to the opinion that it was converted into earth. But the experiments of Mr. Lavoiſier have ſhewn that this earth ariſes from the wear of the veſſels; and the celebrated Scheele has proved the identity of the nature of this earth with that of the glaſs veſſels in which the operations were performed. But in order to obtain more accurate ideas of a ſubſtance ſo eſſential to be underſtood, it will be neceſſary to conſider water under its three different ſtates of ſolidity, fluidity, and vapour or gas.

Of Water in the State of Ice.—This is the natural ſtate of water, whenever it is deprived of a portion of that caloric with which it is combined when it appears in the form of a liquid or gas. The converſion of this fluid into ice is attended with ſeveral phenomena which ſeldom vary. The firſt, and that which is probably the moſt extraordinary, is a ſenſible production of heat at the moment in which the water paſſes to the ſolid ſtate. The experiments of different chemiſts leave no doubt on the ſubject. If a thermometer be immerſed into freezing water, the mercury riſes ſome degrees above 32°; while in another, in the open atmoſphere of the ſame temperature, it either remains fixed at that point or ſinks below it. It appears, therefore, that part of the heat which is fixed in water in a liquid ſtate, is diſengaged and eſcapes into the atmoſphere when it aſſumes a ſolid form; and that the ſpecific heat of the ice is actually leſs than that of the water.

The external air alſo promotes the formation of ice; for water in a cloſe veſſel freezes but very ſlowly; but if expoſed to the open air, even in the ſame temperature, ice will almoſt inſtantly appear. A ſimilar phenomenon is obſerved in the cryſtallization of ſalts: many ſaline ſolutions, which in cloſe veſſels are maintained in that ſtate, will almoſt in an inſtant diſplay cryſtals, if the mouth of the veſſels be opened, and the contents expoſed to the contact of the atmoſphere.

A gentle or ſlight agitation of the fluid likewiſe facilitates the converſion of water into ice, nearly in the ſame manner as the ſlighteſt motion very frequently determines the cryſtallization of certain ſalts. This ariſes probably from the circumſtance, that by this means the caloric, which is interpoſed between the particles, and may oppoſe itſelf to the production of the phenomenon, may be expreſſed or diſengaged. In proof of this opinion, at leaſt, it is ſeen that the thermometer riſes at the very ſame inſtant: a circumſtance which Fahrenheit has obſerved.

It may be obferved, in the next place, that frozen water occupies a larger fpace than fluid water; and we are indebted to the Academy del Cimento for the proofs of this truth. In the experiments which were made by this academy, bomb-fhells, and the ftrongeft veffels, being filled with water, were burft into pieces by the congelation of this fluid. It frequently happens that the trunks of trees are fplit and divided with a loud noife, by the freezing of the fap which they contain; and fo likewife ftones are broken in pieces the moment the water with which they are impregnant paffes to a ftate of ice. Thefe effects are probably not to be afcribed to the water, but to the air which is difengaged from it during the time of its congelation.

It appears probable that the formation of ice is nothing more than a confufed cryftallization; for it has been obferved by Mr. Mairan, that when ice is formed by a flow congelation, its cryftals are in the form of needles croffing each other at angles of from 60° to 120°. Sometimes its cryftallization takes a regular and determinate form. Mr. Pelletier remarked this in a piece of fiftulous ice cryftals in the form of flat quadrangular prifms, terminating in two dihedral fummits, but with great varieties. On the contrary, when ice is fuddenly formed, and in large maffes, it becomes one irregular folid, exactly like that produced when folutions of falts are preffed clofe together and fuddenly cooled. Its folidity is fo great, that it may be reduced to powder, and carried about by the wind. In very cold climates, indeed, ice becomes fo hard that it may be hewn into pieces like ftone, and ufed in building. The elafticity of ice is alfo very great, much greater than that of water in a fluid ftate. If a piece of ice be thrown on a folid plane, it rebounds from it like any other hard body. It has, likewife, a keen, fharp tafte, nearly approaching to caufticity, and the fenfation which it gives when applied to the fkin is well known. The gravity of ice is lefs than that of the fluid on which it fwims; which feems to be occafioned by its containing a greater quantity of air in proportion to its bulk. The fame phenomenon takes place on moft of thofe bodies that admit of concretion by cold, and fufion by heat, fuch as butter, fats, wax, &c. and arifes from the fame caufe; for every fubftance is by itfelf more denfe and weighty in its folid than in a fluid ftate. The tranfparency of ice, at leaft in irregular maffes, is obfcured by air-bubbles. Any one may be convinced of this by examining a piece of ice attentively; for if the cavities be opened under water, the air which they contain will be feen to iffue in bubbles from its furface. Ice melts at fome degrees above 32°; the liquefaction proceeding gradually from the furface to the centre.

At the time when water paffes from the folid to the liquid ftate, it produces cold by the abforption of a portion of heat, as is confirmed by the fine experiments of Mr. Wilcke, of Stockholm. The production of cold, by the fufion of ice, is likewife proved by the practice of the confectioners, who fufe certain falts with ice, in order to produce a degree of cold below the freezing point. The ice formed by falt water affords frefh water when melted; and in feveral northern provinces water is faid to be concentrated by froft, in order to collect the falt it holds in folution. Mr. Chaptal has likewife obferved, that feveral metallic falts are precipitated by expofing their folutions to a temperature fufficient to freeze them. The ice which was formed in thefe cafes did not, however, poffefs the characters of the falt which had been diffolved.

Of Water in the Liquid State.—We have already obferved that the natural ftate of water is that of ice; its moft ufual ftate, however, is that of fluidity; and under this form it poffeffes certain general properties, which are very different from thofe which it has in a ftate of ice.

Some experiments which were made by the Academy del Cimento have led the philofophical world to deny the leaft elafticity to water, becaufe in thefe trials it efcaped through the pores of balls of metal ftrongly compreffed, rather than yield to preffure. But Zimmerman, and the abbé Mongez, have attempted to prove its elafticity from the very experiments upon which the contrary opinion had been formed. They found that the metal fpheres which had been filled with water for thofe experiments, continued to exude liquid drops, after being taken out of the prefs, which could not have happened if the water had not fuffered compreffion. The experiments of the ingenious Mr. Canton are alfo in proof of the fame conclufion. He inclofed water in fpherical glafs veffels, from which a narrow neck proceeded, like that of a thermometer. In thefe trials the water was found to occupy a larger fpace when the preffure of the atmofphere was removed by means of the air-pump, and a lefs fpace when a greater preffure was added by means of the condenfor. The liquid ftate renders the force of aggregation in water lefs powerful, and it enters into combination more readily when in this form. Heat is well known to dilate water into a gafeous ftate, and that the paffing from a liquid ftate to that of aëriform fluidity conftitutes ebullition. The caufe of this phenomenon is, that, part of the mafs of water having affumed the form of an elaftic fluid, the heat no longer fuffers it to remain in union with that which is ftill liquid: each bubble rifes from the bottom of the veffel, and afcends into the atmofphere, in obedience to the action of heat. The weight of the air has a remarkable influence on the ebullition of water. It oppofes its dilatation and evaporation: and in proportion as the gravity of the air is lefs or more, the refiftance which it oppofes to the volatilization of water muft be weaker or more powerful. Thus, Fahrenheit obferved, that the temperature of water in a ftate of ebullition is not always the fame. In order, therefore, to know with greater certainty the precife degree of heat at which water boils, we muft confult the barometer as well as the thermometer, and we fhall find the requifite heat always proportioned to the weight of the air. The water which flows on the furface of our globe is never pure, and rain-water is feldom exempt from fome mixture, as is evident from the fine feries of experiments of the celebrated Margraff. Profeffor Chaptal, a very ingenious chemift, has found, at Montpelier, that the rain-water in ftorms is more impure than that of a gentle fhower, and that the water which falls firft is lefs pure than the water which falls after feveral hours or feveral days rain; that the water which falls when the wind blows from the fea to the fouthward, contains fea-falt; whereas that which is produced by a northerly wind, does not contain a particle of that falt. It is of importance that the chemift fhould have very pure water for feveral delicate operations; it may, therefore, be neceffary to point out the means which are employed to carry any kind of water to this degree of purity. The principal means of purifying water is by diftillation, which is an operation performed in veffels called alembics, as we have already feen. The alembic is compofed of two pieces; a boiler or cucurbit, and a covering called the capital or head. The water is put into the cucurbit, from which it is raifed in vapours by means of fire, and thefe vapours are condenfed by cooling the head with cold water. The condenfed vapours flow into a veffel defigned to receive them, and this is called diftilled water; which is pure, becaufe it has left behind it in the cucurbit the falts and other fixed principles which rendered it impure. See Plate 72.

The operation of diftillation is more fpeedy and expeditious, as has been already obferved, in proportion as the preffure of the air is lefs upon the furface of the ftagnant fluid. Mr. Lavoifier diftilled mercury *in vacuo*; and the abbé Rochon has made a fuccefsful application of thefe principles to diftillation. It is alfo to the fame principle that we muft refer the obferva-

tions of almoſt all naturaliſts and philoſophers, who have remarked, that the ebullition in the liquid becomes more eaſy, in proportion as we aſcend a mountain from any other elevation. It was likewiſe in conſequence of theſe principles that Mr. Achard conſtructed an inſtrument to determine the heights of mountains, by the degrees of temperature of the ebullition of boiling water. It has been found by the abbé Mongez, and Mr. Lamanon, that ether evaporates with prodigious facility upon the peak of Teneriffe; and theſe obſervations have been confirmed by Mr. De Sauſſure on the mountains of Switzerland. It is evident that a true diſtillation is carried on every where at the ſurface of our globe. The heat of the ſun raiſes water in the form of vapours; theſe remain a certain time in the atmoſphere, and afterwards fall in the form of dew, by ſimple refrigeration. This riſe and fall of humidity, which ſucceed each other, waſh and purge the atmoſphere of all thoſe particles, which by their corruption or development might render it infectious; and it is probably this combination of various *miaſmata* with water which renders the evening dew ſo noxious and unwholeſome. It is alſo to a ſimilar natural diſtillation that we ought to refer the alternate tranſition of water from the liquid ſtate to that of vapour, which forms clouds, and by this means conveys the water from the ſea to the ſummits of mountains, from which it is precipitated in torrents, to return again to the common receptacle. Pure water, however, requires to be agitated, and combined with the air of the atmoſphere, in order to render it wholeſome. And hence, no doubt, it is, that water immediately produced by melting ſnow is improper for drink. The general characteriſtics of potable water are, a lively, freſh, and agreeable taſte; the property of boiling readily, and alſo that of boiling peaſe, and other pulſe, as well as the power of diſſolving ſoap without curdling.

Of Water in the State of Gas.—Water when reduced by the action of heat into the ſtate of vapour or elaſtic fluidity, acquires new properties which diſtinguiſh it from what it was under the two former modifications. There are many ſubſtances, as has been already obſerved, which are naturally in the ſtate of an aëriform fluid, at the degree of the temperature of our atmoſphere: ſuch, for example, are the carbonic acid; and the oxigenous, the hydrogenous, and the nitrogenous gaſes. There are alſo other ſubſtances that evaporate at a degree of heat very near that in which we live. Ether and alcohol are of this kind; for the former of theſe liquors paſſes to the ſtate of gas at the temperature of one hundred and eleven, and the latter at one hundred and eighty-five degrees of Fahrenheit's thermometer.

But ſome fluids require a ſtronger heat for this purpoſe; ſuch as water, the ſulphuric and nitric acids, oil, &c. In order to convert water into an aëriform fluid, De la Place and Lavoiſier filled a glaſs veſſel with mercury, and reverſed it over a diſh filled with the ſame metal. Two ounces of water were transferred beneath this veſſel; and the mercury was heated to the temperature of between ninety-five and a hundred of Reaumur, by plunging it in a boiler filled with the mother water of nitre. The included water became rarefied, and occupied the whole capacity. According to the experiments of Dr. Prieſtley and Mr. Kirwan, water was alſo found to be converted into gas, by paſſing through earthen veſſels ignited in the fire. The æolipile, the ſteam-engine, the digeſter of Papin, and the proceſs of the glaſs-blowers, who blow large globes by injecting a mouthful of water through their iron tube, likewiſe prove the converſion of water into a ſtate of vapour or gas.

It evidently follows from theſe principles, that the volatilization of water being nothing more than a direct combination of caloric with this liquid, the portions of water which are the moſt immediately expoſed to heat, muſt be the firſt volatilized; and this is daily obſerved; for it is conſtantly ſeen that ebullition begins at the part moſt heated; but that when the heat is applied equally at all parts, the ebullition becomes general.

From ſeveral circumſtances and phenomena it ſeems evident that water may be converted into air. The proceſs which the glaſs-blowers follow in making large ſpheres; the hydraulic organ of father Kircher; the phenomena of the æolipile; the experiments of Dr. Prieſtley, Mr. Kirwan, and ſeveral other chemiſts; the manner of aſſiſting combuſtion, by ſprinkling a ſmall quantity of water upon the coals; all appeared to announce the converſion of water into air. But it was far from being ſuppoſed that moſt of theſe phenomena were produced by the decompoſition of this fluid, until the genius and extenſive labours of Mr. Lavoiſier afforded a conſiderable degree of certainty and preciſion upon this important ſubject.

It had indeed been already obſerved by Mr. Macquer and De la Metherie, that the combuſtion of inflammable air produced a conſiderable quantity of water, and Mr. Cavendiſh had confirmed theſe experiments by the rapid combuſtion of inflammable and vital air. Since that period, however, it has been proved by the French chemiſts, Lavoiſier, De la Place, Monge, and Meuſnier, that the whole maſs of the water may be converted into hydrogene and oxigene; and that the combuſtion of theſe two gaſes produces a volume of water proportioned to the weight of the two principles employed in this experiment. It has been found by the experiments of theſe chemiſts, that if a ſmall glaſs veſſel be inverted over mercury, and a known quantity of diſtilled water and filings of iron be put into the upper part of this veſſel, inflammable air will be gradually diſengaged, the iron will ruſt, and the water which moiſtens it will diminiſh, and at length diſappear; the weight of the inflammable air which is produced, and the augmentation in the weight of the iron, will be equivalent to the weight of the water made uſe of. It appears therefore to be proved, that the water is reduced into two principles, the one of which is inflammable air, and the other the principle which has entered into combination with the metal. Now we know that the oxidation or calcination of metals is owing to vital air; and conſequently the two ſubſtances produced, namely the vital air and inflammable air, ariſe from the decompoſition of water. For when water is converted into the ſtate of vapour, in its paſſage through an ignited iron tube, the iron becomes oxided, and hydrogene is obtained in the ſtate of gas. The augmentation of weight in the metal, and the weight of the hydrogene obtained, form preciſely a ſum equal to that of the water which has been employed in the experiment.

On this ſubject the experiments which were made at Paris, in the preſence of a numerous commiſſion of the Academy, is ſtill more ſatisfactory and convincing. In this attempt a gun-barrel was employed, into which was introduced a quantity of thick iron-wire, flattened by hammering; the gun-barrel, and the iron which it contained, were weighed with the moſt ſcrupulous exactneſs; after which the outſide of the gun-barrel was covered with a lute, for the purpoſe of ſecuring it from the immediate contact of the fire. It was then placed in a furnace with ſuch a degree of inclination, that water could run through it. To the higher extremity was adapted a funnel intended to contain water, which was ſuffered to eſcape drop by drop by means of a cock. This funnel was cloſed, to prevent all evaporation of the water. To the inferior extremity of the ſame gun-barrel was luted a tubulated receiver, deſigned to receive the water which ſhould eſcape decompoſition, and to the tube of the receiver was fitted another tube to convey the hydrogenous gas to the pneumato-chemical apparatus. As a further precaution, a vacuum was made in every part of the apparatus, in order that the hydrogenous gas might not be mixed with common air. Laſtly, when all theſe preparations were completed, the gun-barrel was made red hot, and the water introduced

drop by drop. An enormous quantity of inflammable gas or hydrogene was difengaged during the courfe of the experiment. When it was finifhed, the gun-barrel was cleared of its lute, and, being weighed, was found to have acquired a very confiderable augmentation of weight: this augmentation of weight, added to that of the hydrogenous gas obtained, gave a total very exactly equal to that of the water which had difappeared. With regard to the flat pieces of iron which had been introduced into the gun-barrel, and likewife the interior part of the barrel itfelf, they were found converted into a thick ftratum of black oxide of iron or martial ethiops, cryftallized like the iron ore of Elba. The chemical analyfis of this fubftance proved that the iron was reduced exactly to the fame ftate as that which had been burned in vital air or oxigenous gas, or, in other words, it confifted of iron combined with oxigene. But decifive as this experiment would feem to have been, it was not fufficient to content the chemifts who made it: they were defirous of forming water again with the fame hydrogenous or inflammable gas which had been obtained; it was therefore burned in an apparatus properly fuited to this purpofe, with a quantity of oxigenous gas equal to that which had been retained by the gun-barrel, and the fame quantity of water was re-formed with fufficient exactnefs, and amounted to a little more than fix ounces.

Lavoifier and De la Place, by burning in a proper apparatus a mixture of fourteen parts of hydrogenous gas, and eighty-fix of oxigene, alfo obtained a proportionate quantity of water; and Mr. Monge obtained the fame refult at Mezieres about the fame time. But the moft conclufive and the moft authentic experiment which has been made upon the compofition or fynthefis of water, is probably that which was begun at the Royal College, by Mr. Lefevre de Gineau, on the 23d of May, and ended on the 7th of June, 1788.

In this experiment the volume of oxigenous gas confumed, when reduced to the preffure of twenty-eight inches of mercury, at the temperature of ten degrees of the thermometer of Reaumur, was 35085 French cubic inches, and its weight 250 gros 10.5 grains. The volume of hydrogenous gas was 74967.4 cubic inches, and the weight 66 gros 4.3 grains. The nitrogenous gas and the carbonic acid which were mixed with thefe gafes, and which had been extracted out of the receiver at nine feveral times, weighed 39.23 grains. The oxigenous gas contained $\frac{1}{3}$ of its weight of carbonic acid; fo that the weight of the gafes burned was 280 gros 63.8 grains, which makes 2 pounds 3 ounces 0 gros 63.8 grains. After the experiment the veffels were opened in the prefence of the gentlemen of the Academy of Sciences, and feveral other learned men, and were found to contain 2 pounds 3 ounces 0 gros 33 grains of water: this weight anfwers to that of the gafes made ufe of, wanting 31 grains. This deficiency might probably arife from the caloric which held the gafes in folution being diffipated when they became fixed, which muft neceffarily have occafioned a lofs. The water produced in this attempt was fubacid to the tafte, and afforded $27\frac{1}{2}$ grains of nitric acid, which acid is produced by the combination of the nitrogene and oxigene gafes. It is, therefore, evident from the experiment of the decompofition of water, that 100 parts of that fluid contain

Oxigene $84,2636 = 84\frac{1}{4}$.
Hydrogene $15,7364 = 15\frac{3}{4}$.

And according to the experiment of its compofition, 100 parts of it contain

Oxigene $84,8 = 84\frac{1}{4}$.
Hydrogene $15,2 = 15\frac{3}{4}$.

We may here take notice of another experiment which, though not fo fatisfactory as thofe already related, has appeared to make more impreffion upon the minds of fome chemifts. When 16 ounces of alcohol are burnt in an apparatus which is properly adapted for collecting all the water difengaged during the combuftion, from 17 to 18 ounces of water are obtained: but as no fubftance can furnifh a product larger than its original bulk, it is evident that fomething muft have united with the alcohol during its combuftion; and we have already fhewn that this muft be oxigene. Thus alcohol contains hydrogene, which is one of the elements of water; and the atmofpheric air contains oxigene, which is the other element neceffary to the compofition of water. A large quantity of carbonic acid gas is alfo difengaged during the combuftion of alcohol; which proceeds from the combination of carbon, contained along with hydrogene in the compofition of the alcohol, with oxigene during the combuftion. But independent of thefe experiments of analyfis and fynthefis, the phenomena exhibited by water, in its feveral ftates, confirm the opinion concerning the conftituent parts which it is now acknowledged to poffefs. The oxidation of metals in the interior parts of the earth, at a diftance from the atmofpherical air, the efflorefcence of pyrites, and the formation of ochres, are phenomena which cannot be explained without the affiftance of this theory. Water, therefore, being compofed of two known principles, muft act like all other compound bodies with which we are acquainted, that is, according to the affinities of its conftituent parts. It muft in fome inftances yield its hydrogene, and in others its oxigene. If it be placed in contact with bodies which have the ftrongeft affinity with oxigene, fuch as the metals, oils, charcoal, &c. the oxigenous principle will unite with thefe fubftances; and the hydrogene, being fet at liberty, will be diffipated. This happens when hydrogene gas is difengaged, by caufing the acids to act upon certain metals; or when red hot iron is plunged in water, as has been fhewn by Mr. Haffenfratz, and fome other chemifts.

But, on the contrary, in vegetables it feems that the hydrogene is the principle which fixes itfelf; while the oxigene is eafily difengaged, and makes its efcape. From the whole of thefe experiments, both analytical and fynthetical, it may be affirmed, that water is not a fimple elementary fubftance, but is compofed of two elements, oxigene and hydrogene; which elements, when exifting feparately, have fo ftrong an affinity for caloric, as only to fubfift under the form of gas in the common temperature and preffure of our atmofphere. This decompofition and recompofition of water is perpetually operating before our eyes, in the temperature of the atmofphere, by means of compound elective attractions; and we fhall find that the phenomena attendant upon vinous fermentation, putrefaction, and even vegetation, are produced, at leaft in a certain degree, by the decompofition of water—a fact, which it is rather extraordinary fhould have hitherto efcaped the obfervation of natural philofophers. See WATER.

SECT. VII. *Of Alkalis.*

FROM various obfervations and experiments it would feem to be proved, that the combination of nitrogene gas with hydrogene forms one of the fubftances comprifed in the clafs of alkalis. It is therefore very probable that the others are compofed of the fame gas and an earthy bafis; and from thefe confiderations it is that we have thought proper to place thofe fubftances here. This decifion with refpect to arrangement has been adopted with fo much the more foundation, as the knowledge of alkalis is indifpenfably neceffary in order to proceed with regularity in a treatife of this kind, and alfo becaufe thefe re-agents are moft frequently employed, and their combinations and ufes prefent themfelves at every ftep in the phenomena of nature and art. It is an eftablifhed rule to call every fubftance an alkali, which poffeffes the following characteriftic properties: an acrid, burning, urinous tafte: the property of converting fyrup of violets into a green colour, but not the tincture of

turnſole, as has been obſerved by ſome writers: the quality of forming glaſs, when fuſed with quartzoſe ſubſtances; and that of rendering oils miſcible with water: of effervefcing with certain acids; and of forming neutral ſalts with all of them.

It muſt be obſerved, however, that none of theſe characters is rigorous and excluſive, conſequently that no one of them is ſufficient to afford a certainty of the exiſtence of an alkali; but the concurrence of ſeveral of them may be ſufficient to lead to an accurate deciſion.

Theſe ſubſtances are divided into fixed alkalis, and volatile alkalis; which diſtinction is eſtabliſhed upon the ſmell of the ſubſtances: the former are not volatilized, even in the focus of a burning glaſs, conſequently emit no characteriſtic ſmell; but the latter are eaſily reduced into vapour, and emit a very penetrating and ſuffocating ſmell. See Alkali.

Sect. VIII. *Of Fixed Alkalis.*

Chemistry has not hitherto diſcovered any more than two kinds of fixed alkalis, one, which is called *Vegetable Alkali*, or *Pot-Aſh*; and the other *Mineral Alkali*, or *Soda*.

Of the Vegetable Alkali, or Pot-Aſh.—This alkali, in a ſtate of conſiderable purity, is white, and of a dry ſolid form; it has alſo a great degree of ſapidity. It communicates inſtantaneouſly to the ſyrup of violets a deep green colour, much more obſervable than that which lime cauſes it to aſſume. It alters, and almoſt entirely deſtroys this colour, changing it to a brown yellow. When expoſed to the action of fire in cloſe veſſels, it is ſoftened, and, by the time when it begins to appear red, becomes liquid. If it be then poured on a ſmooth hard ſurface, it cools into a white, opaque, brittle maſs. It has not yet been decompoſed by heat. A moſt intenſe heat, ſuch as that of the furnace of a glaſs-houſe, is ſcarcely able to volatilize it. In all of theſe operations it diſſolves part of the clay veſſels in which it is contained. If expoſed to the open atmoſphere it attracts moiſture ſtrongly, diſſolves into a liquid, and gradually paſſes into the ſtate of a neutral ſalt, by abſorbing the acid diffuſed through the atmoſphere. For this reaſon it acquires, on ſuch occaſions, an increaſe of weight, and becomes capable of effervefcing with acids; which never takes place when it is in that ſtate of purity in which we have ſuppoſed it. To preſerve it pure, therefore, it muſt be kept in cloſe veſſels which are quite full with it. It diſſolves very readily in water, and excites a conſiderable degree of heat, as well as exhales a fetid lixivious odour. The ſolution of it is colourleſs; and when very pure affords no precipitate. To ſeparate it from the ſolvent the ſolution muſt be evaporated to dryneſs in cloſe veſſels. If this operation be performed in open veſſels, the acid of the atmoſphere is attracted, and renders the pot-aſh effervefcent. And this abſorption takes place ſo readily, that, if a ſolution of this ſalt be expoſed to the open air for ever ſo ſhort a ſpace of time, it ſuffers an alteration, and is in fact neutralized. If it be kept in a flaſk which it does not entirely fill, and which is frequently opened, it is liable to the ſame alteration. It is well known that pot-aſh combines with ſiliceous earth in the dry way, and cauſes it to melt together with itſelf; by which means the two ſubſtances compoſe a tranſparent body known by the name of *glaſs*. This body is liable to varieties from the various proportions in which the ſiliceous ſand and the fixed alkali are united in it.

The vegetable fixed alkali may be extracted from various ſubſtances; and it is more or leſs pure, accordingly as it is afforded by one ſubſtance or another. Several varieties are made in commerce, to which different names have been affixed, and which are indiſpenſably neceſſary to be known. The chemiſt may indeed confound all theſe diſtinctions, in his writings, under one ſingle denomination: but the diſtinctions eſtabliſhed by the artiſts are founded upon a ſeries of experiments, which have proved that the virtues of theſe ſeveral alkalis are very different; and this conſtant variety in their effects would ſeem to juſtify the various denominations which have been given to them.

When the alkali extracted from the lixivium of wood-aſhes is calcined, and by that means diſengaged from all the blackening principles, it forms pot-aſh. Aſhes are more or leſs rich in alkali, according to the nature of the wood from which they have been formed; in general, however, hard woods contain the moſt. According to the experiments of Mr. Chaptal, which were made in the large way, the aſhes of beech afford from eleven to thirteen pounds in every quintal, and thoſe of box from twelve to fourteen pounds in the ſame quantity. In order to extract this alkali, nothing more is neceſſary than to waſh the aſhes, and to concentrate the diſſolution in boilers of caſt iron. It is on account of the alkali that wood-aſhes are uſed in the lixiviums employed in bleaching. The uſe of alkali, in this caſe, is to combine with the fat ſubſtances, and to render them ſoluble in water.

This ſubſtance may alſo be prepared from the lees of wine, which are almoſt totally converted into alkali by combuſtion. This alkali is called by the French *Cendres Gravelées*; and it has almoſt always a greeniſh colour. It is conſidered as a very pure alkali. The combuſtion of tartar of wine likewiſe affords an alkali of conſiderable purity. It is uſually burned wrapped up in paper, in ſmall packets, which are dipped in water, and afterwards expoſed upon burning coals. In order to purify it, the reſidue of the combuſtion is diſſolved in water, the ſolution concentrated by fire, the foreign ſalts ſeparated in proportion as they precipitate; and a very pure alkali is at laſt obtained, which is known by the name of *Salt of Tartar*. But Mr. Chaptal has employed a method of procuring ſalt of tartar, which is more ſpeedy, as well as more economical; which is by burning a mixture of equal parts of nitrate of pot-aſh, or common nitre and tartar. The reſidue, after lixiviation, affords a beautiful ſalt of tartar. It is this ſalt that is moſt commonly employed for medicinal purpoſes.

When ſaltpetre is fuſed upon charcoal, the acid is decompoſed and diſſipated, while the alkali remains alone and diſengaged, and is called *Extemporaneous Alkali*. The vegetable alkali, when it has been brought to the greateſt ſtate of purity, attracts the humidity of the air, and is reſolved into a liquor, which in this ſtate is known by the very improper name of *Oil of Tartar per Deliquium*.

Of the Mineral Alkali, or Soda.—This ſubſtance has been called *Mineral Alkali*, from its forming the baſis of marine ſalt. It is found in large quantities in the waters of the ſea, forming half the weight of the common ſalt. It is alſo ſometimes met with in other natural combinations. The ſaline matter that hangs upon old damp walls conſiſts of this ſalt united with carbonic acid and water. But for the purpoſes of commerce, it is chiefly obtained from marine plants by combuſtion: for this purpoſe heaps of the ſaline plants are formed; and at the ſide of theſe heaps a round cavity is dug, which is enlarged towards the bottom, and is three or four feet in depth. This is the fire-place in which the vegetables are to be burned. The combuſtion is kept up without interruption for ſeveral days; and when all the plants are conſumed, a maſs of alkaline ſalt is found remaining, which is cut into pieces, to facilitate its carriage and ſale. This is known by the name of *Rock Soda*. All marine plants do not, however, afford ſoda of the ſame quality. The barilla of Spain affords the beautiful ſoda of Alicant.

The taſte of ſoda is not ſo ſtrong and cauſtic as that of pot-aſh; but it turns the ſyrup of violets green, and produces the ſame alteration as the other on that colour: it appears naturally

in a dry and folid form. It melts in the fire as it begins to become red-hot; a violent heat volatilizes it; and it acts on almost all the veffels in which it can be expofed to heat.

The method of rendering mineral alkali clear of all heterogeneous falts is by diffolving it in water, and feparating the feveral falts in proportion as they fall down. The laft portion of the fluid being concentrated, affords the foda, which cryftallizes in rhomboidal octahedrons. This alkali is fometimes found in a native ftate; and in Egypt it is known by the name of *Natron*. Two lakes of this kind have been defcribed by Mr. Sicard and Mr. Volney, which are fituated in the defert of Chaiat, to the weft of Delta. Their bed is a natural cavity of three or four leagues in length, and a quarter of a league in breadth; the bottom is folid and ftony. It is dry during nine months in the year; but in winter a water of a violet-red colour oozes out of the earth, which fills the lake to five or fix feet in depth: the return of the heat of fummer evaporates this, and leaves a bed of falt behind it of two feet in thicknefs, which is dug out with bars of iron. The quantity obtained annually amounts to 36,000 quintals. Natron has alfo been found by Mr. Prouft upon the fchifti which form the foundation of the town of Angers in France, and likewife upon a ftone from the falpetriere of Paris.

The chief circumftances in which the mineral alkali differs from the vegetable, are in its having lefs caufticity and lefs attraction for humidity, confequently efflorefcing in the air; in cryftallizing in rhomboidal octahedrons; in forming different products with the fame bafes; and in being more proper for the purpofes of vitrification.

The queftion whether alkalis exift ready formed in vegetables, or are the product of the feveral operations made ufe of in extracting them, has divided the opinions of chemifts. Du Hamel and Groffe have long fince proved the exiftence of alkali in cream of tartar, by treating it with the nitric, fulphuric, and other acids; and the experiments of Margraff and Rouelle have afforded additional proofs of the fact. It has alfo been found by the latter, as well as the marquis de Bullion, that this fubftance exifts in *muft*, or wine newly expreffed.

But it muft not be concluded from the exiftence of an alkali in vegetables, that it is there found in a difengaged ftate; for, on the contrary, it is generally found combined with acids, oils, and fuch fubftances.

It may be obferved ftill farther, that the alkalis, fuch as we have defcribed them, even after they have been difengaged from every mixture, by folution, filtration, and evaporation, are not in that ftate of purity and difengagement, which is neceffary to be obtained in many cafes. They are nearly in the ftate of neutral falts, by their combination with the carbonic acid. When it is required to difengage this acid, the alkali muft be diffolved in water, and quick-lime then flaked in the folution. This fubftance feizes the carbonic acid of the alkali, and gives out its caloric in exchange. The alkali being deprived of the carbonic acid, no longer effervefces with other acids; it is more cauftic, and more violent in its action; unites more eafily to oils; and is then called *Cauftic Alkali, Pure Pot-afh*, or *Pure Soda*. When this alkali is evaporated, and brought into the dry form, it is known by the name of *Lapis Cau/ticus*. The corrofive virtue of this fubftance depends principally upon the avidity with which it feizes humidity, and falls into *deliquium*.

In the ufual mode of preparing the cauftic alkali, it always contains a fmall quantity of carbonic acid, filiceous earth, iron, &c. The means which Mr. Berthollet has propofed for purifying it are the following:—He concentrates the cauftic lixivium until it has acquired a flight degree of confiftence; at which period he mixes it with alcohol, and draws off a portion by diftillation. As foon as the retort is become cold, he finds it to contain cryftals, mixed with a blackifh earth, in a fmall quantity of liquor of a dark colour, which is feparated from the folution of alkali in the alcohol, which fwims above like an oil. Thefe cryftals confift of the alkali faturated with the carbonic acid, and are infoluble in fpirit of wine; the depofition confifts of filiceous earth, lime, iron, &c. The cauftic alkali in a ftate of great purity, diffolved in the alcohol, fwims above the aqueous folution which contains the effervefcent alkali. If the fpirituous folution of alkali be concentrated on the fandbath, tranfparent cryftals are formed, which confift of the pure alkali itfelf: thefe cryftals appear to be formed by quadrangular pyramids inferted one in another; they are very deliquefcent, are foluble in water and in alcohol, and produce cold by their folution. Thefe alkalis alfo combine eafily with fulphur, which combination may be effected either by the fufion of equal parts of alkali and fulphur, or by digefting the pure and liquid alkali upon fulphur. In thefe cafes the alkali becomes of a reddifh-yellow colour.

The folutions of fulphur in alkali are known by the name of *Livers of Sulphur, Sulphures of Alkali*, &c. They emit an offenfive fmell, refembling that of rotten eggs, which is occafioned by the efcape of a kind of gas, that has been denominated *Hepatic Gas*. In thefe cafes the fulphur may be precipitated by acids; and the refult of this precipitation is what the ancient chemifts diftinguifhed by the name of *Milk*, and *Magiftery of Sulphur*. Thefe fulphures or hepars diffolve metals: even gold itfelf can be fo divided by this means as to pafs through filters.

On the whole, though the analyfis of the two alkalis has not yet been made with ftrictnefs, feveral experiments lead to an opinion, that azote or nitrogene is one of their conftituent principles. Mr. Thouvenel, having expofed wafhed chalk to the exhalations of animal fubftances in putrefaction, obtained nitrate of pot-afh, or common nitre. Mr. Chaptal has alfo repeated this experiment in a clofed chamber of fix feet fquare. Twenty-five pounds of chalk well wafhed in warm water, and expofed to the exhalation of bullock's blood in putrefaction during eleven months, afforded nine ounces of nitrate of lime, in a dried ftate; and three ounces one gros of cryftals of nitrate of pot-afh, or common nitre. The repeated diftillation of foaps decompofes them, and affords ammoniac; and the analyfis of this laft fubftance, by Mr. Berthollet, feems to prove the exiftence of azotic or nitrogenous gas as one of its conftituent parts; there is therefore reafon to apprehend that azotic or nitrogene gas is one of the principles of alkalis. The experiments of Mr. Thouvenel, as well as thofe of Mr. Chaptal, alfo lead to a fuppofition that this gas, when combined with lime, forms pot-afh, or the vegetable alkali, while its union with magnefia conftitutes foda. This laft opinion is fupported by the experiments of Mr. Dehne, who obtained magnefia from foda: and by thofe of Mr. Lorgna, who procured much magnefia by repeatedly diffolving, evaporating, and calcining this fubftance. The trials of Mr. Ofburg have likewife confirmed the various experiments that have been made by thefe ingenious chemifts on this fubject.

Sect. IX. *Of Ammonia, or Volatile Alkali.*

The refearches of chemifts have not hitherto exhibited more than one fpecies of volatile alkali. Its formation appears to be owing to putrefaction; and though the diftillation of fome fchifti affords it, yet this circumftance may be attributed to their origin, which is pretty generally afcribed to vegetable and animal decompofition. The prints of fifhes which are frequently met with in thefe fubftances feem to favour this opinion. Some plants likewife afford volatile alkali; for which reafon they have been called *Animal Plants*. But the volatile alkali is moft generally afforded by animal fubftances: the diftillation of all their parts affords it in confiderable abun-

dance. Horns are employed in preference, becaufe they are refolved almoft entirely into oil and volatile alkali. The putrefaction of all animal fubftances produces volatile alkali; and in this cafe, as well as in diftillation, it is formed by the combination of its two conftituent parts: for analyfis very often fails in exhibiting any alkali ready formed, in fuch parts as diftillation or putrefaction would abundantly afford it from. Almoft all the volatile alkali made ufe of in either commerce or medicine, is afforded by the decompofition of fal ammoniac; and it is on account of this circumftance that the chemifts who have drawn up the New Nomenclature have diftinguifhed the volatile alkali by the name of *Ammoniac*. In order to obtain ammoniac in a ftate of confiderable purity, equal parts of fifted quick-lime and muriate of ammoniac, or common fal ammoniac in powder, are mixed. This mixture is then introduced into a retort, to which a receiver and the apparatus of Mr. Woulfe have been adapted. A quantity of pure water is then put into the bottles, correfpondent to the weight of the falt employed; and the junctures of the veffels are made good with the ufual lutes. The ammoniac is difengaged in the ftate of gas, at the firft impreffion of the fire. It combines with the water with heat; and when the water of the firft bottle is faturated, the gas paffes to that of the fecond, and faturates it in its turn.

The volatile alkali is known by its very ftrong but not difagreeable fmell. It is eafily reducible into the ftate of gas, and preferves this form at the temperature of the atmofphere. This gas may be obtained by decompofing the muriate of ammoniac by quick-lime, and receiving the product over mercury. Alkaline gas kills animals, and corrodes the fkin; and the irritation is fuch, that pimples have been obferved to arife all over the bodies of birds expofed to its atmofphere. This gas is improper for combuftion; but if a taper be gently immerfed in it, the flame is enlarged before it goes out, and the gas fuffers a decompofition. Alkaline gas is lighter than atmofpheric air; and has even been mentioned, on account of its lightnefs, as a proper fubftance to fill balloons.

From the experiments of Dr. Prieftley, who changed alkaline into hydrogene gas by means of the electric fpark; and thofe of the chevalier Landriani, who, by paffing the fame gas through ignited glafs tubes, obtained a large quantity of hydrogenous gas, a fufpicion of the exiftence of hydrogene among the principles of alkaline gas was occafioned; but the experiments of Mr. Berthollet feem to have removed the doubts on this fubject; and further obfervations have confirmed the opinion that this alkali is a compound of the nitrogenous and hydrogenous gafes. Thus, if the oxigenated muriatic acid be mixed with very pure ammoniac, an effervefcence takes place, with a difengagement of nitrogenous gas, a production of water, and a converfion of the oxigenated acid into the ordinary muriatic acid. In this beautiful experiment, the water which is produced is formed by the combination of the hydrogene of the alkali and the oxigene of the acid; and the nitrogene gas being fet at liberty, is diffipated. But when the nitrate of ammoniac is expofed to diftillation, nitrogene gas is obtained, and a greater quantity of water is found in the receiver than the falt itfelf contained. After the operation, the ammoniac is found no longer to exift. The water of the receiver is flightly charged with a fmall quantity of nitric acid, which had paffed over. In this cafe, the hydrogene of the alkali, and the oxigene of the acid, form the water in the receiver, while the nitrogenous gas efcapes. If the oxides of copper or gold be heated with ammoniacal gas, the product is water and nitrogenous gas, and the metals are reduced. Mr. Chaptal has alfo obferved that the oxides of arfenic, being digefted with ammoniac, are reduced, and often form octahedral cryftals of arfenic. In this cafe there is a difengagement of nitrogene gas, and a formation of water. It alfo very often happens when metals, fuch as copper or tin, are diffolved by means of the nitric acid, that an abforption of air takes place, inftead of a difengagement of nitrous gas, as might be expected. This phenomenon takes place more efpecially when a very concentrated acid is made ufe of, and the copper is in fine filings: in this cafe ammoniac is produced. The ammoniac in this inftance is formed by the combination of the hydrogene of the water with the nitrogene gas of the nitric acid; while the oxigene of the fame acid, and that of the water, oxide the metal, and prepare it for folution. It is to a fimilar caufe that we muft refer the experiment of Mr. J. M. Hauffman of Colmar, who by paffing nitrous gas through a certain quantity of precipitate of iron, in the mercurial apparatus, obferved that this gas was fpeedily abforbed, and the colour of the iron changed; at the fame time that vapour of ammoniac was found in the veffels. By a fimilar theory alfo the formation of alkaline gas, by the mixture of hepatic and nitrous gas over mercury, may be accounted for, as Mr. Kirwan has obferved.

In forming ammoniac, Dr. Auftin found that the combination of nitrogenous gas with the bafe of hydrogene did not take place, unlefs this laft was in a ftate of great condenfation. The formation of ammoniac by diftillation and putrefaction, appears likewife to indicate the conftituent parts of this fubftance. In fact, there is in both thefe operations a difengagement of hydrogene and nitrogene gas, and their combination produces ammoniac. Mr. Berthollet has proved, by the way of decompofition, that one thoufand parts of ammoniac, by weight, are compofed of about eight hundred and feven of nitrogene gas, and one hundred and ninety-three of hydrogene gas. But according to Dr. Auftin, the nitrogene gas is in proportion to the hydrogene, as one hundred and twenty-one to thirty-two.

Sect. X. *Of Acids.*

It appears to be pretty well afcertained, that the bodies which are called *Acids* are combinations of vital air with a certain elementary fubftance. The analyfis of almoft all the acids, whofe component parts are known, eftablifhes this truth in a pofitive manner; and it is on account of this property that the denomination of *Oxigenous Gas* has been given to vital air. Every fubftance which poffeffes the following properties is called an *Acid*: a four corrofive tafte. The term *four*, which is ufually employed to denote the impreffion, or lively and fharp fenfation produced on the tongue by certain bodies, may be regarded as fynonymous to the word *acid*. The only difference which may be eftablifhed between them is, that the one denotes a weak fenfation, whereas the other comprehends all the degrees of force from the leaft perceptible tafte to the greateft degree of caufticity. The caufticity of acids feems to arife from their ftrong tendency to combination; and it is from this property that Sir Ifaac Newton has defined them to be bodies which attract and are attracted. It is likewife from this property that fome chemifts have fuppofed acids to be pointed bodies; and on account of the decided tendency to combination which they poffefs, it feldom happens that they are met with in a difengaged ftate.

The fecond property of acids is that of changing certain blue vegetable colours into red, fuch as the colour of turnfole, fyrup of violets, &c. Thefe two re-agents are commonly ufed to afcertain the prefence of acids.

It is proper to obferve that the tincture of turnfole is prepared by flightly infufing in water that fubftance which is known in common under the name of *Turnfole* or *Litmus*. If, however, the water be too highly charged with the colouring matter, the infufion has a violet tinge, and muft in that cafe be

diluted with water until it becomes blue. This tincture, when expoſed to the ſun, becomes red, even in cloſed veſſels; and ſome time afterwards the colouring part is diſengaged, and falls down in the form of a mucilaginous diſcoloured ſubſtance. Alcohol may be employed inſtead of water in the preparation of the tincture of turnſole.

In trying any concentrated acid with ſyrup of violets, there are two circumſtances to be attended to. The ſyrup of violets is often green, becauſe the petal of the violet contains a yellow part at its baſe, which, when combined with the blue, forms this green colour; it is therefore eſſential to employ only the blue of the petal in order to have a beautiful blue infuſion. Care muſt alſo be taken to dilute the ſyrup with a certain quantity of water; otherwiſe concentrated acids, ſuch as the ſulphuric, would burn it, and form a coal. The ſimple infuſion of violets may be uſed inſtead of the ſyrup. The colouring matter of indigo is not, however, ſenſible to the impreſſion of acids. The ſulphuric acid diſſolves it, without altering its colour.

A third character of acids is, that of their efferveſcing with alkalis; but this property is not general, as neither the carbonic acid, nor almoſt any weak acid, can be diſtinguiſhed by this property. The pureſt alkalis alſo combine with acids, without motion or efferveſcence.

It has been a queſtion much agitated among chemiſts, whether there be not, in nature, one particular acid, of which the others are only modifications. Paracelſus admitted an univerſal principle of acidity, which communicated taſte and ſolubility to all its compounds; and Becher ſuppoſed, that this principle was compoſed of water and vitrifiable earth. After him Stahl endeavoured to prove that the ſulphuric acid was the univerſal acid; and his opinion was adopted by moſt chemiſts for a conſiderable length of time. But long after the time of this excellent chemiſt Meyer contended, that the acid element was contained in fire; and his ſyſtem, which is founded on certain known facts, has had its ſupporters. The chevalier Landriani alſo imagined that he had ſucceeded in reducing all the acids to the carbonic acid; becauſe, by treating them all with different ſubſtances, he obtained this laſt as the conſtant reſult of his analyſis. He was led into an error for want of having ſufficiently attended to the decompoſition of the acids he made uſe of, and the combination of their oxigene with the carbone of the bodies which entered into his experiments, and produced the carbonic acid.

The ſtrict analyſis and ſyntheſis of moſt of the known acids have, however, proved to Mr. Lavoiſier, that oxigene is the baſe of all of them; and that their differences and varieties ariſe only from the ſubſtance with which this common principle is combined. Oxigene united with metals forms oxides; and among theſe laſt there are ſome which poſſeſs acid characters, and are claſſed among acid ſubſtances. The ſame ſubſtance, when combined with inflammable bodies, ſuch as ſulphur, carbone, and oils, forms other acids.

It has been found that the adheſion of oxigene to the baſe is more or leſs ſtrong in the ſeveral acids, and conſequently that their decompoſition is more or leſs eaſy; as, for example, in metallic ſolutions, which do not take place excepting when the metal is in the ſtate of an oxide. The acid which will yield its oxigene with the greateſt facility to oxide the metal, will have the moſt powerful action upon it. Hence it happens, that the nitric and the nitro-muriatic acids are thoſe which diſſolve metals the moſt readily; and hence likewiſe it happens that the muriatic acid diſſolves the oxides more eaſily than the metals, while the nitric acid acts in a manner directly contrary: hence alſo it ariſes that this laſt acts ſo powerfully upon oils, &c. It is therefore only from having a proper idea of the conſtituent principles of acids, that it is poſſible to conceive and explain the various phenomena which they preſent in their different operations.

With reſpect to the nomenclature of acids it is proper to remark, that the word *acid* being uſed as a generic term, each acid ought to be diſtinguiſhed in language, as in nature, by the name of its baſe or radical. Thus the generic name of acids is given to the products of the combuſtion or oxigenation of ſulphur and carbone; and theſe products are reſpectively named the *ſulphuric* and the *carbonic acid*. There is, however, a remarkable circumſtance in the oxigenation of combuſtible bodies, and of a part of ſuch bodies as are convertible into acids; that they are ſuſceptible of different degrees of ſaturation with oxigene, and that the reſulting acids, though formed by the union of the ſame elements, are poſſeſſed of different properties, depending upon that difference of proportion. Of this the ſulphuric furniſhes us with examples. When ſulphur is combined with a ſmall proportion of oxigene, it forms, in this firſt or lower degree of oxigenation, a volatile acid, having a penetrating odour, and poſſeſſed of very peculiar qualities. By a larger proportion of oxigene, it is changed into a fixed, heavy acid, without any odour, and which, by combination with other bodies, gives products quite different from thoſe furniſhed by the former. Theſe varieties in the oxigenation of the acids are expreſſed by ſimply varying the termination of their ſpecific names. The volatile acid produced from ſulphur was anciently known by the name of *ſulphurous* acid, and this term is ſtill employed to denote the ſame acid when under-ſaturated with oxigene; the other, the completely ſaturated or oxigenated acid, being diſtinguiſhed by the name of *ſulphuric* acid. In this new chemical language, we therefore ſay, that ſulphur, in combining with oxigene, is ſuſceptible of two degrees of ſaturation; that the firſt, or leſſer degree, conſtitutes ſulphurous acid, which is volatile and penetrating; while the ſecond, or higher degree of ſaturation, produces ſulphuric acid, which is fixed and inodorous. This difference of termination is alſo employed for all the acids which aſſume ſeveral degrees of ſaturation. Hence we have a nitrous and a nitric acid, an acetous and an acetic acid; and ſo on, for others in ſimilar circumſtances.

Sect. XI. *Of the Carbonic Acid.*

The title of *carbonic acid* has been given to an acid which occurs in great abundance through the whole of nature, and which appears almoſt always in the ſtate of an aëriform fluid. This acid ſeems to have been in ſome degree known to the ancient chemiſts. Van Helmont gave it the name of *Gas Silveſtre*. Dr. Black of Edinburgh muſt, however, be conſidered as the real diſcoverer of this acid; he maintained, in the year 1755, that lime-ſtone contained much air of a different nature from that of common air, and affirmed that the diſengagement of this air converted it into lime, and that calcareous ſtone was regenerated by the reſtoration of this air. The ſame doctrine was further ſupported by additional facts in 1746, by Dr. M'Bride; and Mr. Jacquin, a profeſſor at Vienna, reſumed the ſame purſuit, and multiplied experiments on the manner of extracting it, and adduced ſome other proofs in confirmation of the opinion that the abſence of this air rendered alkalis cauſtic, and formed lime; and the induſtry and extenſive experimental knowledge of Dr. Prieſtley threw ſtill greater light upon this ſubject. At that time, this ſubſtance was known by the name of *Fixed Air*. Bergmann, in the year 1772, proved it to be an acid to which he gave the name of *Aërial Acid*; and ſince that time it has been diſtinguiſhed by the names of *Mephitic Acid*, *Cretaceous Acid*, &c. But as ſoon as it was diſcovered to conſiſt of a combination of oxigene and carbone, or pure charcoal, the name of carbonic acid was affixed to it. This acid is found in three different ſtates: in a ſtate of gas, of mixture, and of combination.

It is met with in a ſtate of gas in the famous Grotto del Cano, near Naples, and in various other ſubterraneous places, ſuch as tombs, cellars, neceſſaries, &c. It is alſo diſengaged in this form by the decompoſition of vegetables heaped together, by the fermentation of wine or beer, by the putrefaction of animal matters, &c.

This ſubſtance exiſts in the ſtate of ſimple mixture in mineral waters, and in theſe it poſſeſſes all its acid properties and virtues.

The carbonic acid is contained in a ſtate of combination in lime-ſtone, common magneſia, alkalis, and ſuch like ſubſtances.

In collecting this acid different proceſſes are employed, according to the ſtate in which it is met with. When it exiſts in the ſtate of gas, it may be collected by filling a bottle with water, and emptying it into an atmoſphere of this gas: the acid in this caſe takes the place of the water, and the bottle is afterwards corked to retain it. It may alſo be procured by expoſing lime-water, cauſtic alkalis, or even pure water, in its atmoſphere; in which caſe the gaſeous acid mixes or combines with theſe ſubſtances, and can be afterwards extracted by re-agents.

This acid, when it is found in a ſtate of combination, may be extracted either by diſtillation with a ſtrong heat, or by the re-action of other acids, ſuch as the ſulphuric acid, which has the advantage of not being volatile, and conſequently is not altered by its mixture with the carbonic, which is diſengaged.

When this acid is met with in the ſtate of ſimple mixture, as in water, briſk wines, &c. it may be obtained by agitation of the liquid which contains it; and by making uſe of a bottle to which a moiſtened bladder has been fitted; and alſo by diſtillation. Theſe methods are not however very accurate.

Another method has been attempted by Mr. Gioanetti, which conſiſts in precipitating the acid by means of lime-water, weighing the precipitate, and deducting thirteen thirty-ſecond parts for the proportion of carbonic acid: it having been deduced from analyſis by this phyſician, that thirty-two parts of carbonate of lime contain ſeventeen of lime, two of water, and thirteen of acid.

That this ſubſtance is an acid, ſeems pretty evident from the tincture of turnſole becoming red when agitated in a bottle filled with this gas. In the ſecond place, ammoniac, or volatile alkali, when poured into a veſſel filled with this gas, becomes neutralized. Water impregnated with this gas has alſo a ſtrong ſub-acid taſte, and it neutralizes alkalis, and cauſes them to cryſtallize. Although this acid, in the ſtate of an elaſtic fluid, may ſeem to poſſeſs all the appearances of air; it has very different phyſical properties. It is improper for the purpoſes of reſpiration, as has been ſhewn by various experiments.

It is this gas which produces ſo many unhappy accidents at the opening of cellars, in places where wine, cyder, or beer are ſuffered to ferment.

This acid is alſo improper for vegetation. Doctor Prieſtley having kept the roots of ſeveral plants in water impregnated with the carbonic acid, obſerved that they all periſhed; and in thoſe inſtances where plants are obſerved to vegetate in water or in air which contains this gas, the quantity of gas is very ſmall. Mr. Senebier has even obſerved, that plants which are ſuffered to grow in water ſlightly acidulated with this gas emit a much larger quantity of oxigenous gas; becauſe, in this caſe, the acid is decompoſed, the carbonaceous principle combines and is fixed in the vegetable, while the oxigene is thrown off. Mr. Chaptal has alſo found that thoſe fungi which are formed in ſubterraneous places, are almoſt totally reſolved into carbonic acid: but that if theſe vegetables be gradually expoſed to the action of light, the proportion of acid diminiſhes; while that of the coaly principle augments, and the vegetable becomes coloured. This gas is diſſolved in water with great facility; and when the laſt fluid is ſufficiently impregnated with this carbonic acid, it has been found to poſſeſs highly valuable medicinal qualities; and with a view to its application in this way, various apparatus have been invented at different times, but the improved glaſs machine of Doctor Nooth is unqueſtionably the moſt convenient.

This acid gas has alſo been found to be heavier than common air. The proportion between theſe two airs in weight, according to Mr. Kirwan, is as 45.69 to 68.74; but according to the experiments of Mr. Lavoiſier, as 48.81 to 69.50. The great weight of this gas cauſes it to occupy the loweſt ſituations; and even gives it the property of being poured out from one veſſel to another, ſo as to diſplace the atmoſpheric air.

It ſeems now to be proved, by a ſufficient number of experiments, that the carbonic acid is a combination of carbone, or pure charcoal, and oxigene. Thus the oxides of mercury, when diſtilled, are reducible without addition, and afford only oxigenous gas; but if a ſmall quantity of charcoal be mixed with the oxide, the product which comes over conſiſts of carbonic gas only, and the weight of the charcoal is diminiſhed. If well-made charcoal be ignited, and plunged into a veſſel filled with oxigenous gas, and the veſſel be inſtantly cloſed, the charcoal burns rapidly, and at laſt goes out: the product in this experiment is carbonic acid, which may be ſeparated by the known proceſſes; the remainder is a ſmall quantity of oxigenous gas, which may be converted into carbonic acid by the ſame treatment.

It has been found that the proportion of charcoal to that of oxigene is as 12.0288 to 56.687. In ſome caſes where the carbonic acid is obtained by burning hydrogenous gas, it ariſes from carbone being held in ſolution in this gas. The carbone may even be diſſolved in hydrogenous gas, by expoſing it to the focus of the burning mirror in the mercurial apparatus, under a glaſs veſſel filled with this gas. The hydrogenous gas which is extracted from a mixture of ſulphuric acid and iron, holds more or leſs of charcoal in ſolution; as iron itſelf contains this ſubſtance in a greater or leſs quantity, as has been aſcertained by the fine experiments of Mr. Berthollet, Monge, and Vander Monde. The alkalis, ſuch as we uſually meet with them, alſo contain carbonic acid; and it is this acid which modifies them, and diminiſhes their energy, at the ſame time that it communicates to them the property of effervefcing. Alkalis may therefore be conſidered as carbonates with an exceſs of alkali; and it is eaſy to ſaturate this ſuperabundant alkali, and to form cryſtallizable neutral ſalts.

Carbonate of Pot-aſh.—What is called *carbonate of pot-aſh*, in the new chemiſtry, is a neutral ſalt reſulting from a ſaturated combination of carbonic acid with pot-aſh. It was formerly diſtinguiſhed by ſeveral different names, as *cretaceous tartar*, *mephitic tartar*, &c. and was always taken for a pure alkali, until the experiments of Doctor Black ſhewed it to be a neutral ſalt. The old name by which it was known was that of *fixed ſalt of tartar*, from its being obtained by the incineration of tartar of wine; and it was conſidered as an alkali, on account of its poſſeſſing ſome of the properties of thoſe ſalts. The method of cauſing oil of tartar to cryſtallize, has been known for a conſiderable length of time; and both Bonhius and Montet have ſucceſſively ſhewn the manner of conducting theſe proceſſes: the moſt ſimple method however conſiſts in expoſing an alkaline ſolution in an atmoſphere of the carbonic acid gas which is diſengaged in the vinous fermentation; in this way the alkali becomes ſaturated, and forms tetrahedral priſmatic cryſtals terminated by very ſhort four-ſided pyramids. Mr. Chaptal has frequently obtained thoſe cryſtals in the form of quadrangular priſms, with their extremities cut off ſlantwiſe. This neutral ſalt no longer poſſeſſes the urinous

tafte of the alkali, but exhibits the penetrating tafte of neutral falts, and may be employed in medicine with the greateft fuccefs, and convenience, as it poffeffes an advantage beyond the falt of tartar, in being lefs cauftic, and always of the fame virtue. According to the analyfis of Bergman, carbonate of pot-afh, when faturated with the acid, and regularly cryftallized, to which he gives the name of *aërated vegetable alkali*, contains twenty parts of the acid, forty-eight of pure alkali, and thirty-two of water, in the quintal. But it muft be obferved, that carbonates are more liable than other neutral falts to vary in the quantity of the acid. This falt when perfectly cryftallized, does not attract the humidity of the air, as it may be preferved for feveral years in an open veffel, without any appearance of alteration.

The carbonate of pot-afh is decompofed by filex in a fufficient degree of heat, which occafions a confiderable boiling or ebullition. The refidue is glafs, in which the alkali is in the cauftic ftate. Lime likewife decompofes it, having a greater affinity than pot-afh with the acid. Lime-water poured into a folution of carbonate of pot-afh, gives a precipitate of an almoft infoluble falt, produced by the combination of lime with the carbonic acid; and the pure or cauftic alkali remains diffolved in the water. In pharmacy, this procefs is made ufe of for the preparation of the *lapis caufticus*, which is nothing but fixed vegetable alkali rendered cauftic by lime. Thus, lime decompofes the carbonate by uniting with the acid, and acids produce the fame effect by feizing and combining with the alkaline bafes.

Carbonate of Soda.—This falt, like the foregoing, was formerly thought an alkali. It is, however, a combination of the carbonic acid with the mineral alkali; and feems to be the falt which the ancients called *natron*. Generally however it has been called *falt of foda*, becaufe it can be obtained pure, and regularly cryftallized by evaporating a lixivium of common foda. It has alfo had other denominations, as *aërated mineral alkali, cretaceous foda*, &c. The mineral alkali, in its natural ftate, contains a greater quantity of carbonic acid than the vegetable; and nothing more is neceffary than to diffolve it, and duly evaporate the water, in order to obtain it in cryftals. Thefe cryftals are ufually rhomboidal octahedrons; and fometimes have the form of rhomboidal laminæ, being applied obliquely one upon the other, in a manner refembling tiles. When this falt is expofed to the air, it crumbles down very readily into duft; as the air deprives it of the water of its cryftallization: but it is not altered by this efflorefcence; as we can reftore to it its primary form by folution in water.

By an exact analyfis, Bergman has found, that one hundred parts of carbonate of foda which he denominates *aerated mineral alkali*, contain fixteen parts of the acid, twenty of pure alkali, and fixty-four of water. The affinity of its bafis with filex is ftronger than that of the carbonate of pot-afh; in confequence of which, the vitrification it produces is more quick, eafy, and perfect.

Lime, barytes, and the acids, decompofe this falt with the fame phenomena that have been obferved in treating of the *carbonate of pot-afh*.

Carbonate of Ammoniac.—This name has been given to a kind of falt which has generally been known by the title of concrete volatile alkali; and fometimes by that of cretaceous volatile alkali, &c. It may be obtained by diftillation from many animal fubftances. Tobacco affords, likewife, a large proportion; but almoft the whole of that which is employed in the arts, and in medicine, is formed by the direct combination of the carbonic acid and ammoniac, or volatile alkali. This combination may be effected, by paffing the carbonic acid through ammoniac, or the pure volatile alkali in folution; by expofing ammoniac in an atmofphere of carbonic acid gas; and by decompofing the muriate of ammoniac by the neutral falts which contain this acid, fuch as the carbonate of lime or common chalk. For this purpofe, white chalk is taken, and very accurately dried; and then mixed with equal parts of muriate of ammoniac, or common fal ammoniac in fine powder. This mixture is put into a retort, and diftilled; the ammoniac and the carbonic acid being difengaged from their bafes, and reduced into vapours, combine together, and are depofited on the fides of the receiver, where they form a ftratum more or lefs thick. The form of the cryftallization of this carbonate appears, by the experiments of Mr. Chaptal, to be that of a four-fided prifm, terminated by a dihedral fummit. The carbonate has lefs fmell than the ammoniac; it is very foluble in water. Even cold water diffolves its own weight of this falt, at the temperature of fixty degrees of Fahrenheit. By the accurate experiments of Bergman, it has been found that one hundred grains of this falt contain forty-five parts of the acid, forty-three of alkali, and twelve of water.

Moft of the acids decompofe this falt, and difplace the carbonic acid from it.

Sect. XII. *Of the Sulphuric Acid.*

The fulphuric acid, which has generally been denominated *vitriolic acid*, is a very cauftic faline fubftance, which, when concentrated, burns and cauterizes the fkin, reddens fyrup of violets without deftroying its colour, and when diluted in a large proportion of water, has a four, ftiptic tafte. This acid, when pure, appears under the form of a very tranfparent oleaginous fluid, twice the fpecific weight of diftilled water, deftitute of fmell, and united with water, from which there are yet no means known of feparating it. It has received the name of the *vitriolic acid*, becaufe it ufed formerly to be obtained from martial vitriol by diftillation. At prefent it is obtained both in this country and in France, by the complete combuftion of fulphur. Its nature, therefore, and the manner in which it is obtained, render it proper to give it the name of the *fulphuric acid*.

It is obvious that fulphur, like every other combuftible fubftance, cannot be burnt but by virtue of the oxigenous gas which combines with it. The moft ufual phenomena which accompany this combuftion, are, a blue flame, a whitifh and fuffocating vapour, and a ftrong, penetrating, and difagreeable fmell. The refults of this combination vary according to the proportion in which thefe two principles enter into this fame combination. Therefore, the fulphureous or the fulphuric acid may be at pleafure obtained from fublimed fulphur, or from crude fulphur, accordingly as a greater or lefs quantity of oxigene is combined with the fulphur, by means of combuftion. When the current of air which maintains the combuftion is rapid, the fulphur is carried, and depofited without any apparent alteration, in the internal part of the leaden chambers in which the fulphuric acid or oil of vitriol is made; but if the current of air be rendered more moderate, the combination is fomewhat more accurate; the fulphur is partly changed, and is depofited in a pellicle upon the furface of the water. This pellicle is flexible like a fkin, and may be handled and turned over in the fame manner. If the current be ftill lefs rapid, and the air be fuffered to have a fufficient time to form an accurate combination with the fulphur, the refult is fulphureous acid; which acid preferves its gafeous form at the temperature of the atmofphere, and may become liquid like water by the application of cold, as the ingenious experiments of Mr. Monge have fully fhewn. If the combuftion be ftill flower, and the air be fuffered to digeft upon the fulphur a longer time, and with greater accuracy, the refult is fulphuric acid: this laft combination may be facilitated by the mixture

of nitrate of pot-ash or common nitre, as that substance furnishes oxigene very copiously.

The different processes which are capable of being employed for extracting the sulphuric acid, are reducible to two: the extraction of it from substances in which it is contained; and the forming it directly by the combination of sulphur and oxigene. In the first case, the sulphures, or vitriolic salts of iron, copper, or zinc, and even those whose bases are clay and lime, according to some chemists, may be exposed to distillation. These processes, however, are too difficult and expensive: they have therefore yielded to others of greater simplicity.

In the second case, the oxigene may be presented to the sulphur in two forms; either in the state of gas, or in the concrete state. The combustion of sulphur by oxigenous gas is performed in large chambers lined with lead; and this combustion is facilitated by mixing about one-eighth of a nitrate of pot-ash with the sulphur. The acid vapours which fill the chamber are precipitated against its sides, and the condensation is facilitated by a stratum of water disposed on the bottom of the chamber. In some manufactories in Holland, this combustion is performed in large glass balloons with wide mouths, and the vapours are precipitated upon water placed at the bottom. In both cases, when the water is sufficiently impregnated with acid, it is concentrated in leaden boilers, and rectified in glass retorts, to render it white, and to concentrate it sufficiently for the purposes of trade. The acid, when of a proper strength, indicates sixty-six degrees, according to the acrometer of Mr. Baumé; and when it has not been carried to this degree, it is unfit for most of the uses for which it is intended. It cannot, for example, be employed in dissolving indigo; for the small quantity of nitric acid which it contains, unites with the blue of the indigo, and forms a green colour.

In cases where the oxigene in the concrete state is presented to the sulphur, it is in combination with other bodies, which it abandons to unite with this last. This happens when the nitric acid is distilled from sulphur. Forty eight ounces of this acid, at thirty-six degrees, distilled from two ounces of sulphur, has been found to afford nearly four ounces of good sulphuric acid. Sulphur may likewise be converted into sulphuric acid by means of the oxigenated muriatic acid. The sulphuric acid which is found disengaged in some places in Italy, appears also to arise from the combustion of sulphur.

By the first trial of Mr. Berthollet, sixty-nine parts of sulphur with thirty-one parts of oxigene formed one hundred parts of sulphuric acid; and, according to a second experiment, seventy-two of sulphur and twenty-eight of oxigene formed one hundred parts of dry acid. The various degrees of concentration of the sulphuric acid have caused it to be distinguished in commerce by different names, as Spirit of Vitriol, Oil of Vitriol, and Glacial Oil of Vitriol. The sulphuric acid is capable of passing to the concrete state by the impression of intense cold. This congelation is a phenomenon which has long been observed; Kunckel and Bohn have mentioned it; and it did not escape the ingenious Dr. Boerhaave. On this subject the experiments of Mr. Kier and those of Mr. Cavendish are also highly curious and interesting. We are also indebted to the Duke D'Ayen for some very valuable experiments upon the congelation of this acid; which have been repeated with equal success by Mr. de Morveau, who has proved that this congelation may be effected at a degree of cold considerably less than what had been mentioned. Mr. Chaptal has several times obtained beautiful crystals of sulphuric acid in flattened hexahedral prisms, terminated by an hexahedral pyramid; and his experiments have enabled him to conclude, that the very concentrated acid crystallizes more difficultly than that, the density of which lies between sixty-three and sixty-five; and, that the proper degree of cold is from 1 to 3 degrees below 0 of Reaumur.

The characteristic properties of the sulphuric acid are the following. It is unctuous and fat to the touch, which has occasioned it to obtain the very improper name of Oil of Vitriol. It weighs one ounce and seven drachms in a bottle containing one ounce of distilled water. It produces heat, when mixed with water, to such a degree as to exceed that of boiling water. If one end of a tube of glass be closed, and water poured into it, and the closed end of this tube be plunged into water, the water in the tube may be made to boil by pouring sulphuric acid into the external water which surrounds the tube. It seizes with great avidity all inflammable substances; and it is blackened and decomposed by this combination. The sulphuric acid is made use of in many of the arts, more especially by the dyer and the hat-maker; by the former it is employed for dissolving indigo, which is by that means carried in a state of extreme division, upon the stuffs to be dyed. It is one of the most common and useful menstrua in the laboratory.

The sulphureous acid is used in dying, for whitening silks, and giving them a beautiful lustre; also for taking out stains.

Sulphate of Pot-ash.—This sulphate, which has been called *Vitriolated Tartar*, *Sal de duobus*, *Polychrest salt*, and *Arcanum duplicatum*, is a salt, resulting, as its name denotes, from the combination of the sulphuric acid with pot-ash. This salt is generally in a greater or a less degree transparent and regular; its crystals differ in form and magnitude, according to the circumstances in which they are obtained. When formed slowly in the small way, they assume the figure of hexahedral prisms, terminating in hexahedral pyramids, with triangular faces. It has a lively and penetrating taste, and melts difficultly in the mouth. It decrepitates on hot coals, becomes red-hot before it fuses, and is volatilized without decomposition. It is soluble in fixteen parts of cold water, at the temperature of 60 degrees of Fahrenheit; and boiling water dissolves one-fifth of it in weight. One hundred grains of this salt contain 30.21 of acid, 64.61 of alkali, and 5.18 of water.

Almost all the sulphate of pot-ash used in medicine is formed by the direct combination of the sulphuric acid and pot-ash, or the vegetable alkali; but that which is met with in commerce is produced in the distillation of aquafortis, by the sulphuric acid: this has the form of beautiful crystals. From the analysis of tobacco, Mr. Chaptal has also been enabled to procure this salt.

It has likewise been shewn by Mr. Baumé, that the nitric acid, assisted by heat, is capable of decomposing the sulphate of pot-ash; and Mr. Cornette has since proved that the muriatic acid possesses the same virtue; and in 1780, Mr. Chaptal observed that this acid may be displaced by the nitric acid, without the assistance of heat; though the sulphuric acid resumes its place when the solution is concentrated by means of heat.

Sulphate of Soda.—The sulphate of soda, which has been commonly known by the name of *Glauber salt*, from the name of the German chemist who first discovered it, is a neutral salt, formed, as its name indicates, by the union of the sulphuric acid with mineral alkali or soda. This salt possesses many properties in common with sulphate of pot-ash, and some peculiar to itself. It is equally disposed to crystallize as the other; has a bitter taste, and easily dissolves in the mouth; is scarce fusible, and incapable of union with earths; but like sulphate of pot-ash, is partly decomposable by the nitrous and muriatic acids. Its crystals are of the form of rectangular octahedrons of a prismatic shape, the two pyrimids of which are truncated near their basis.

This sulphate swells up upon heated coals, and boils, in consequence of the dissipation of its water of crystallization. After this water has been dispersed, there remains only a white powder, difficult of fusion, which is volatilized without decomposition by a strong heat. By exposure to the air, it effervesces,

loſes its tranſparency, and is reduced to a fine powder. Three parts of water, at 60 degrees of Fahrenheit's thermometer, diſſolve one part of this ſalt; and boiling water diſſolves its own weight. One hundred grains of ſulphate of ſoda contain about 14 of acid, 22 of alkali, and 64 of water.

This ſalt is formed by the direct combination of the two principles which contain it; and the plant called *tamarix gallica*, which grows on the ſea coaſts, contains ſo large a quantity, that it can be extracted with advantage. This is done by burning and lixiviating the aſhes of the plant. This ſulphate is likewiſe formed in the laboratory when the muriate of ſoda, or common ſalt, is decompoſed by the ſulphuric acid. Pot-aſh when diſſolved by heat in a ſolution of ſulphate of ſoda, precipitates the ſoda, and takes the place, which it poſſeſſed.

Sulphate of Ammoniac.—This ſulphate, which was formerly known by the names of *Ammoniacal Vitriolic Salt* and *Glauber's Secret Ammoniacal Salt*, has a very bitter and diſagreeable taſte. It cryſtallizes in long flattened priſms with ſix ſides, terminated by ſix-ſided pyramids; but it cannot be obtained in well-formed cryſtals except by means of inſenſible evaporation. It ſlightly attracts the humidity of the air; liquefies by a gentle heat, and riſes over a moderate fire. Two parts of cold water diſſolve one of this ſalt; and boiling water diſſolves its own weight of it according to the experiments of Mr. Fourcroy. The fixed alkalis, barytes, and lime, diſengage the ammoniac from it; and the nitric and muriatic acids diſengage the ſulphuric acid.

The ſulphate of ammoniac has never yet been found among the products of nature, but art can produce it by a direct combination of the ſulphuric acid with ammoniac, by decompoſing earthy or metallic ſalts with volatile alkali, and by the decompoſition of nitric, muriatic, and carbonic ammoniacal ſalts with ſulphuric acid.

SECT. XIII. *Of the Nitric Acid.*

THIS acid, which in commerce is called *Aqua-fortis*, is lighter than the ſulphuric. In a liquid and pure ſtate it is white; but, as uſually met with, it has a yellow colour, a ſtrong and diſagreeable ſmell, and emits red vapours. It gives a yellow colour to the ſkin, to ſilk, and to almoſt all animal ſubſtances with which it may come in contact. It diſſolves and ſpeedily corrodes iron, copper, zinc, &c. in which caſe a cloud of red vapours eſcapes during the time of its action. It reddens and entirely deſtroys the colour of violets: it unites to water with facility; and the mixture aſſumes a green colour, which diſappears if ſtill further diluted. This acid has nowhere been found in a diſengaged ſtate. It always exiſts in a ſtate of combination; and it is from theſe combinations that the art of chemiſtry extracts it, in order to apply it to various uſes. The nitrate of pot-aſh, or common nitre, is the combination which is moſt generally known, and is that from which the nitric acid is moſt commonly extracted.

The proceſs which is generally employed in commerce to make *aqua fortis*, conſiſts in mixing one part of ſalt-petre with two or three parts of red bolar earth. This mixture is put into coated retorts, diſpoſed in a gallery or long furnace, to each of which is adapted a receiver. The firſt vapour which ariſes in the diſtillation is nothing but water, which is ſuffered to eſcape at the place of juncture, before the luting: and when the red vapours begin to appear, the phlegm which is condenſed in the receiver is poured out; and the receiver, being replaced, is carefully luted to the neck of the retort. The vapours which are condenſed, form at firſt a greeniſh liquor: this colour diſappears inſenſibly, and is replaced by another which is more or leſs yellow. Some chemiſts, and particularly Mr. Baumé, have been of opinion that the earth acted upon the ſaltpetre by virtue of the ſulphuric acid it contained. But not to mention that this principle does not exiſt in all the earths made uſe of, as has been ſhown by Macquer, De Morveau, and Scheele; it is well known that pulverized flints equally produce the decompoſition of ſaltpetre. Mr. Chaptal is of opinion, that the effect of theſe earths upon the ſalt ought to be referred to the very evident affinity of the alkali to the ſilex, which is a principal component part; and more eſpecially to the ſlight degree of adheſion which exiſts between the conſtituent principles of nitrate of pot-aſh, or common nitre.

The nitrate of pot-aſh, or ſaltpetre, is decompoſed in laboratories by means of the ſulphuric acid. Very pure nitrate of pot-aſh is taken, and introduced into a tubulated retort, placed in a ſand bath, with a receiver adapted. All the places of junction are carefully luted; and as much ſulphuric acid as amounts to half the weight of the ſalt is poured through the tubulure; and the diſtillation is proceeded upon. Care muſt be taken to fit a tube into the tubulure of the receiver; the other end of which muſt be plunged into water, to condenſe the vapours, and to remove all fear of an exploſion. Inſtead of employing the ſulphuric acid, we may alſo ſubſtitute the ſulphate of iron, and mix it with ſaltpetre in equal parts. In this caſe the reſidue of the diſtillation, when well waſhed, forms the mild earth of vitriol which is employed in poliſhing glaſs.

But whatever precaution is taken in the purification of the ſaltpetre, and however great the attention may be which is beſtowed upon its diſtillation, the nitric acid is always impregnated with ſome foreign acid, either the ſulphuric or muriatic, from which it requires to be purified. It is cleared of the firſt by re-diſtilling it upon very pure ſaltpetre, which retains the ſmall quantity of ſulphuric acid that may exiſt in the mixture. It is deprived of the ſecond by pouring into it a few drops of a ſolution of nitrate of ſilver. The muriatic acid combines with the ſilver, and is precipitated with it in the form of an inſoluble ſalt. The fluid is then ſuffered to remain at reſt, and is afterwards decanted from the precipitate or depoſition. This acid, ſo purified, is known under different names, as *Aqua Fortis for Parting*, *Precipitated Nitrous Acid*, *Pure Nitric Acid*, &c. Stahl conſidered the nitric acid as a modification of the ſulphuric, produced by its combination with an inflammable principle; and the experiments of Dr. Hales led him ſtill nearer to this concluſion, as his manipulations were ſucceſſively employed upon the two conſtituent principles of the nitric acid. This celebrated philoſopher obtained ninety cubic inches of air from half a cubic inch of nitre; but he proceeded no further in his concluſions, than to aſſert that this air is the principal cauſe of the exploſions of nitre. The ſame philoſopher alſo relates that the pyrites of Walton, treated with equal quantities of ſpirit of nitre and water, produces an air which has the property of abſorbing the freſh air, which may be made to enter the veſſel. This great man, therefore, extracted ſucceſſively the two principles of the nitric acid; and his ingenious experiments probably paved the way to the diſcoveries which have been lately made by Dr. Prieſtley. It was not however until the year 1776 that the analyſis of the nitric acid was well known. Mr. Lavoiſier, by diſtilling this acid from mercury, and receiving the ſeveral products in the pneumato-chemical apparatus, has proved that the nitric acid, whoſe ſpecific gravity is to that of diſtilled water as 131607 to 100000, contains one ounce, ſeven drams, and fifty-one grains and a quarter of nitrous gas; one ounce, ſeven drams, and ſeven grains and a half of oxigenous gas, and thirteen ounces of water. By combining theſe three principles together the decompoſed acid was regenerated.

It is evident that the action of the nitric acid on moſt inflammable matters, conſiſts in nothing more than a continual

decompofition of this acid. If the nitric acid be poured upon iron, copper, or zinc, thefe metals are inftantly attacked with a ftrong effervefcence; and a confiderable difengagement of vapours takes place, which become of a red colour by their combination with the atmofpheric air, but which may be retained and collected in the ftate of gas in the hydro-pneumatic apparatus. In all thefe cafes the metals are ftrongly oxided. This acid, when mixed with oils, renders them thick and black, and either converts them into charcoal, or inflames them, according as it is more or lefs concentrated, or in a greater or lefs quantity. If very concentrated nitric acid be put into a fmall phial, and be poured upon very dry charcoal in an impalpable powder, it fets it on fire inftantly, at the fame time that carbonic acid and nitrogene gas are difengaged. The different acids which are obtained by the digeftions of the nitric acid on certain fubftances, fuch as the oxalic acid, or acid of fugar, the arfenical acid, &c. owe their exiftence merely to the decompofition of the nitric acid, the oxigene of which is fixed in combination with the bodies upon which the acid is diftilled. The facility with which this acid is decompofed, renders it one of the moft active; becaufe the action of acids upon moft bodies is a confequence of their own proper decompofition. The characters of nitrous gas, which is extracted by the decompofition of the acid, are the following: it is invifible, or perfectly tranfparent; its fpecific gravity is rather lefs than that of atmofpherical air; it is unfit for refpiration, though the abbé Fontana has afferted that he refpired it without danger; it does not maintain combuftion; it is not acid, according to the experiments of the duke de Chaulnes; but it combines with oxigene, and re-produces the nitric acid.

With refpect to the nature of nitrous gas, it was for fome time pretended, that it confifted of the nitric acid faturated with phlogifton. This opinion ought, however, to have been abandoned as foon as it was proved that the nitric acid depofited its oxigene upon the bodies on which it acted; and that the nitrous gas was lefs in weight than the acid made ufe of. A beautiful experiment of Mr. Cavendifh's has, however, thrown great light on the fubject. This ingenious chemift having introduced into a tube of glafs feven parts of oxigenous gas obtained without nitrous acid, and three parts of nitrogene gas; or, by eftimating thefe quantities in weight, ten parts of nitrogene to twenty-fix of oxigene; and having caufed the electric fpark to pafs through this mixture, perceived that its volume or bulk was greatly diminifhed, and ultimately fucceeded in converting it into nitric acid. It may therefore be prefumed, from his experiment, that the acid is a combination of feven parts of oxigene, and three of nitrogene. Thefe proportions conftitute the ordinary nitric acid; but when a portion of its oxigene is taken away, it paffes to the ftate of nitrous gas; fo that nitrous gas is a combination of nitrogene gas, with a fmall quantity of oxigene. Nitrous gas may be decompofed by expofing it to a folution of the fulphure of pot-afh, or hepar of fulphur: the oxigene gas unites to the fulphur, and forms fulphuric acid; while the nitrogene gas remains behind in a ftate of purity. It may likewife be decompofed by means of pyrophorus, which burns in this air, and abforbs the oxigenous gas. The electric fpark has alfo the property of decompofing nitrous gas. It has been obferved by Mr. Van Marum, that three cubic inches of nitrous gas are reduced by electricity to one cubic inch and three quarters; and that this refidue no longer poffeffed any property of nitrous gas; and from the experiments of Mr. Lavoifier, it appears that one hundred grains of nitrous gas contain thirty-two parts of nitrogene, and fixty-eight of oxigene. The fame chemift has alfo found, that one hundred grains of nitric acid contain feventy-nine and a half of oxigene, and twenty and a half of nitrogene: it is for this reafon that nitrous gas fhould be employed in a lefs proportion than nitrogene gas, to combine with the oxigene gas, and form the nitric acid. Thefe opinions refpecting the compofition of the nitrous acid appear to be confirmed by the repeated proofs we now have of the neceffity of caufing fubftances, which afford much nitrogene gas, to be prefented to the oxigene gas, in order to obtain nitric acid.

The different ftates of the nitric acid may be fully explained on this theory, as the fuming nitrous acid is that in which the oxigene does not exift in a fufficient proportion; for the whiteft and the moft faturated nitric acid may be rendered fuming and ruddy by depriving it of a part of its oxigene by means of metals, oils, inflammable fubftances, &c. or even by difengaging the oxigene by the fimple expofition of the acid to the light of the fun, as Mr. Berthollet has fhown by his valuable experiments. The property which nitrous gas poffeffes, of abforbing oxigene to form the nitric acid, has caufed it to be employed to determine the proportion of oxigene in the compofition which forms our atmofphere; for on thefe principles the abbé Fontana has conftructed an ingenious eudiometer.

Nitrate of Pot-afh.—Nitrate of pot-afh, common nitre, or faltpetre, is formed by a faturated combination of the nitric acid with pot afh. This falt has a frefh penetrating tafte, followed by a fenfation of coldnefs; is a perfect neutral falt, and does not alter the colour of fyrup of violets. It is rarely the product of any direct combination of its two conftituent parts, but is generally found ready formed in certain places: in this manner it is that the whole of the nitre employed in the arts is obtained. In the Eaft Indies it effloref ces on the furface of uncultivated grounds, and the inhabitants lixiviate thefe earths with water, which they afterwards boil and cryftallize in earthen pots. Mr. Dombey found a great quantity of faltpetre near Lima, upon earths which ferve for pafture, and which produce only gramineous plants; and Mr. Talbot Dillon, in his travels into Spain, has obferved that one-third of all the grounds, and in the fouthern parts of that kingdom even the duft of the roads, contain faltpetre. In France faltpetre is commonly extracted from the ruins and plafter of old houfes. This falt has alfo been found ready formed in fome kinds of vegetables, fuch as parietaria and buglofs, &c. and its exiftence has been proved in all extracts which are capable of fermenting. The fermentation of faltpetre may be favoured, by caufing certain circumftances to concur which are of advantage to its formation. In the north of Europe the faltpetre-beds are formed with lime, afhes, earth of uncultivated grounds, and ftraw, which are ftratified, and watered with urine, dunghill-water, and mother waters. Thefe beds are defended by a covering of heath or broom. It has been long known that nitre is formed moft readily near habitations, or in earths impregnated with animal products; and likewife that, in general, the alkaline bafis was afforded by the concurrence of a vegetable fermentation. It has alfo been proved by Mr. Thouvenel, in an ingenious memoir, that the gas which is difengaged by putrefaction, is neceffary to the formation of nitre; that blood, and next to it urine, are the animal parts which are the moft favourable to its formation; that the moft minutely divided and the lighteft earths are the moft proper for nitrification; and that the current of air muft be properly managed, to fix upon thefe earths the nitric acid which is formed. It therefore follows from all the difcoveries and obfervations which have hitherto been made, that in order to eftablifh artificial nitre-beds, it is neceffary that animal putrefaction and vegetable fermentation fhould concur. The nitrogene gas, in its difengagement from the animal fubftances, combines with the oxigene, and forms the acid, which again unites with the alkali, whofe formation is favoured by the vegetable decompofition. When the manufacturer is in poffeffion of faltpetre-grounds, whether by the fimple operations of nature, or by the affiftance of art, the faltpetre is to be ex-

tracted by the lixiviation of these earths; which lixivium is afterwards to be concentrated, and made to crystallize. In proportion as the evaporation goes forward, the marine salt, which almost always accompanies the formation of nitre, is precipitated. This is taken out with ladles, and set to drain in baskets placed over the boilers. As a great part of the nitre has, however, an earthy basis, and requires to be furnished with an alkaline one, in order to cause it to crystallize, this purpose is accomplished either by mixing ashes with the saltpetre-earths, or by adding an alkali ready formed to the lixivium itself. Nitre obtained by this first operation is never pure, but contains sea-salt, and an extractive and colouring principle, from which it must be cleared. For this purpose it is dissolved in fresh water, which is evaporated; and to which bullocks' blood may be added, to clarify the solution. The nitre obtained by the second manipulation is known by the name of *Nitre of the Second Boiling*; and if recourse be had to a third operation to purify it, it is then entitled *Nitre of the Third Boiling*. The nitrate of pot-ash, when purified, is employed in delicate operations, such as the manufacture of gunpowder, the preparation of *aqua fortis* for parting, and the solution of mercury, &c. The saltpetre of the first boiling is used in those works where *aqua fortis* is made for the dyers. It affords a nitro muriatic acid, which is capable of dissolving tin by itself.

The crystallization of the nitrate of pot-ash is in prismatic octahedrons, which almost always represent six sided flattened prisms, terminated by dihedral summits. It is fusible upon ignited coals; and in this case its acid is decomposed. The oxigene unites with the carbone, and forms the carbonic acid; the nitrogene gas and the water are dissipated; and it is this mixture of principles which has been known under the name of clyssus of nitre. The distillation of the nitrate of pot-ash affords twelve thousand cubic inches of oxigenous gas for each pound of the salt. Seven parts of water dissolve one of nitre, at sixty degrees of Fahrenheit; and boiling water dissolves its own weight of this salt. One hundred grains of the crystals of nitre contain thirty of acid, sixty-three of alkali, and seven of water. When a mixture of equal parts of nitre and sulphur are thrown into a red-hot crucible, a saline substance is obtained, which was formerly known by the name of *Sal Polychrest* of *Glaser*, and which has since been considered as sulphate of pot-ash. If nitre be fused, and a few pinches of sulphur be thrown upon this salt in fusion, and the whole be afterwards poured out, or cast into plates, it forms a salt known by the name of *crystal mineral*. A mixture of seventy-five parts of nitre, nine and a half of sulphur, and fifteen and a half of charcoal, when properly triturated, forms gun-powder; the powerful effects of which are well known. See GUN-POWDER.

There is also another composition in which this salt is employed, and which produces effects still more tremendous than those of gun-powder; it has the name of *fulminating powder*, and is made by the mixture and trituration of three parts of nitre, two of salt of tartar, and one of sulphur. In order to obtain the full effect of this powder, it must be exposed in a ladle to a gentle heat; when the mixture melts, a sulphurous blue flame appears, and the explosion takes place. Care must be taken to give neither too strong nor too slight a degree of heat. In either case, the combustion of the principles takes place separately, and without explosion or noise. See FULMINATING POWDER.

Nitrate of Soda.—Nitrate of soda, which has been called *cubic*, *quadrangular*, and *rhomboidal nitre*, is a neutral salt, resulting from a saturated combination of the nitric acid with soda. This salt constantly appears in pretty large and very regular rhomboidal crystals; the name of *cubic nitre* is therefore improperly used. It has a cool, fresh, and rather more bitter taste than that of the nitre of pot-ash. It slightly attracts the humidity of the air; and dissolves in cold water even more readily than some other neutral salts; for two parts of water, at the ordinary temperature of 60°, are sufficient to dissolve one part of nitrate of soda. Boiling water scarcely dissolves it in a greater proportion: therefore, when we wish to obtain it in regular crystals, the solution must be slowly evaporated. If a tolerably clear lixivium of this salt be set aside in a dry place, at the end of some months it will be found to contain rhomboidal crystals, six or eight lines, and sometimes near an inch, long. This is probably the happiest process for crystallizing salts that are as soluble in cold as in warm water. This salt also fuses upon burning coals with a yellow colour; while common nitre, according to the experiments of Margraff, affords a white flame. One hundred grains of this salt contain 28.80 of acid, 50.09 of alkali, and 21.11 of water. Nitrate of soda has not yet been found in nature; it is always a product of art, and is formed in the following ways: by the direct combination of the nitric acid with soda; by decomposing with this alkali earthy nitrates, ammoniacal nitrate, and metallic nitrates; by decomposing muriate of soda with the nitric acid for an intermedium; by decomposing sulphate of soda by the fuming spirit of nitre; and by decomposing such nitrous solutions of metals as are susceptible of it with muriate of soda: in this instance, in proportion as the muriatic acid combines with the metal, separating from it the nitric acid, the separated acid combines with the soda, which has also deserted the acid with which it was before united.

Nitrate of Ammoniac.—This salt is a product of art, and is prepared by the direct combination of the nitric acid with ammoniac.

The vapours of ammoniac, or volatile alkali, being brought into contact with those of the nitrous acid, combine with them, and form a white and thick cloud, which slowly subsides. But when the acid is directly united to the alkali, the result is a salt, which has a cool, bitter, and urinous taste. The figure of its crystals is not well ascertained.

Mr. de Lisle thinks that it crystallizes in beautiful needles, similar to those of sulphate of pot-ash. Crystals of this kind cannot be obtained, however, but by a very slow evaporation. When this salt is exposed to the fire, it liquefies, emits aqueous vapours, dries, and detonates.

SECT. XIV. *Of the Muriatic Acid.*

THIS acid has been generally known by the name of *Marine Acid*, and among artisans is still distinguished by the name of *Spirit of Salt*. When pure, this acid is colourless. It is lighter than the two preceding acids, and has a strong penetrating smell, resembling that of saffron, but infinitely more pungent; it emits white vapours when it is concentrated, and precipitates silver from its solution in the form of an insoluble salt, &c. This acid has no where been found disengaged; therefore in order to obtain it in this state, it must be disengaged from its combinations; and for this purpose common salt is generally employed.

The spirit of salt used in commerce is obtained by a process, differing very little from that which is used in the extraction of *aqua fortis*. But as this acid adheres more strongly to its basis, the product is very weak, and only part of the marine salt is decomposed. Flints pulverized, and mixed with this salt, do not separate the acid. Ten pounds of flints in powder, treated by a violent fire with two pounds of salt, did not afford in the trials of Mr. Chaptal any other product than a mass of the colour of litharge. The fumes that issued from it were not perceptibly acid. The results of repeated experiments by the same excellent chemist also prove, that if clay, which has once served to decompose marine salt, be mixed with a new quantity of the same salt, it will not decompose an atom of it, even though the mixture be moistened and formed into a paste. The sulphate of iron, or martial vitriol, which so readily disengages the nitric

acid, decompofes marine falt very imperfectly. The impure foda which is known in France by the name of *blanquette*, the analyfis of which by Mr. Chaptal has exhibited twenty-one pounds of common falt out of twenty-five, fcarcely affords any muriatic acid when it is diftilled with the fulphuric acid; but yields abundance of fulphureous acid. Thefe refults have been attributed by Mr. Berard to the coal contained in this kind of foda which decompofed the fulphuric acid. For after calcining this fubftance, and thereby deftroying the charcoal, he found that it might be treated in the fame way, and with the fame fuccefs as common falt.

It is ufual to employ the fulphuric acid to decompofe marine falt. An excellent method of proceeding confifts in drying the marine falt, pounding it, and putting it into a tubulated retort placed upon a fand bath. A receiver is adapted to the retort, and afterwards two bottles, after the manner of Woulfe, in which a weight of diftilled water equal to that of the marine falt made ufe of is diftributed. The joinings of the veffels are then luted, but with the greateft caution; and when the apparatus is thus fitted up, a quantity of fulphuric acid is poured through the tubulure equal to half the weight of the falt. A confiderable ebullition is immediately excited; and when this effervefcence is in fome degree ceafed, the retort is gradually heated, and the mixture made to boil. The acid is difengaged in the ftate of gas; and mixes rapidly with the water, in which it producess a confiderable degree of heat. The water of the firft bottle is ufually faturated with the acid gas, and forms a very concentrated and fuming acid; and though the fecond be weaker, it may be carried to any defired degree of concentration, by impregnating it with a new quantity of the gas.

The particular nature of the muriatic acid, and the principles of its compofition, have not hitherto been fufficiently explained. It is capable, however, of combining with an additional proportion of oxigene; and, what is very remarkable, it becomes more volatile in confequence of this additional quantity; whereas the other acids appear to acquire a greater degree of fixity in the fame circumftances. It may even be faid, that its acid virtues become weaker in this cafe, fince its affinities with alkalis diminifh; and it is fo far from reddening blue vegetable colours, that it deftroys them. Another phenomenon not lefs interefting, is alfo prefented to us by this new combination, which is, that although the muriatic acid feize the oxigene with avidity, it contracts fo weak an union with it, that it yields it to almoft all bodies, and the mere action of light alone is fufficient to difengage it. We are undoubtedly indebted to Scheele for the difcovery of the oxigenated muriatic acid. In the year 1774 he formed it by employing the muriatic acid as a folvent for manganefe. It was perceived by this chemift, that a gas was difengaged, which poffeffed the diftinctive fmell of *aqua regia*; and he therefore concluded that in this cafe the muriatic acid abandoned its phlogifton to the manganefe. On this account he termed it *dephlogifticated marine acid*. This chemift fuppofed that this acid diffolved gold, from its avidity to unite with a new portion of phlogifton. No unequivocal experiment has, however, demonftrated the exiftence of fuch an inflammable principle in this acid. In the year 1780 it was hinted by Mr. Fourcroy, that it was the bafe of vital air contained in the manganefe that entered into combination with the muriatic acid; and Mr. Berthollet has fince fhown that fuppofition to be true by a feries of accurate and ingenious experiments.

In order to extract this acid, a large glafs alembic of one fingle piece is placed upon a fand-bath. To the alembic is adapted a fmall receiver; and to the receiver three or four fmall bottles nearly filled with diftilled water, and arranged according to the method of Woulfe. The receiver and the bottles are difpofed in a ciftern, the places of junction being luted with fat lute, and fecured with rags foaked in the lute of lime and white of egg. The bottles are then furrounded with pounded ice. When the apparatus is thus difpofed, half a pound of good manganefe is introduced into the alembic, and three pounds of fuming muriatic acid poured upon it at different times. The quantity of acid poured at once fhould not be more than three ounces, as at each time of pouring a confiderable effervefcence is excited. It is not neceffary to pour a new quantity until nothing more comes over into the receivers. This method of proceeding is indifpenfably neceffary, when the operator is defirous of making his procefs with a definite quantity of the materials. For if too large a quantity of acid be poured at once, it is impoffible to reftrain the vapours; and the effervefcence will throw a portion of the manganefe into the receiver. The vapours which are developed by the affufion of muriatic acid are of a greenifh yellow colour; and they communicate this colour to the water when they combine with it. When this vapour is concentrated by means of the ice, and the water is faturated by it, it forms a fcum at the furface, which is precipitated through the liquid, and refembles a congealed oil. It is neceffary to affift the action of the muriatic acid by means of a moderate heat applied to the fand-bath. The fecure luting of the veffels is alfo an effential circumftance; for the vapour which might efcape is fuffocating, and would not permit the chemift to infpect his operation clofely. It is eafy to difcover the place where it efcapes through the lutes, by running a feather dipped in volatile alkali over them: the combination of thefe vapours inftantly forms a white cloud, which renders the place vifible where the vapour efcapes. The fame oxigenated muriatic acid may be obtained by diftilling, in a fimilar apparatus, ten pounds of marine falts, three or four pounds of manganefe, and ten pounds of fulphuric acid.

It has been obferved by Mr. Reboul, that the concrete ftate of this fluid is a cryftallization of the acid, which takes place at three degrees of temperature below the freezing point of Reaumur. The forms which have been obferved are thofe of a quadrangular prifm, truncated very obliquely, and terminated by a lozenge. The fame chemift has likewife obferved hollow hexahedral pyramids on the furface of the liquor. To make ufe of the oxigenated acid in the arts, and in order to concentrate a greater quantity in a given volume of water, the vapour is made to pafs through a folution of alkali. A white precipitate is at firft formed in the liquor; but a fhort time afterwards the depofition diminifhes, and bubbles are difengaged, which are nothing but the carbonic acid. In this cafe two falts are formed, the oxigenated muriate, and the ordinary muriate. The mere impreffion of light is fufficient to decompofe the former, and convert it into common falt. This lixivium contains, indeed, the oxigenated acid in a ftronger proportion. The execrable fmell of the acid is, however, much weakened. It may be employed for various ufes with the fame fuccefs, and with great facility; but the effect is very far from correfponding with the quantity of oxigenated acid which enters into this combination, becaufe the virtue of a great part is deftroyed by its union with the alkaline bafis. The oxigenated muriatic acid has an exceffively ftrong fmell; and it acts directly on the larynx, which it ftimulates, excites coughing, and produces violent headaches. Its tafte is fharp and bitter, and it fpeedily deftroys the colour of tincture of turnfole. But it appears that the property which moft oxigenated fubftances poffefs, of reddening blue colours, arifes only from the combination of oxigene with the colouring principles; and that, when this combination is very ftrong and rapid, the colour is deftroyed. The oxigenated muriatic acid, with which a folution of cauftic alkali is faturated, affords, by evaporation in veffels fecluded from the light, common muriate and oxigenated muriate. This laft detonates upon charcoal; is more foluble in hot than in cold water; cryftallizes, fometimes in hexahedral laminæ, but oftener in rhom-

oidal plates. Thefe cryftals have an argentine brilliancy, like mica; their tafte is faint; and when they are diffolved in the mouth, they produce a fenfation of coolnefs refembling that of nitre. It has been afcertained by the experiments of Mr. Berthollet, that the oxigenated muriatic acid which exifts in the oxigenated muriate of pot-afh, contains more oxigene than an equal weight of oxigenated muriatic acid diffolved in water; and this has led that chemift to confider the oxigenated acid combined in the muriate as being fuperoxigenated. He confiders the common muriatic gas with relation to the oxigenated muriatic gas, the fame as the nitrous gas or fulphureous gas with refpect to the nitric and fulphuric acids. It is alfo fuppofed by the fame chemift that the production of the fimple muriate and the oxigenated muriate in the fame operation, may be compared to the action of the nitric acid, which in many cafes produces nitrate and nitrous gas. Hence he has confidered the muriatic acid as a pure radical, which, combined with a greater or lefs quantity of oxigene, forms either fimple muriatic acid gas, or the oxigenated muriatic acid gas. The oxigenated muriates of foda do not differ from thofe of pot-afh, but in being more deliquefcent and foluble in alcohol, like all the falts of this nature. The oxigenated muriate of pot-afh gives out its oxigene in the light, and by diftillation as foon as the veffel is heated to rednefs. One hundred grains of this falt afford feventy-five cubic inches of oxigenous gas reduced to the temperature of twelve degrees of Reaumur. This air is purer than the others, and may be employed for delicate experiments. The oxigenated muriate of pot-afh, when cryftallized, does not trouble the folutions of nitrate of lead, of filver, or of mercury. Mr. Berthollet has fabricated gun-powder, by fubftituting the oxigenated muriate inftead of faltpetre; but the powder fo formed exploded the moment it was triturated.

The oxigenated muriatic acid has been applied to the purpofes of bleaching, and has been found to whiten thread and cotton. For this purpofe the cotton is boiled in a weak alkaline lixivium; after which the ftuff is wrung out, and fteeped in the oxigene acid. Care muft be taken to move the cloth occafionally in the fluid, and to wring it out; it muft then be wafhed in a large quantity of water, to deprive it of the fmell with which it is impregnated. On account of this known property, it has alfo been employed in the whitening of paper and old prints, and in deftroying common ink; but printers' ink is not attacked by this acid. From the experiments of Profeffor Chaptal, it appears alfo probable that linen and cotton cloths, and paper, may be bleached by the vapour of the oxigenated marine acid.

The oxigenated muriatic acid thickens oils; and oxidates metals to fuch a degree, that it is probable that the procefs may be advantageoufly employed in forming verditer. It alfo diffolves metals without effervefcence; as its oxigene is fufficient to oxidate them without the neceffity of the decompofition of water, and confequently without the difengagement of gas. This acid precipitates mercury from its folutions, and converts it into the ftate of corrofive fublimate. It converts fulphur into fulphuric acid, and inftantly deprives the very black fulphuric acid of its colour. When mixed with nitrous gas, it paffes to the ftate of muriatic acid, and converts part of the gas into nitric acid. If expofed to light, it affords oxigenous gas, and the muriatic acid is regenerated. The muriatic acid has been found to act very efficacioufly upon metallic oxides, merely in confequence of its becoming oxigenated; and in this cafe it forms with them falts, which are likewife more or lefs oxigenated.

Muriate of Pot-afh.—Muriate of pot-afh, which was formerly diftinguifhed by the name of *Febrifuge Salt of Sylvius*, is a faturated combination of the muriatic acid with pot-afh. It has been improperly named *regenerated marine falt*; as the nature of its bafe renders it different from that falt. Its cryftals are cubic, but always of a confufed appearance, and rather an irregular form. Its tafte is ftrong pungent, bitter, and difagreeable. It decrepitates upon coals, and when urged by a violent heat fufes, and is volatilized without decompofition. It requires three times its weight of water, at the temperature of fixty degrees of Fahrenheit, for its folution; and is fubject to fcarcely any alteration from the air. One hundred grains of this falt contain 29.68 of acid, 63.47 of alkali, and 6.85 of water. It is frequently met with, but in fmall quantities, in the water of the fea, in plafter, and even in the afhes of tobacco, &c. This falt is produced by art in different ways, as by a direct combination of the muriatic acid with pot-afh; by decompofing earthy, ammoniacal, and metallic muriates; by means of the fame alkali; and by decompofing fulphate or nitrate of pot-afh by the muriatic acid.

Muriate of Soda.—Muriate of foda, generally known under the name of *culinary* or *common falt*, is a neutral falt, formed by a faturated combination of the muriatic acid with foda. This falt has a penetrating but not bitter tafte. It decrepitates on coals, fufes, and is volatilized by the heat of a glafs-maker's furnace, without a decompofition. It is foluble in 2.5 times its weight of water, at fixty degrees of Fahrenheit's thermometer. One hundred grains of it contain 33.3 of acid, 50 of alkali, and 16.7 of water. This falt has been found to cryftallize in cubes. Mr. Gmelin has obferved that the falt of the falt lakes in the environs of Sellian on the banks of the Cafpian fea, forms cubical and rhomboidal cryftals; and Mr. De Lifle has remarked, that a folution of marine falt, left to infenfible evaporation during five years by Mr. Rouelle, had formed regular octahedral cryftals refembling thofe of alum. Marine falt may be obtained in octahedrons, by pouring frefh urine into a very pure folution of frefh falt; and Mr. Berniard thinks that this addition only changes the form of the falt, without altering its nature.

Muriate of foda or common falt is found native in fome places in this country; and Spain, Calabria, Switzerland, and Hungary, poffefs mines, which are more or lefs abundant; but the richeft falt-mines are thofe of Wielicka in Poland. This falt, as it exifts in the earth, is generally irregular, and feldom cryftallized; it is ufually more or lefs white, but fometimes coloured: in this ftate it is called *gem-falt*, having often the tranfparency of the cryftals known under that name. This colour feems to arife from its almoft always containing an oxide of iron. The waters of the fea, as well as of fome lakes and rivers, all contain this falt.

It feems probable that falt-mines owe their origin to the drying up of vaft lakes; as the fhells and madrepores which have been found in thofe immenfe mines of Poland, afford proofs of marine depofitions. There are alfo fome feas in which this falt is fo abundant, that it is depofited at the bottom of the water; as is evident from the analyfis, which has been made by Mr. Macquer and Mr. Sage, of the water of the lake Afphaltites.

But as thefe falt-mines are neither fufficiently abundant to fupply the wants of the inhabitants of the globe, nor diftributed with fuch an uniformity as to permit all nations to have ready recourfe to them, it has been found neceffary to extract the falt from the water of the fea. The fea does not however contain an equal quantity in all climates; for Dr. Ingenhoufz has fhewn that the northern feas contain lefs than the fouthern. The method of extracting the falt from the water of the fea varies according to the difference of climate. In the northern provinces, the falt fands of the fea-coafts are wafhed with the leaft poffible quantity of water, and the falt is obtained by evaporation. In very cold countries, falt water is concentrated by freezing, and the refidue is evaporated by fire. At the falt

ſprings of Lorraine and Franche-comté, the water is pumped up, and ſuffered to fall upon heaps of thorns, which divide it, and cauſe a part to evaporate. The farther concentration is effected in boilers. But in the ſouthern provinces, as at Peccais, the extraction is begun by ſeparating a certain quantity of water from the general maſs of the ſea, which is ſuffered to remain in ſquare ſpaces, called *Partenemens*. For this purpoſe it is neceſſary to have ſluices which may be opened and ſhut at pleaſure, and to form ſurrounding walls which prevent all communication with the ſea, except by means of theſe gates. It is in the *partenemens* that the water goes through the firſt ſtage of evaporation; and when it begins to depoſit its ſalt, it is raiſed by bucket wheels to other ſquare compartments, called *Tables*, where the evaporation is finiſhed.

Afterwards the ſalt is heaped together, to form the *cammelles*; in which ſtate it is left for three years, in order that the deliqueſcent ſalts may flow out of it; at which time it becomes fit for uſe.

Much attention has been paid, and extraordinary exertions have been made to diſcover a cheap method of decompoſing marine ſalt, in order to obtain the mineral alkali at a cheap rate, as being of ſuch extenſive uſe in the manufactures of ſoap, glaſs, bleaching, &c. The different means by which this important diſcovery has been hitherto attempted, are the following: The nitric acid diſengages the muriatic acid, and forms the nitrate of ſoda, which may be eaſily decompoſed by detonation. Potaſh diſplaces the ſoda, even in the cold, as has been found by the experiments of Mr. Chaptal. The ſulphuric acid forms ſulphate of ſoda by decompoſing the marine ſalt; the new ſalt, when heated with charcoal, is deſtroyed; but a ſulphure of ſoda, or liver of ſulphur, is formed, which is difficult to be entirely ſeparated; and this proceſs does not appear to be economical. The ſulphate may likewiſe be decompoſed by the acetite of barytes, and the ſoda afterwards obtained by the calcination of the acetite of ſoda. Margraff attempted in vain to accompliſh this purpoſe, by means of lime, ſerpentine, iron, clay, &c. He obſerves that if common ſalt be thrown upon lead heated to redneſs, the ſalt is decompoſed, and muriate of lead is formed. The oxides of lead have been propoſed by Scheele, for the decompoſition of common ſalt. If common ſalt be mixed with litharge, and made into a paſte, the litharge gradually loſes its colour, and becomes converted into a white matter, from which the ſoda may be extracted by waſhing. It is by proceſſes of this kind that Mr. Turner extracts it in his manufactory; but this decompoſition has not been found to be complete, unleſs the litharge was employed in a proportion quadruple to that of the ſalt. It has been obſerved by Profeſſor Chaptal, that almoſt all bodies are capable of alkalizing marine ſalt, but that the abſolute decompoſition of it is very difficult. Barytes, according to the trials of Bergmann, decompoſes this ſalt. The vegetable acids, combined with lead, may likewiſe be uſed to decompoſe common ſalt. When theſe ſalts are mixed, a decompoſition takes place: the muriate of lead falls down; and the vegetable acid, united to the ſoda, remains in ſolution. The vegetable acid may be diſſipated by evaporation and calcination; and the alkali remains diſengaged, or ſeparate. The purpoſes to which muriate of ſoda is applied are extremely various: It is employed for glazing different kinds of earthen ware, by occaſioning a ſlight fuſion of their exterior ſurfaces. This is eaſily effected by throwing a certain quantity of muriate of ſoda into a furnace, which is volatilized, and by that means ſpread over the ſurface of the earthen ware. It is uſed by glaſs-makers, for whitening and purifying glaſs, and in aſſaying the ores of metals, as a flux to the matters of which the ſcoriæ are formed, to facilitate the precipitation of the metals, and to defend them from the contact of the atmoſphere, ſo that they may ſuffer no change from the air.

Muriate of Ammoniac.—This combination of ammoniac is one of the moſt intereſting, and the moſt generally uſed. It has commonly been known by the name of Sal Ammoniac. This ſalt may be directly formed by decompoſing the muriate of lime by means of ammoniac, as has been practiſed by Mr. Baumé. This ſalt is prepared in large quantities in this country. The volatile alkali is obtained from ſoot, bones, and other ſubſtances known to contain it; and to this the vitriolic acid is added; and this vitriolic ammoniac is decompoſed by common ſalt by means of a double affinity. The liquor obtained in conſequence of this decompoſition contains ſulphate of ſoda and ſal ammoniac. The former is cryſtallized, and the latter ſublimated ſo as to form cakes, which are then expoſed to ſale. By an ingenious proceſs, Lord Dundonald alſo extracts ammoniac from pit-coal. But formerly almoſt all the ſal ammoniac which was employed in commerce was brought from Egypt, where it was extracted by diſtillation from ſoot, by the combuſtion of the excrements of ſuch animals as feed on ſaline plants. This ſoot is put into large round bottles a foot and an half in diameter, and terminating in a neck two inches long. Theſe bottles are filled up till within four inches of the neck. Each bottle holds about forty pounds of ſoot, and affords nearly ſix pounds of ſalt. Theſe veſſels are put into a furnace in the form of an oven, ſo that only the necks appear above. A fire of camel's dung is kindled beneath it, and continued for three days and three nights. On the ſecond and the third day the ſalt is ſublimed. The bottles are then broken, and the ſalt taken out in cakes. Theſe cakes, which are ſent us juſt as they have been taken out of the bottles in Egypt, are convex, and unequal on the one ſide: on the middle of that ſide they exhibit each a tubercle correſponding to the neck of the bottle in which it was prepared. The lower ſide is concave; and both are ſooty.

It may alſo be obſerved that ſal ammoniac is continually ſublimed through the apertures of volcanic mountains. It has been found by Mr. Ferber among volcanic products; and by Mr. Swab and other chemiſts in the grottos of Puzzolo. It is alſo produced in the human body, and exhales by perſpiration in malignant fevers. Mr. Model has proved this fact in his own perſon: for at the time of a violent ſweat which terminated a malignant fever, he waſhed his hands in a ſolution of pot-aſh, and obſerved that a prodigious quantity of alkaline gas was diſengaged or ſeparated.

The muriate of ammoniac or ſal ammoniac cryſtallizes by evaporation in quadrangular priſms, terminated by ſhort quadrangular pyramids. It is often obtained in rhombic cryſtals by ſublimation; and the concave face of the loaves of ſal ammoniac in commerce is ſometimes covered with theſe cryſtals. This ſalt has a penetrating, acrid, urinous taſte. It poſſeſſes a degree of ductility which renders it flexible, and cauſes it to yield to a blow of the hammer. It does not change in the air; which circumſtance renders it probable that our ſal ammoniac is different from that mentioned by Pliny and Agricola, as that attracted humidity. Three parts and a half of water diſſolve one part of ſal ammoniac, at ſixty degrees of Fahrenheit's thermometer; and a conſiderable degree of cold is produced by the ſolution. One hundred parts of ſal ammoniac contain fifty-two parts of acid, forty of ammoniac, and eight of water. This ſalt is not at all decompoſed by clay; nor by magneſia except with great difficulty, and only in part; but it is completely decompoſed by lime and fixed alkalis. The ſulphuric and nitric acids alſo diſengage the acid of ammoniac. This ſalt is employed in dying, to bring out certain colours. It is mixed with aqua fortis in order to increaſe the ſolvent power which it poſſeſſes. It is alſo uſed in ſoldering, in which operation it poſſeſſes the double advantage of clearing the metallic ſurface, and preventing the oxidation of it.

Sect. XV. *Of the Nitro-muriatic Acid.*

The acid to which the name of Nitro-muriatic has been given is a combination of the nitric and muriatic acids. It was formerly diſtinguiſhed by the title of *Aqua Regia*, on account of the property which it poſſeſſes of diſſolving gold. There are ſeveral known proceſſes for making this mixed acid. If two ounces of common ſalt be diſtilled with four of nitric acid, the acid which comes over into the receiver will be good nitro-muriatic acid. This is the way in which this acid was prepared by Mr. Baumé.

If the nitrate of pot-aſh be decompoſed by diſtilling two parts of muriatic acid from one of this ſalt, a good *aqua regia* will be produced by the operation, and the reſidue is a muriate of pot-aſh. It has been affirmed by Dr. Boerhaave that he obtained a good *aqua regia*, by diſtilling a mixture of two parts of nitrate of pot-aſh or common nitre, three of ſulphate of iron or martial vitriol, and five of muriate of ſoda or common ſalt.

It is well known that the ſimple diſtillation of nitre of the firſt boiling affords an *aqua regia*; which is employed by the dyers in the ſolution of tin, for the compoſition of the ſcarlet dye. This *aqua fortis* is a true *aqua regia*: and it is by virtue of the mixture of acids that it diſſolves tin; for if it conſiſted of the nitric acid in a ſtate of too great purity, it would corrode and oxide the metal without diſſolving it.

Four ounces of muriate of ammoniac or ſal ammoniac in powder, diſſolving gradually, and in the cold, in one pound of nitric acid, form an excellent *aqua regia*. An oxigenated muriatic acid gas is diſengaged at firſt, and for ſome time; which it is imprudent to attempt to coerce, and which ought to be ſuffered to eſcape by convenient apertures. *Aqua regia* is likewiſe formed by mixing together two parts of pure nitric acid and one of muriatic acid. The very evident ſmell of oxigenated muriatic acid, which is diſengaged in every proceſs that can be adopted to form the acid at preſent in queſtion; and the property which it poſſeſſes, equally with the oxigenated muriatic acid, of diſſolving gold; have led ſome chemiſts to infer that, in the mixture of theſe two acids, the muriatic acid ſeizes the oxigene of the nitric, and aſſumes the character of oxigenated muriatic acid: ſo that the nitric acid is conſidered as anſwering no other purpoſe than that of oxigenating the muriatic. But this opinion Mr. Chaptal thinks inconſiſtent; for though the virtues of the muriatic acid are modified by this mixture, and it is oxigenated by the decompoſition of a portion of the nitric acid, nevertheleſs the two acids ſtill exiſt in the *aqua regia*; and he is convinced that the beſt made *aqua regia*, ſaturated with pot-aſh, will afford the ordinary muriate, the oxigenated muriate, and the nitrate. It appears to him alſo, that the powerful action of the *aqua regia* depends ſimply on the union of the two acids; one of which is exceedingly well calculated to oxidate the metals, and the other diſſolves the oxides or calces with the greateſt avidity and keenneſs.

Sect. XVI. *Of the Acid of Borax.*

Experiment has ſhown borax to be a neutral ſalt formed by the combination of ſoda with a peculiar acid, which was formerly known by the name of Homberg's Sedative Salt, but which at preſent is denominated *Acid of Borax*. It is generally afforded by the decompoſition of the borate of ſoda, or borax. It has, however, been lately found perfectly formed in certain places. Mr. Hoeſer, director of the Pharmacies of Tuſcany, was the firſt who detected this acid ſalt in the waters of the lake Cherchiajo, near Monte-Rotondo, in the inferior province of Sienna: theſe waters are very hot, and they afforded him three ounces of the pure acid in one hundred and twenty pounds of the water. The ſame chemiſt having evaporated twelve thouſand two hundred and eighty grains of the water of the lake of Caſtelnuovo, obtained one hundred and twenty grains of acid from the whole. He alſo ſuſpects that it may be found in other waters. It is likewiſe produced in the mines of Tuſcany; and it has been found by Mr. Weſtrumb in the ſtone called the Cubic Quartz, at Luneburg; from which he obtained it by decompoſing the ſtone by means of the acids of ſulphur, nitre, &c. The reſult of his analyſis is as follows: Sedative ſalt $\frac{6}{10}$, Calcareous earth $\frac{1}{10}$, Magneſia $\frac{1}{10}$, Clay and ſilex $\frac{2}{100}$, Iron $\frac{1}{100}$ to $\frac{2}{100}$.

It has been obſerved that this ſtone has the form of ſmall cubical cryſtals, which are in ſome caſes tranſparent, and in others milky; and that it affords ſparks with the ſteel. The acid of borax is generally found combined with ſoda; and from this combination it is diſengaged, and obtained either by ſublimation or cryſtallization. When it is propoſed to obtain it by ſublimation, three pounds of calcined ſulphate of iron, and two ounces of borate of ſoda, are diſſolved in three pounds of water. The ſolution is then filtered, and evaporated to a pellicle; after which the ſublimation is performed in a cucurbit of glaſs with its head. The acid of borax attaches itſelf to the internal ſurface of the head, from which it may be ſwept by a feather, or ſome ſuch ſubſtance.

This acid was obtained by Homberg, by decompoſing of borax with the ſulphuric acid. This proceſs alſo ſucceeded very well in Mr. Chaptal's trials. For this purpoſe he made uſe of a glaſs cucurbit with its head, which he placed on a ſand-bath. He then poured upon the borax half its weight of ſulphuric acid, and proceeded to ſublimation. The acid prepared in this way is of the moſt beautiful whiteneſs. Both Stahl, and the younger Lemery, have obtained the ſame acid by making uſe of the nitric and muriatic acids.

In order to extract the acid of borax by cryſtallization, the borax muſt be diſſolved in hot water, and an exceſs of ſulphuric acid poured in. A ſalt is depoſited during the cooling on the ſide of the veſſel, in the form of thin round plates, laid one upon the other. This ſalt, when dry, is very white, and light, of a ſilvery appearance, and is the acid of borax. We are indebted to Geoffroy for this proceſs; but Baron has added two facts: the firſt of which is that the vegetable acids are equally capable of decompoſing borax; and the ſecond, that borax may be regenerated by combining the acid of borax with ſoda. This acid may be purified by ſolution, filtration, and evaporation; but it muſt be obſerved, that a conſiderable part is volatilized with the water which flies off during the evaporation.

This acid has a ſaline cool taſte; and colours the tincture of turnſole, ſyrup of violets, &c. red. One pound of boiling water, according to the experiments of Mr. De Morveau, did not diſſolve more than one hundred and eighty-three grains of it. But alcohol diſſolves it more eaſily; and the flame which this ſolution affords is of a beautiful green. When expoſed to the fire, it is reduced to a vitriform and tranſparent ſubſtance, inſtead of riſing; which proves, as Rouelle has remarked, that it is only ſublimed by favour of the water, with which it forms a very volatile compound. As moſt of the known acids decompoſe this acid, and exhibit it in the ſame form, it has been thought a juſtifiable concluſion that it exiſts ready formed in the borax. Mr. Baumé has even affirmed that he compoſed this acid by leaving a mixture of grey clay, greaſe, and cows' dung expoſed to the air in a cellar. But Mr. Wiegleb, after an unſucceſsful labour of three years and a half, has thought himſelf authoriſed to give a formal negative to this French chemiſt.

It has been attempted to be proved by Mr. Cadet, that the acid of borax always retains a portion of the acid employed in the operation, and that this ſame acid has ſtill the mineral alkali for its baſis. But Mr. De Morveau has, with great acute-

nefs and fagacity, difcuffed all the proofs that have been brought in fupport of thefe pofitions by Mr. Cadet, and has fhown that none of them are conclufive.

Borate of Pot-afh.—The name of *borate of pot-afh* has been given to the combination of the acid of borax with pot-afh. This falt may be obtained either by the direct combination of thefe two feparate principles, or by decompofing borax by the addition of pot-afh. The borate of pot-afh, which is yet but little known, afforded Mr. Baumé fmall cryftals. The acids decompofe this falt by feizing its alkaline bafe.

Borate of Soda.—Borate of Soda, or common borax, is a neutral falt, formed by the combination of the acid of borax with foda. This falt is brought from the Eaft Indies; and in the language of the country is called *Swagah*. It is brought to Hindoftan from the mountains of Tibbet, and is faid to be dug up in a cryftallized ftate from the bottom of certain falt lakes in a mountainous, barren, volcanic diftrict, about twenty five days journey to the eaftward of Laffa, the principal town of the kingdom of Tibbet.

It does not appear that borax was known to the ancients. The chryfocolla, of which Diofcorides fpeaks, was nothing but an artificial folder, compofed by the goldfmiths themfelves, with urine, and ruft of copper, which were beaten together in a mortar of the fame metal. Borax is firft mentioned in the writings of Geber; every thing therefore which has been written fince that time concerning borax is applicable to the fubftance which is at prefent known to us by that name. Borate of foda, or common borax, is found in commerce in three different ftates. The firft is brute borax, tincall, or chryfocolla. It comes to us from Perfia, and is enveloped and foiled by a greafy covering. The pieces of brute borax have almoft all of them the form of a fix-fided prifm, flightly flattened, and terminated by a dihedral pyramid. The fracture of thefe cryftals is brilliant, with a greenifh caft. This kind of borax is far from being pure. The fecond kind of borax known in commerce comes from China. It is purer than the preceding, and has the form of fmall plates cryftallized upon one of their furfaces, on which the rudiments of prifms may be perceived. This borax is mixed with a white powder, which appears to be of an argillaceous nature. The third kind of borate of foda or common borax that is met with in commerce, is that which has been refined or purified.

In order to purify borax, nothing more is neceffary than to clear it of the unctuous fubftance which foils it, and impedes its folution. Crude borax added to a folution of mineral alkali, is more completely diffolved, and may be obtained of confiderable beauty by a firft cryftallization; but it retains the alkali made ufe of: and borax, purified in this manner, poffeffes a greater proportion of alkali than in its crude ftate. The oily part of borax may be deftroyed by calcination. By this treatment it becomes more foluble, and may in fact be purified in this way; but the method is attended with a confiderable lofs, and is not fo advantageous as might be expected. The moft fimple method of purifying borax, confifts in boiling it ftrongly, and for a long time. This folution being filtrated, affords by evaporation cryftals rather foul, but which may be purified by a fecond operation fimilar to the foregoing.

The borate of foda when well purified is white, tranfparent, and has a fomewhat greafy appearance in its fracture. It cryftallizes in hexahedral prifms, terminated by trihedral, and fometimes hexahedral pyramids; has a ftyptic tafte; and converts fyrup of violets to a green colour.

If borax be expofed to the fire, it fwells up, the water of cryftallization is diffipated in the form of vapour; and the falt then becomes converted into a porous, light, white, and opake mafs, commonly called calcined borax. If the fire be more ftrongly urged, it affumes a pafty appearance, and is at length fufed into a tranfparent glafs of a greenifh yellow colour, foluble in water; and which lofes its tranfparency by expofure to the air, in confequence of a white efflorefcence that forms upon its furface. This falt requires eighteen times its weight of water, at the temperature of fixty degrees of Fahrenheit's thermometer, to diffolve it; but boiling water diffolves one-fixth of its weight. Barytes and magnefia decompofe borax. Lime-water precipitates the folution of this falt; and if quick-lime be boiled with borax, a falt of fparing folubility is formed, which is the borate of lime. Borax is ufed as an excellent flux in docimaftic operations. It enters into the compofition of reducing fluxes, and is of the greateft ufe in analyfes by the blow-pipe. It may be applied with advantage in glafs manufactories; for when the fufion turns out bad, a fmall quantity of borax re-eftablifhes it. It is more efpecially ufed in foldering. It affifts the fufion of the folder, caufes it to flow, and keeps the furface of the metals in a foft or clean ftate, which facilitates the operation. It is fcarcely of any ufe in medicine.

This falt has the inconvenience of fwelling up, and requires the greateft attention on the part of the artift who ufes it in delicate works, more efpecially when defigns are formed with gold of different colours. It has been long a defideratum to fubftitute fome compofition in the room of borax, which might poffefs its advantages without its defects. With this view the following procefs has been publifhed by Mr. Georgi: "Natron, mixed with marine falt and Glauber's falt, is to be diffolved in lime-water; and the cryftals which feparate by the cooling of the fluid may be fet apart. The lixivium of natron is then to be evaporated; and this falt afterwards diffolved in milk. The evaporation affords fcarcely one eighth of the natron employed, and the refidue may be applied to the fame ufes as borax."

It has alfo been affirmed that the phofphate of pot-afh fufed with a certain quantity of fulphate of lime, conftitutes an excellent glafs for foldering metals with.

Borate of Ammoniac.—The borate of ammoniac, or the faturated combination of the acid of borax with ammoniac, has not yet been fufficiently examined by chemifts. Mr. Fourcroy has, however, made the following remarks on this falt:

He diffolved a quantity of very pure acid of borax in ammoniac, or cauftic volatile alkali, till the fubftances appeared to be mutually and completely faturated: this folution he diluted in a little water, and then evaporated, in a fand-bath, about one half of this liquor. When cooled, it afforded a layer of cryftals joined together, and exhibiting on their furface polyhædral pyramids. This falt has a poignant urinous tafte; it turns fyrup of violets green, gradually lofes its cryftalline form, and becomes brown by the contact of the air. It diffolves readily enough in water, and lime difengages the ammoniac or volatile alkali from it. This falt feems alfo to poffefs a confiderable degree of folubility in water.

Sect. XVII. *Of Earthy Subftances.*

At prefent no elementary earth is admitted in chemiftry. What was formerly called fo by way of eminence, and confidered as an element and the caufe of folidity, drynefs, infipidity, and indiffolubility, is not now acknowledged by chemifts. They, however, allow five kinds of earthy fubftances, as entering into the compofition of different bodies. Of thefe, three poffefs faline properties, viz. lime, barytes, and magnefia; the other two are, in fome degree, more earthy, dry, fufceptible of hardnefs, and infipid. Thefe are alumine and filex. Each of thefe fubftances have fome characters that are common to the whole; and others that are fpecific, and which ferve to diftinguifh each particular earth.

Sect. XVIII. *Of Lime.*

This white earthy ſubſtance has been found totally diſengaged from all combination by Dr. Falconer, near Bath. But as this is perhaps the only inſtance in which it has been found in ſuch a ſtate, it is indiſpenſably neceſſary to ſhow the proceſs by which lime may be obtained in a ſtate of the greateſt purity. For this purpoſe chalk is to be waſhed in boiling diſtilled water, then diſſolved in diſtilled acetous acid, and precipitated by the carbonate of ammoniac, or mild volatile alkali. The precipitate, being waſhed and calcined, becomes pure lime. This earth poſſeſſes the following characters: it converts ſyrup of violets to a green colour; is ſoluble in ſix hundred and eighty times its weight of water, at the temperature of ſixty degrees of Fahrenheit; it has a penetrating, acrid, urinous, and burning taſte. According to Mr. Kirwan, its ſpecific gravity is about 2.3, but from the trials of Bergman it appears to be 2.720.

This earthy ſubſtance ſeizes water with great avidity, and at the ſame time that it falls into powder, increaſes in bulk, and emits heat. After being ſlaked with air, this ſubſtance appears under the form of a very fine white duſt; it has acquired a very conſiderable augmentation in weight, and its taſte is become much fainter. Theſe appearances are occaſioned chiefly by the water contained in the atmoſphere, and the force with which the lime tends to unite with it. By heating lime which has been ſlaked with air in a retort, till it becomes red-hot, water is obtained, and the lime returns to its original ſtate.

Acids diſſolve it without effervefcence, but with the production of heat. The borate of ſoda, or borax, the oxides of lead, and the phoſphates of urine, diſſolve it by the blow-pipe without effervefcence. It would appear to be infuſible alone, as it has reſiſted the heat of flame urged by a ſtream of vital air in the trials of Mr. Lavoiſier.

If it be mixed with acids, it forms a fuſible combination; and it haſtens the fuſion of aluminous, ſiliceous, and magneſian earths, as the experiments of Mr. Darcet and Bergman have ſufficiently ſhown.

Earthy Salts with baſis of Lime.—The combination of lime with different acids affords ſeveral kinds of calcareous ſalts.

Carbonate of Lime is a combination of lime with the carbonic acid. This combination is very commonly met with, and comprehends all the ſtony ſubſtances which have been generally diſtinguiſhed under the names of *Lime-ſtone*, *Calcareous Stone*, &c. The carbonates of lime are characteriſed by their effervefcing with certain acids; and by their being converted into lime by calcination. Various opinions and hypotheſes have been advanced concerning the formation of theſe ſtony ſubſtances, but the moſt probable one is that which ſuppoſes them to be owing to the wearing down of ſhells. To whatever cauſe, however, we may attribute the origin of this ſtone, it is found to exiſt in two principal ſtates; that is either in the form of cryſtals, or of irregular maſſes.

Cryſtallized calcareous ſtony ſubſtances require, in order to form them, a concurrence of circumſtances which very ſeldom meet together. Calcareous ſtone, in its cryſtallized ſtate, preſents us with ſeveral varieties of form; but the rhomboidal figure appears to be the moſt conſtant and the moſt general. Theſe kinds of calcareous ſtones have the name of ſpars.

It has been found by Mr. Kirwan, that the ſpecific gravity of calcareous ſpars, when pure, is about 2.700; they alſo contain from thirty-four to thirty-ſix parts of carbonic acid, and from fifty three to fifty-five of earth; the reſt being water. Spars often exhibit a ſmooth uniform ſurface, upon which the ſulphuric acid takes but ſlight hold; and they are ſometimes contaminated with iron, which gives them various tinges of colour.

Calcareous ſtony ſubſtances which are not cryſtallized ſeldom affect any regular form: they lie almoſt always in ſtrata, or immenſe blocks thrown or heaped together on the ſurface of the globe, in which we cannot reaſonably pretend to diſcern any primitive deſign of cryſtallization. Among calcareous ſtones that are not capable of cryſtallization, two natural diviſions may be eſtabliſhed: as ſubſtances of this kind are either ſuſceptible of a perfect poliſh, in which caſe they are called marbles and alabaſters; or they are not ſuſceptible of this poliſh, in which caſe they are called friable earths, tufa, &c. The firſt diviſion comprehends the different kinds of marble and alabaſter; the ſecond included the calcareous ſtone made uſe of in building; and chalk from which Spaniſh white is made.

We have already ſeen with reſpect to the nature of calcareous ſubſtances, that they poſſeſs, as one of their component parts, an air different from atmoſpherical air. Dr. Black has aſſerted that calcareous ſtone, when deprived of this air by calcination, forms lime; and that lime may again paſs to the ſtate of calcareous ſtone by reſuming the principle it had been deprived of. Mr. Jacquin has alſo proved that lime and alkalis owe their cauſticity to the ſubtraction of this fixed air, at the ſame time that he has pointed out ſeveral methods of depriving them of it. The proceſſes which are moſt commonly uſed for the decompoſition of lime-ſtone, are fire and acids: the firſt is uſed in the making of lime; the ſecond in laboratories, when it is intended to procure the carbonic acid.

The operation of calcination deprives lime-ſtone of the acid and water which it contained. Theſe two principles are evidently replaced by the matter of heat itſelf; and ſeveral circumſtances ſerve to ſhew, that in proportion as the calcareous ſtone is deprived of the aëriform principle, it combines with the igneous principle, which cannot be diſplaced but by the way of affinities. It appears from the experiments of Dr. Higgins, that the beſt lime is that which is made with the hardeſt and moſt compact ſtone broken into ſmall pieces, and heated ſlowly, until the furnace is become of a white heat. This heat muſt be kept up until the ſtone is no longer capable of effervefcing with acids. The lime becomes over-burned if the ignition be carried to a greater degree; and the produce is then a frit, which is no longer capable of being divided in water, or of reſuming with avidity the principles it had loſt. The moſt perfect lime is that which is the moſt quickly divided by immerſion in water, and affords the greateſt quantity of heat in this proceſs, which cauſes it to fall into the fineſt powder. Good lime ſhould likewiſe diſſolve in the acetous acid without effervefcence, and leave the leaſt poſſible quantity of reſidue. Lime conſtantly endeavours to reſume the acid and the water of which the ſtone was deſtroyed by calcination; therefore when it is left expoſed to the air, it cracks, becomes heated, falls into powder with an increaſe of bulk, and reſumes the property of effervefcing. It is conſequently of importance to uſe lime newly made, if the artiſt be deſirous of poſſeſſing its whole force and virtue. Lime is ſparingly ſoluble in water, and its ſolution is called lime-water; the lime may be precipitated by means of carbonic acid, which regenerates calcareous ſtone in the form of a precipitate or ſediment. Lime-water is employed to indicate the preſence, and determine the proportion of carbonic acid in any mineral or other water.

Sulphate of Lime.—This ſubſtance, which has been denominated *Gypſum*, *Selenite*, and *Plaſter Stone*, loſes its tranſparency by calcination; at the ſame time that it becomes pulverulent, and acquires the property of again ſeizing the water of which it had been deprived, and reſuming its hardneſs: it does not give fire with the ſteel, nor effervefce with acids. We are principally indebted to Margraff for our knowledge of the conſtituent principles of plaſter: and from ſubſequent experiments the following proportion of the ſame principles has been

affigned. One hundred parts of gypfum contain thirty of fulphuric acid, thirty-two of pure earth, and thirty-eight of water; it lofes very confiderably by calcination.

From various facts and circumftances it would feem that the formation of this fubftance is, in fome degree, dependent on, and connected with, the prefence of fulphur and lime. Whenever, therefore, the pyrites are decompofed, the fulphuric acid which thence arifes feizes the lime, and effloresces in fmall cryftals, which are carried off by the water, and fooner or later depofited. Mr. Chaptal has obferved perceptible depofitions of plafter on the banks of rivulets which wafh pyritous clays, and likewife feen depofitions of the fame nature in rivers whofe waters have been ftrongly concentrated by the burning heat of fummer. If we therefore fuppofe felenite to be difperfed in more confiderable maffes of water, there will be no difficulty in conceiving the formation of thofe ftrata which are exhibited by the plafter quarries. Sulphate of lime or gypfum is found in the earth in four different ftates: in the pulverulent and friable form, which conftitutes gypfeous earth, foffil flour, &c.; in folid maffes, which conftitute plafter-ftone; in ftalactites, or fecondary depofitions. In this place we may notice the ftriated filky gypfums, the cauliflowers, the gypfeous alabafters, and that prodigious variety of forms which the ftalactites affume, whatever may be its component parts; and in determinate cryftals, which ufually exhibit the following forms: the compreffed tetrahedral rhomboidal prifm; the hexahedral prifm truncated at its fummit; and the decahedral rhomboid.

Gypfum is fubject to a great number of varieties with refpect to its colour, and which are the figns of various qualities relative to its ufes. The white is the moft beautiful, but fometimes it is grey; and in this cafe is lefs efteemed, and lefs valuable. The feveral ftates of the oxides of iron, with which it abounds in greater or lefs quantities, conftitute its rofe-coloured, red, and black varieties. The fpecific gravity of gypfum varies according to its purity. Mr. Kirwan found it fometimes of the weight of 2.32, and fometimes 1.87. It is foluble in about five hundred times its weight of water, at the temperature of 60 degrees of Fahrenheit. If it be expofed to heat, its water of cryftallization is diffipated, it becomes opake, lofes its confiftence, and falls into powder. When moiftened, it becomes hard again, but does not refume its tranfparency; a circumftance which appears to prove that its firft ftate is a ftate of cryftallization. If it be kept in a fire of confiderable intenfity, in contact with powder of charcoal, the acid is decompofed, and the refidue is lime. Its principles may likewife be feparated by finely pulverizing it, and boiling it with alkali. It is fufible by the blow-pipe, and in a porcelain furnace; as has been fhown by Bergman and Darcet.

It is proper to obferve that the management of the fire in the calcination of gypfum is of great confequence. Too much heat decompofes it; and too little does not enable it to unite, and form a hard fubftance with water. This fubftance, when calcined, divides and difperfes itfelf in water, with which it forms a pafte, that may be caft into any kind of figures. We are indebted to this property for the beautiful ornaments in the infide of our houfes; but it cannot be ufed for external decorations, becaufe its folubility in water renders it gradually deftructible by that fluid.

Fluate of Lime.—This ftony fubftance has had the different names of *Vitreous Spar*, *Fufible* or *Phofphoric Spar*, and *Fluor Spar*. It is a combination of a peculiar acid, called the *Fluoric Acid*, with lime. It decrepitates on heated coals, like the muriate of foda, or common falt; but when flightly heated, it fhines with a beautiful blue colour, that remains even under water, or in acids. The refidue of this appearance of combuftion is white and opake. From the trials of Mr. Kirwan its fpecific gravity feems to be, in general, from 3.41 to 3.18.

This kind of fpar enters into fufion by a ftrong heat, and corrodes the crucible: it likewife fufes without effervefcence with the mineral alkali, the borate of foda, and the phofphates of urine. It poffeffes the moft lively and various colours; and it is known under the names of *falfe emerald*, *falfe amethyft*, or *falfe topaz*, accordingly as its colour is green, violet, or yellow. From the experiments of different chemifts it would feem, that the blue fluor fpars moft commonly owe their colour to iron, but fometimes alfo to cobalt; and that the green fluors are coloured by iron. The moft ufual form of fluate of lime is the cubic, with all the modifications which accompany this primitive form. When this fubftance is diftilled with its own weight of fulphuric acid, the firft product confifts of elaftic whitifh vapours, which fill the receiver, and depofit a cruft at the furface of the water, while the water itfelf becomes acidulous. The refidue in the retort is fulphate of lime, as has been fhown by Mr. Scheele. The cruft which is formed on the water of the receiver is filiceous earth; and the water itfelf being faturated with the vapour, conftitutes the fluoric acid. The moft extraordinary property of this acid is that of feizing the filiceous earth, which is a conftituent principle of glafs, and volatilizing it with itfelf. In order to have the acid in a ftate of greater purity, and exempt from every mixture of filex, the operations are performed in retorts of lead; but both Mr. De Puymaurin and Mr. Chaptal are of opinion, that the acid even then is feldom pure, becaufe the moft beautiful fluor contains almoft always a fmall quantity of filex, which the acid carries with it. The whiteft, the moft tranfparent, and the moft regularly cryftallized fluor, diftilled on the water-bath in a leaden retort, afforded to the latter of thefe gentlemen an acid contaminated by a fmall quantity of filex. Mr. Meyer is alfo of opinion, from having ufed every poffible means to obtain this acid in a ftate of great purity, that when it does not find filex in the retort, it attacks the fides of the receiver, and becomes changed. This acid may, however, be preferved in bottles whofe internal furfaces are coated with wax diffolved in oil. The fluoric acid has fome analogy with the muriatic; and fome chemifts have even confounded them together: but they differ effentially from each other. The fluoric acid, when combined with pot-afh, prefents a gelatinous fubftance, which when dry, retains one-fifth of the alkali employed, and forms a true neutral falt; it acts nearly in the fame manner with foda; with ammoniac it affords a jelly, which when dry exhibits all the appearances of filex; when mixed with lime-water, it regenerates the fluid of lime; and does not attack gold, or diffolve filver; but combines in preference with oxides, fuch as thofe of lead, iron, copper, tin, cobalt, and even of filver. One part of the fluate of lime, fufed with four parts of cauftic fixed alkali, forms a falt infoluble in water. The fame quantity of fluate of lime, treated in the fame manner with the carbonate of pot-afh, or mild vegetable alkali, affords a foluble falt; and at the bottom of the water a calcareous earth is found, which proves that the fluoric acid is not feparated but by double affinity.

This ftony fubftance, which hitherto has not been employed but as a flux, or in the fabrication of ornaments, appears to deferve particular attention. Its texture feems to be lamellated like the diamond; and like that ftone it is not capable of double refraction, as has been obferved by the abbé Rochon. Its phofphorefcence has likewife fome relation with the combuftibility of the diamond, and it has lively and varied colours. All thefe circumftances eftablifh an analogy between thefe two fubftances; and might lead us to fufpect that the conftituent principles of the diamond exift in this fubftance, mixed and

combined with an acid and lime, &c. The fluoric acid possesses the very singular property of attacking glass, and of dissolving and carrying off its siliceous part. This property was first observed by Margraff, and has since been happily applied to the art of engraving on glass by Mr. De Paymaurin and Mr. Klaproth.

This acid is employed to corrode the glass, in the same manner that *aqua-fortis* is used to engrave upon copper. Some chemists have attempted to prove that this acid is nothing else but a modification of the acid used in the decomposition of the spar. They seem to found their opinion chiefly on the circumstance, that the acid obtained exceeds in weight the spar made use of; but they have neglected the increase of weight which must arise from the erosion, dissolution, and mixture of the glass of the distilling vessels, which were employed in the experiments.

Nitrate of Lime.—This salt, as well as the two which follow, exists only in waters. Their great solubility, and their spontaneous deliquescence, do not permit them to form durable masses, or to exist in the form of stoney concretes. This combination is commonly known by the name of *calcareous nitre.*

This nitrate is principally formed near inhabited places: old plaster affords it in abundance by lixiviation. It is one of the salts which abound in the mother waters of the saltpetre makers; and it has been found in some mineral waters. It is commonly obtained in the form of small needles, applied sideways to each other. When a solution of nitrate of lime is concentrated to a gelatinous consistence nearly equal to that of syrup, it forms, in process of time, crystals in hexahedral prisms. Two parts of cold water dissolve one of this salt; and boiling water dissolves more than its own weight; its taste is bitter and disagreeable; it liquefies easily on the fire, and becomes solid by cooling: if it be strongly calcined, and carried into the dark, it is luminous, and constitutes what is known by the name of *Baldwin's Phosphorus.* It loses its acid in a violent and continued heat; and when distilled in close vessels, it affords the same products as nitre by the decomposition of its acid. If it be projected upon ignited coals, it detonates in proportion as it becomes dry. Its acid may be disengaged by means of clay, or the sulphuric acid; and both alkalis and barytes precipitate its earth. The sulphuric salts, and the carbonates of alkali, decompose it by means of a double affinity.

Muriate of Lime.—This combination exists more especially in the waters of the sea; and contributes to give to these waters that bitter taste which has improperly been referred to bitumens. This salt is generally known by the name of *calcareous marine salt.* It is very deliquescent; one part and a half of water dissolves one of this salt; and hot water dissolves more than its own weight. It may be made to crystallize by concentrating a solution of it to the 45th degree of Baumé, and then exposing it in a cool place. By these precautions it affords a salt in tetrahedral prisms terminated by four-sided pyramids. It enters into fusion with a moderate degree of heat; but is decomposed with great difficulty. It acquires by calcination the property of shining in the dark, and is called *Homberg's Phosphorus.* Barytes and the alkalis decompose this salt. The concentrated sulphuric acid, poured upon a very strong solution of muriate of lime, disengages the acid in vapours, and forms a solid precipitate; an appearance which seems in an instant to transform two liquids into a solid, and produces a very striking effect. The theory of this phenomenon is easily explained from the very great solubility of the muriate, and the almost absolute insolubility of the sulphate which takes its place.

Phosphate of Lime.—The phosphate of lime has been found by Mr. Bowle in Spain, in the kingdom of Estramadura. It has had the title of *Calcareous Phosphoric Salt;* and is a whitish stony substance of considerable density, but not hard enough to give fire with steel. It is found in horizontal strata, reposing upon quartz, and exhibiting vertical, flattened, and close fibres. Mr. Proust has observed that, when thrown on ignited coals, it does not decrepitate, but burns quietly, and affords a beautiful green light, which seems to penetrate through it, and which does not disappear so quickly but that a sufficient time is allowed to contemplate its brilliancy with admiration. Before the blow-pipe it runs into a white enamel, without boiling up; whereas bones support the most violent heat without fusion. Its habitudes with the nitric and sulphuric acids are the same as those of calcined bones; its acid may be separated and brought into the state of an animal glass; it is also capable of being decomposed, and the phosphorus extracted.

Sect. XIX. *Of Barytes.*

This earth has been generally known by the name of *Terra ponderosa*, or ponderous earth; and it is to the celebrated chemists Gahn, Scheele, and Bergmann, that we are principally indebted for our knowledge of this earthy substance. It has not yet been found free from all combination; but in order to obtain it in a suitable degree of purity, the following process may be employed: The sulphate of barytes, or ponderous spar, which is the most usual combination met with in the earth, is to be pulverized, and calcined in a crucible, with an eighth part of powder of charcoal: the crucible must be kept ignited during an hour; after which the calcined matter is to be thrown into water: it communicates a yellow colour to this fluid, at the same time that a strong smell of hepatic gas is emitted; the water is then to be filtered, and muriatic acid poured in: a considerable precipitate falls down, which must be separated from the fluid by filtration. The water which passes through the filter holds the muriate of barytes, or marine salt of ponderous earth, in solution. A solution of the carbonate of pot-ash, or mild vegetable alkali, being then added, the ponderous earth falls down, in combination with the carbonic acid; and this last principle may be driven off by calcination. Pure barytes is of a pulverulent form, and extremely white. It is soluble in about nine hundred times its weight of distilled water, at the temperature of sixty degrees, according to Mr. Kirwan. The prussiate of pot-ash, or Prussian alkali, precipitates it from its combination with the nitric and muriatic acids, which habitude distinguishes it from other earths. It also precipitates alkalis from their combinations with acids. Mr. Lavoisier having exposed barytes to a flame fed with oxigenous gas, found it to be fused in a few seconds: at first it extended itself upon the surface of the coal; after which it began to burn and detonate until the whole was nearly dissipated. This kind of inflammation is a character common to metallic substances; but when the barytes is pure it is perfectly infusible. When fused in the fire with the silex or alumine of the crucible, it assumes a blue or green colour. This earth urged by the blow pipe makes little effervescence with soda, but is perceptibly diminished: it dissolves in the borate of soda with effervescence, and still more with the phosphates of urine. It has a strong affinity for acids, and serves to detect the presence of the sulphuric acid. Its specific gravity, according to Mr. Kirwan, exceeds 4.000.

Earthy Salts with Base of Barytes.—The most common state in which barytes is found is in that of combination with the sulphuric acid.

Sulphate of Barytes.—This substance, which is generally called *Ponderous Spar*, is extremely heavy. Its specific gravity is commonly from 4 to 4.6. It decrepitates in the fire, melts before the blow-pipe without addition, and fluxes dissolve it with effervescence. Mr. Darcet has succeeded in fusing it in a porcelain furnace. This spar has been often confounded with gypsum and fluor spar: but the characters of these two substances are very different. It almost always accompanies metallic ores, and it is even considered as an happy presage of

finding them. The analogy between this ſtone and metals has been eſtabliſhed by the experiments of Bergmann and Lavoiſier. This ſtone, when rather ſtrongly heated, exhibits a blueiſh light in the dark, and forms what has been called the *Bolognian Phoſphorus*. To form theſe kinds of phoſphori, the ſpar is pulverized, the powder is kneaded up with mucilage of gum tragacanth, and the paſte is formed into pieces as thin as the blade of a knife, Theſe pieces are afterwards dried, and ſtrongly calcined by placing them in the midſt of the coals of a furnace; they are afterwards cleared by blowing on them with the bellows. In this ſtate, if they be expoſed to the light for a few minutes, and afterwards carried into a dark place, they ſhine like glowing coals. Theſe pieces ſhine even under water; but they gradually become deprived of this property, which however may be reſtored again by a ſecond heating. Ponderous ſpar is eaſily divided into plates by the ſlighteſt blow; and the moſt uſual form which it affects is that of an hexahedral priſm, very flat, and terminated by a dihedral ſummit.

It has been found at the diſtance of one league from Clermont d'Auvergne, in France, in the form of hexahedral priſms terminated by a tetrahedral or dihedral pyramid. Mr. Chaptal has ſeen it in cryſtals of two inches in diameter. It frequently happens that the form of theſe cryſtals is not very determinate; but all the ſtoney ſubſtances of the nature of theſe exhibit a confuſed aſſemblage of ſeveral plates applied one upon another, and capable of being ſeparated by a very ſlight blow. Ponderous ſpar is inſoluble in water; and upon this property is founded the virtue poſſeſſed by the muriate of barytes, to manifeſt the ſlighteſt portions of ſulphuric acid in any combination which contains it. Barytes adheres more ſtrongly to acids than the alkalis themſelves do; and when the carbonates of alkalis precipitate it, the effect takes place in the way of double affinity, or attraction.

Carbonate of Barytes.—This combination of the carbonic acid with barytes has the ſpecific gravity of 3.773. One hundred parts contain twenty-eight of water, ſeven of acid, and ſixty-five of pure earth. The ſulphuric, nitric, and other acids attack it with efferveſcence. Although the carbonic acid poſſeſſes the ſtrongeſt affinity with this earth, it is not very frequently found in combination with it. This ſubſtance has been lately found in great plenty in the lead mines at Anglezark near Chorley in Lancaſhire, and alſo at Strontian and Dunglaſs near Dumbarton in Scotland.

Nitrate of Barytes.—The nitric acid diſſolves pure barytes, and forms a ſalt which cryſtallizes ſometimes in large hexagonal cryſtals, and frequently in ſmall irregular cryſtals. This nitrate is decompoſed by fire, and affords oxigene. The pure alkalis do not diſengage the barytes, but the alkaline carbonates precipitate it by double affinity. Both the ſulphuric and fluoric acids take this earth from the nitric acid. The nitrate of barytes has not yet been found in a native ſtate.

Muriate of Barytes is a ſalt which is capable of aſſuming a form conſiderably reſembling that of ſpar in tables or plates. It exhibits, with the earths, acids, and alkali, phenomena nearly ſimilar to thoſe of the nitrate of barytes. It forms one of the moſt intereſting re-agents to aſcertain the exiſtence of the ſmalleſt particle of ſulphuric ſalt in any water; becauſe, by the ſudden exchange of principles, the reſult is ponderous ſpar, which immediately falls down. This ſubſtance has not yet been found in a native ſtate.

Sect. XX. *Of Magneſia.*

The magneſian earth has hitherto been nowhere found totally diſengaged from all foreign ſubſtances; but in order to obtain it in the utmoſt poſſible ſtate of purity, the cryſtals of the ſulphate of magneſia, or Epſom ſalt, are to be diſſolved in diſtilled water, and decompoſed by the carbonate of pot-aſh. The precipitate muſt afterwards be calcined, in order to diſengage the carbonic acid. Pure magneſia is very white, ſoft and light, extremely friable, and as it were ſpongy. Its ſpecific gravity, as determined by Mr. Kirwan, is about 2.33. This ſubſtance is not perceptibly ſoluble in water when pure; but when it is combined with the carbonic acid, it is ſoluble; and cold water has a ſtronger action on it than hot, as is evident from the experiments of Mr. Butini. It has no perceptible action on the tongue; but it ſlightly converts the tincture of turnſole to a green colour. It has been obſerved by Mr. Darcet, that a ſtrong heat agglutinates it more or leſs; but the trials of De Morveau, Butini, and Kirwan, ſeem to prove that it is not fuſible; and the experiments of Mr. Lavoiſier determine it to be as infuſible as barytes and lime. The abbé Mongez has ſhewn that the borate of ſoda, and the phoſphates of urine, diſſolve it with efferveſcence.

Earthy Salts with Baſis of Magneſia.—Theſe ſalts were not well known before the time when the celebrated Dr. Black proved that they ought not to be confounded with calcareous ſalts. They may be diſtinguiſhed from theſe by the bitter taſte which almoſt all of them poſſeſs. They are in general very ſoluble in water from which lime-water and ammoniac, or the volatile alkali, precipitate them.

Sulphate of Magneſia.—This ſalt, which has been generally known by the title of Epſom Salt, is frequently met with; it exiſts in different mineral waters, as thoſe of Epſom and Sedlitz, &c. It has alſo often been diſtinguiſhed by the name of *the Bitter Cathartic* or *Purging Salt*, on account of its taſte and virtues.

The ſulphate of magneſia which is uſed in commerce, has the form of ſmall ſilky needles, very white. It does not effloreſce in the air, which diſtinguiſhes it from the ſulphate of ſoda. The cryſtals of the pure ſulphate of magneſia are quadrangular priſms, terminated by pyramids of an equal number of ſides.

The ſulphate of magneſia which is prepared in France contains three ſixteenths of ſulphate of ſoda, two ſixteenths of muriate of magneſia, one ſixteenth of muriate of ſoda, and ſix ſixteenths of true ſulphate of magneſia in each pound; the remainder conſiſting of ſalts with baſis of lime. When expoſed to the fire this ſalt liquefies, and loſes half its weight. The remainder is dry, and requires a ſtrong fire to fuſe it. Water diſſolves its own weight of this ſulphate at the temperature of 60 degrees of Fahrenheit's thermometer. One hundred parts of it contain twenty-four parts of acid, nineteen of earth, and fifty-ſeven of water. This ſalt ſuffers no alteration from either ſiliceous or aluminous earth; but it is decompoſed by barytes, lime, and the pure fixed alkalis. It is ſometimes found efloreſcent upon ſchiſti, from which it may be collected. It is frequently employed as a purgative medicine.

Nitrate of Magneſia.—The nitric acid when combined with magneſia forms a ſalt capable of affording, by proper evaporation, priſmatic, quadrangular, truncated cryſtals. It has an acrid and very bitter taſte; heat decompoſes it; and it imbibes moiſture in the air. It diſſolves very readily in water; a ſlow evaporation is requiſite to make it cryſtallize; and we are even ſo imperfectly acquainted with the laws of its cryſtallization, that we cannot make it aſſume a regular form at pleaſure, like many of the other ſalts. Barytes, lime, and the alkalis, decompoſe it. The nitrate of magneſia is found diſſolved in mother-water of nitre; and M. de Morveau has propoſed precipitating it by lime-water, as a method of obtaining magneſia in the large way. This proceſs, being ſo cheap and eaſy, might be employed with great advantage; but as the ſame chemiſt has obſerved that freſh lime-water precipitates pure calcareous nitrate when it is diſſolved in too ſcanty a proportion of water, the magneſia obtained by this proceſs would not poſſeſs the degree of purity requiſite to render it an uſeful medicine, unleſs

the mother-water were diluted with a large quantity of common water. The fulphuric and the fluoric acids difengage the acid from nitrate of magnefia. The acid of borax alfo feparates it with the help of heat, in confequence of its fixity, as has been obferved by Bergmann. It has alfo been found that this falt decompofes the muriates; but alkalis and lime precipitate its magnefia. This nitrate has not hitherto been applied to any ufe either in medicine or the arts.

Muriate of Magnefia.—The muriate of magnefia is found in the mother-water of different falt works: and in all falt waters, and fuch as contain the fulphate of magnefia in a ftate of folution; its tafte is very bitter. From the experiments of Bergmann, it feems to form a falt in fmall needles, fo deliquefcent that it cannot be obtained but by ftrongly concentrating the folution, and afterwards expofing it to intenfe cold. Lime-water, barytes, and the alkalis, precipitate the magnefia, which can alfo be feparated by means of fire. This falt diffolves very readily in water.

Carbonate of Magnefia.—Although magnefia has the greateft affinity with the carbonic acid, it does not feem that nature has ever exhibited this combination. It is obtained by precipitating the magnefia from Epfom falt, by means of the carbonates of alkali; and in this ftate it is called *Effervefcent Magnefia*, or *Magnefia not Calcined*. The carbonate of magnefia contains thirty parts of acid, forty eight of earth, and twenty-two of water in the quintal, as has been fhewn by Bergmann.

Magnefia fticks to the tongue; and affumes, in drying, a certain tranfparency, which it preferves until it has loft all its water, which is not eafily driven off. Fire however carries off the water and the acid; and in this ftate the refidue is called *Calcined Magnefia*. The carbonate of magnefia is foluble in water in the proportion of feveral grains in an ounce of the fluid. This varies however according to the quantity of acid that it contains. On this fubject Mr. Butini has obferved, that cold diffolves more than hot water, and that the magnefia may be precipitated by heating the water which holds it in folution. Hence it is that water loaded with magnefia becomes white and turbid by ebullition. Pure earths do not decompofe this falt; but lime robs it of its acid, and fixed alkalis decompofe it by uniting with the acid; the fulphuric, nitric and muriatic acids have the fame effect by feizing the magnefia which it contains. It was fuppofed by Bergmann that the carbonate of magnefia was cryftallizable; and Mr. Butini, by concentrating a faturated folution of this falt with a gentle heat, has obtained groups of cryftals, which, when examined by the microfcope, appear to be hexagonal truncated prifms. The carbonate of magnefia is ufed in medicine as a purgative; but as an abforbent, the calcined magnefia ought to be preferred.

Sect. XXI. *Of Alumine, or Pure Clay.*

This kind of earth is not more exempt from mixture and combination than the foregoing; therefore, in order to obtain it in a ftate of purity, the fulphate of alumine is diffolved in water, and decompofed by effervefcent alkalis. Pure clay feizes water with avidity, and may then be kneaded. It combines readily with moft acids, dries in flakes, and adheres ftrongly to the tongue. Its fpecific gravity does not exceed 2.000. When expofed to heat, it dries, contracts, fhrinks, and becomes full of cracks. A confiderable degree of heat renders it fo hard that it gives fire with fteel. After having been well baked, it is no longer capable of uniting with water; but requires to be diffolved in an acid, and precipitated, in order that it may refume this property. The experiments of Mr. Lavoifier fhew that pure alumine is capable of an imperfect fufion, approaching to the confiftence of pafte, by heat excited by a current of vital air. It is then transformed into a kind of very hard ftone, which cuts glafs like the precious ftones, and which very difficultly yields to the file. The mixture of chalk fingularly affifts the fufion of this earth: and according to Mr. Gerhard it is fufible in a crucible of chalk, but not in a crucible of clay. Mr. Kirwan and the abbé Mongez have fhewn that the borate of foda, and the phofphates of lime, diffolve it. From the experiments of Mr. Dorthes, it appears that the pureft native clays, and even that which is precipitated from alum, contain a fmall quantity of iron in the ftate of oxide: and that it is from this principle that the earthy fmell which is emitted by moiftened clays, arifes: it is extremely difficult to deprive them of this.

Earthy Salts with Bafe of Alumine.—It is generally known that the fubftance, which, in the arts, is diftinguifhed by the name *Clay*, is a natural mixture of feveral earths. Alumine or pure clay is capable of combining with the greateft part of the known acids, but the moft known of the falts formed in this way is that which is called alum.

Sulphate of Alumine.—Although alum be very commonly met with, the combination of principles which conftitute it, is not effected without confiderable difficulty. The pure clay upon which the fulphuric acid is digefted, is diffolved with difficulty; and it is by no means eafy to bring this combination to regular cryftals. The ufual product is a falt, which appears to be formed by fcales applied one upon the other. The fulphate of alumine is prepared by a variety of proceffes, according to the country where it is manufactured, and the materials from which it is obtained. But the moft common procefs to diffolve alumine by means of an acid, confifts in calcining the clay, impregnating it with the acid, and facilitating its action by a heat of from 145 to 167 degrees of Fahrenheit. Profeffor Chaptal has however adopted a method, in his manufactory of alum, which appears to be more fimple and convenient; it confifts in prefenting the acid in vapours, and under the dry form, to the clay properly prepared. For this purpofe he calcines his clays, and reduces them into fmall pieces, which he fpreads over the floors of leaden chambers. The fulphuric acid, which is formed by the combuftion of a mixture of fulphur and faltpetre, expands itfelf in the cavity of thefe chambers, and exifts for a certain time in the vaporous ftate. In this form it has a ftronger action than when it has been weakened by the mixture of a quantity of water more or lefs confiderable: fo that it feizes the earths, combines with them, caufes them to increafe in bulk by the efflorefcence which takes place, and at the end of feveral days the whole furface expofed to the vapour is converted into alum. Care muft be taken to ftir thefe earths from time to time, that they fucceffively prefent all their furfaces to the action of the acid. But whatever procefs may be ufed to combine the acid with clay, it is neceffary to expofe the aluminized earths to the air during a greater or lefs fpace of time, in order that the combination may be more accurate, and the faturation more complete. Almoft all the alum employed in commerce is afforded by ores which are dug out of the earth for this purpofe. All the operations of this manufacture may be reduced to four; the decompofition of the ore; the lixiviation of the ore; the evaporation of thefe lixivia: and the cryftallization of the alum. The decompofition of the mineral is effected either in the open air without affiftance, or elfe by means of fire. When the mineral is left to decompofe fpontaneoufly, nothing more is neceffary than to difpofe the ftone which contains the principles of alum in ftrata or layers. The pyrites becomes heated; acid is formed, which diffolves the clay; and the falt arifing from this combination exhibits itfelf by the efflorefcence of the ore. The decompofition may be accelerated by watering the heap of pyrites; and the operation may be ftill more abridged by the affiftance of fire. The method of applying the heat however varies very much. It ought not in general to be either too ftrong or too weak. In

the firſt caſe it volatilizes the ſulphur, and in the ſecond it retards the operation. The ore of alum is ſometimes found impregnated with a ſufficient quantity of bitumen to maintain the combuſtion.

In caſes where the ore has effloreſced into alum, the ſalt is extracted by lixiviation. For this purpoſe the ſame water is paſſed over ſeveral heaps of aluminous earth, in order to ſaturate it. The water which is firſt paſſed over the earth diſſolves in preference the *vitriol*, which is more or leſs abundant; and this ſalt may be ſeparated from the alum by a previous cold waſhing. This lixivium, or ſaline ſolution, is carried into leaden caldrons, where the fluid is properly concentrated. In this part of the proceſs it is that an accurate ſaturation of the alum is effected when the acid is in exceſs; and for this purpoſe alkalis are added, which ſerve likewiſe ſingularly to facilitate the cryſtallization. It has been propoſed by Profeſſor Bergmann to boil clay with the ſolution, to ſaturate the exceſs of acid. This proceſs would ſeem in every point of view advantageous; but Mr. Chaptal thinks it impracticable, becauſe the ſuperabundant acid cannot be made to combine with the clay but by a very long ebullition; and he has remarked, that, by afterwards evaporating the fluid to cauſe it to cryſtallize, this clay falls down, and oppoſes the cryſtallization. This ingenious chemiſt varied the proceſs in different ways, without obtaining the ſucceſs which its celebrated author predicted. There are methods of greater or leſs accuracy to judge of the degree of concentration to which it is proper to carry the lixivium, in order to obtain a good cryſtallization; ſuch as, the immerſion of an egg in the liquid, the effuſion of ſome drops of the lixivium on a plate, &c. Mr. De Morveau has propoſed a metallic hygrometer; but this inſtrument cannot be conſidered as very accurate, becauſe its immerſion in the liquid is proportional to the heat of the fluid in which it is plunged.

In the next place the lixivium is to be conveyed into coolers, where it cryſtallizes by mere refrigeration. The pyramids of alum are conſtantly turned towards the bottom of the veſſel, more eſpecially thoſe which fix themſelves to the ſticks which are put into the liquor to multiply the ſurfaces. Alum affects the form of two tetrahedral pyramids, applied to each other baſe to baſe. Sometimes the angles are truncated, and theſe truncatures take place moſt frequently when the lixivium is ſlightly too acid. According to the experiments of Mr. Kirwan, this ſalt requires fifteen times its weight of water to diſſolve it, at the temperature of 60 degrees of Fahrenheit. Its taſte is ſtyptic: it loſes its water of cryſtallization by heat; at the ſame time that it ſwells up, and is converted into a light and white ſubſtance, called *Burned* or *Calcined Alum*. If it be urged by a violent degree of heat, it loſes part of its acid, and becomes taſteleſs. The reſidue is no longer ſuſceptible of cryſtallization, and precipitates in the form of a very fine adheſive powder, in proportion as the water is diſperſed by evaporation. From this ſolution alumine is precipitated by magneſia, barytes, and the alkalis: theſe laſt diſſolve the precipitate in proportion as it is formed, if they be added in exceſs. For the purpoſes to which this ſubſtance is applied, ſee Alum.

Carbonate of Alumine.—The argillaceous earth precipitated from the ſolution of alum by the carbonates of alkalis, combines with their acid; but this ſalt is very rarely found in nature. Schreber has however aſſerted that the earth known by the name of *Lac Lunæ* is a true carbonate of alumine. Although alumine be ſoluble in the other acids, we are very little acquainted with its combinations. It is only known that the nitric acid diſſolves it, that the ſolution is aſtringent, and that it may be obtained in ſmall ſtyptic and deliqueſcent cryſtals. The muriatic acid has a more evident action upon alumine. This muriate is gelatinous and deliqueſcent. Theſe ſalts have not hitherto been applied to any particular purpoſe, nor have they been any where found in nature.

Sect. XXII. *Of Silex.*

This ſubſtance has had the names of *Quartzoſe*, *Vitrifiable Earth*, &c. It exiſts nearly in a ſtate of purity in rock cryſtal. But when it is required to be had in a ſtate of great purity and free from all impurities, one part of fine rock cryſtal muſt be fuſed with four of pure alkali. The fuſed maſs muſt then be diſſolved in water, and precipitated by an exceſs of acid. Pure ſilex poſſeſſes a very great degree of roughneſs and aſperity to the touch. It is abſolutely void of all diſpoſition to adhere; and its particles, when agitated in water, fall down with extreme facility. Its ſpecific gravity is 2.65. It has been aſſerted by Bergmann, that water can diſſolve it; and Mr. Kirwan has aſſerted that 10,000 parts of water can hold one of ſilex in ſolution, at the ordinary temperature of the atmoſphere; and may even take up a greater quantity at a higher temperature. The fluoric acid diſſolves it; but lets it fall again when it comes in contact with water, or when it is conſiderably cooled. Alkalis diſſolve it in the dry way, and form glaſs; and they attack it likewiſe in the humid way, and are capable of diſſolving one-ſixth part of their weight when in a ſtate of extreme diviſion. From one to two parts of alkali, with one part of ſilex, form hard permanent glaſs; but if the ſalt exceed this proportion, the compound will attract humidity from the air, and aſſume the liquid ſtate. This fluid, or combination of ſilex with water, by the medium of alkalis, is known by the name of the *Liquor of Flints*.

The burning mirror does not fuſe this ſubſtance; but a current of vital air produced a commencement of fuſion on its ſurface, as is ſhewn by the experiments of Mr. Lavoiſier. Soda alſo diſſolves it before the blow-pipe with efferveſcence; and the borate of ſoda diſſolves it ſlowly, but without ebullition, or boiling up.

This earth is rough to the touch; it ſcratches and wears away metals; it is infuſible, incombuſtible, and inſoluble in water and moſt of the acids, but ſoluble by means of alkali in a ſtrong fire, and forming glaſs with theſe ſalts. This ſubſtance has been conſidered by ſome chemiſts as the moſt ſimple of the earths; but experience has not ſupported this concluſion.

Earthy Salts with Baſe of Silex.—Of all the known earths, that which combines the moſt difficultly with acids is ſilex. Chemiſts are not acquainted with any other acid than the fluoric, which exerts an evident action upon it. It riſes with this acid, and holds it in ſolution until it abandons it to unite with water. Some experiments made by Mr. Achard gave reaſon to think that the carbonic acid diſſolved ſilex; but the trials of other chemiſts have not confirmed the reſults of thoſe made at Berlin. Mr. De Morveau ſeems however to have proved that iron and the carbonic acid are neceſſary to form rock cryſtals; but this acid does not remain united and combined with the earths, ſo that we have not hitherto arrived at any proof of its diſſolving power.

Sect. XXIII. *New Earthy Subſtances.*

It may be proper in this place to take notice of three earthy ſubſtances that have been but lately diſcovered, and which have not therefore been ſubjected to experiment, except by thoſe who diſcovered them.

Adamantine Spar.—This ſtrong ſubſtance is remarkable for its hardneſs, which approaches to that of the diamond. From this property it is employed in poliſhing gems. Only two varieties of this ſtone are yet known in Europe. The firſt comes from China; it is cryſtallized in ſix-ſided priſms, without

pyramids, varying in their length from half an inch to one inch, and in breadth near one inch; its colour is grey, of different shades. Whole pieces are opake, but thinner fragments are tranfparent: its texture is fparry, and it breaks with a polifh. The fparry texture produces a flight ftriated appearance on its furface: its hardnefs is fo great, that it not only cuts glafs like a diamond, but it marks rock cryftal and other hard ftones: its fpecific gravity is 3.710, and in fome fpecimens as high as 4.180. Small grains of magnetic oxide or calx of iron are fometimes differminated through this ftone. The fecond variety is whiter, more decidedly fpathofe in its texture, and the grains of oxide of iron are fmaller, and merely adhere to its furface. It is called *corundum* at Bombay; but at Madras it is known by the name of grinding fpar.

The analyfis of this ftone has been attempted by Mr. Klaproth, by keeping it in fufion with fifteen times its weight of cauftic mineral alkali in a filver crucible for five hours; then adding boiling water, filtering and faturating the alkali with an acid, which confequently threw down that portion of earth which had combined with the alkali. The undecompofed part was repeatedly digefted with concentrated boiling acids. The ftone was not, however, completely decompofed till after twelve repetitions of this procefs; but it was then found to confift of two parts of clay, and one of an earth not foluble by fufion in alkalis, nor acted upon by acids.

Jargon of Ceylon—This fubftance has alfo been examined by the above chemift, by proceffes of a nearly fimilar kind. The colour of this ftone is pale, of a yellowifh green, inclining to red; forming upon the whole a kind of fmoky grey tinge. Its regular figure is that of a four-fided prifm, terminated by two obtufe pyramids, compofed each of four ifofceles triangles. Its fpecific gravity exceeds that of any other ftone, being 4.615. Pieces of this ftone being ignited and thrown into water to render them lefs coherent, and afterwards levigated upon porphyry, were fufed in a filver crucible, with a large proportion of cauftic fixed alkali or pot-afh. The folution was treated with water and with muriatic acid, which took up a fmall part, and left a refidue, which was again fufed with alkali, and treated as before. After feveral repetitions of this procefs, the whole was diffolved. By faturating the acid with mild vegetable alkali or carbonate of pot-afh, the earthy matter was thrown down. The digeftion of part of this precipitate with muriatic, and part with fulphuric acid, indicated, after a due application of chemical methods, a confiderable portion of filiceous earth, with a minute quantity of iron and nickel, and a much larger proportion of an earth which remained fufpended on account of its folubility in acids. This earth was found to differ in its properties from every other yet known: its folubility fufficiently diftinguifhes it from filex. When precipitated by the carbonate of pot-afh, it did not become effervefcent, like lime or magnefia; neither did it, like them, form felenite or Epfom falt with the fulphuric acid. It did not form alum with that acid, as clay does. It differed effentially from barytes or ponderous earth, in its not being precipitable by the *Pruffian* alkali; and in forming a falt with the fulphuric acid, which was exceedingly different from fulphate of barytes or ponderous fpar. This earth was not foluble either in *microcofmic falt*, or in mineral alkali, when treated by the blow-pipe; but borax diffolved it. The jargon was found to contain in the hundred parts $31\frac{1}{2}$ of filex, $\frac{1}{2}$ of oxide of iron containing nickel, and 68 of this peculiar earth.

A fubftance has lately been brought from New South Wales, which feems to confift of a mixture of fine white fand, a foft white earth, fome colourlefs micaceous particles, and of a few black ones, refembling black mica or black lead. Mr. Wedgewood has made fome experiments upon this fubftance, but does not appear to have completely analyfed it. Neither the nitric nor fulphuric acids, concentrated or diluted, hot or cold, were found to take up any thing from this mineral which could be precipitated by alkalis; excepting that the ftrong fulphuric acid, by due management, indicated a minute portion of clay. But the muriatic acid, by digeftion near its boiling heat, acted on it with frequent explofive burfts, and took up about one fifth of the whole. The crude mineral, pulverized and calcined, loft its blacknefs, and one-fourth of its weight, but was found to be as difficult of folution as before. Water added to the muriatic folution threw down a white precipitate; and the feparation was fo complete, that, after an addition of eight or nine times the whole bulk of water, there remained nothing in folution that could be precipitated by an alkali. This white matter was infoluble in water, and alfo in the nitric and fulphuric acids, and in alkaline folutions. Strong muriatic acid took it up as before, by the affiftance of the fame degree of heat. A certain precife quantity of nitric acid added to the muriatic folution, kept the white matter fufpended, even when diluted with water. Strong fulphuric acid did not throw down the white matter from the muriatic folution; but when the quantity added was nearly equal to that of the folution, part of the muriatic acid was extricated in white fumes, with effervefcence. The mixture, heated nearly to boiling, becomes tranfparent, and continues fo in the cold. This folution is alfo precipitable by water, and the precipitate is foluble in the muriatic acid.

The faturated muriatic folution does not cryftallize by evaporation, but affords a deliquefcent mafs, which is not corrofive, and parts with its acid in an heat near ignition. *Pruffian* alkali does not precipitate the muriatic folution; but all the alkalis, whether mild or cauftic, occafioned copious precipitations, which were foluble in the muriatic acid, and thence become precipitable by water in the original ftate. This white precipitate is much more fufible than any of the other fimple earths. In a heat between 142 and 156 degrees of Wedgewood's thermometer, which is nearly as high as is produced in a fmall air furnace, it melted in contact with clay, with flint, with chalk, with lime, with magnefia, with barytes or ponderous earth, and with fulphate of barytes or ponderous fpar, in feveral different experiments. In a hole fcooped in chalk it ran into a fmooth whitifh opake bead, not at all adherent to the chalk itfelf; and in a cavity in carbone or charcoal it likewife fufed, but did not feem to undergo any revivification. Part of this was foluble in boiling muriatic acid, and precipitable by water, as at firft; but an accident prevented the determination whether the whole was foluble. From thefe trials it feems proper to confider the white matter as a new earth; directly foluble in no menftruum but muriatic acid, or perhaps its compounds; nor cryftallizable in this combination; precipitable by water, and not by the *Pruffian alkali*; parting with its acid in a heat below ignition; and fufible in a degree of heat not very much exceeding that required to melt caft iron. The black fubftance which feems to have compofed about one-fifth part of the crude mineral, was found to refemble plumbago in its leading properties, but its refidue did not appear to be iron. The remaining three fifths of the mineral which refifted the humid attacks in Mr. Wedgwood's experiments, was probably filex; but he does not fpeak of any direct examination of its properties by fufion with alkalis, the fluoric or fparry acid, or otherwife. With refpect to the combinations of thefe earths we have not yet had any information.

PART III.

Sect. I. *Of Metallic Subſtances.*

THESE ſubſtances are diſtinguiſhed from all the other productions of nature by an abſolute opacity, a much greater ſpecific gravity than that of any other ſubſtance, and a degree of brilliancy peculiar to bodies of this kind. One of the diſtinctive characters of metals is their opacity. The moſt opake ſtone, divided into very thin laminæ, becomes tranſparent; whereas the thinneſt plate of metal preſerves the ſame opacity as the maſs itſelf. Gold muſt, however, be excepted, as that metal has been found to tranſmit light of a beautiful green colour, when beaten into leaf of about the two hundred and eighty thouſandth part of an inch in thickneſs. This truly characteriſtic property has induced artiſts to employ metals to reflect the images of objects. Another character by which metallic ſubſtances may be diſtinguiſhed is their relative weight. A cubic foot of marble weighs but two hundred and fifty-two pounds; a cubic foot of tin, which is the lighteſt of all metals, weighs five hundred and ſixteen pounds. This ſuperior gravity of metals, which ſo much exceeds that of earthy matters, depends moſt probably on their extraordinary denſity.

Metals, in general, likewiſe poſſeſs a facility of being extended and flattened when ſtruck, or ſubjected to a ſtrong and gradual preſſure: this property is known by the name of *Ductility*. All the metals do not poſſeſs this quality; but thoſe which poſſeſs the metallic qualities moſt eminently, exhibit this alſo.

Every metal is fuſed at a certain degree of heat, more or leſs intenſe; and in this ſituation their ſurface is convex. Mr. Macquer and Mr. Lavoiſier having expoſed gold to the focus of a lens, obſerved that this metal exhaled in fumes, without being decompoſed; as was proved by collecting it unaltered upon preſenting a plate of ſilver, which became gilt. Silver is volatilized in the ſame manner without decompoſition. When theſe ſubſtances are fuſed, and cooled ſlowly, they exhibit cryſtallizations of conſiderable regularity. Both the abbé Mongez and Mr. Brogniart have ſucceeded in cryſtallizing moſt of the metals, by varying the proceſs uſed by Mr. Rouelle in the cryſtallization of ſulphur. Almoſt all the metals, when kept in a ſtate of fuſion, loſe their metallic brilliancy, and become converted into an opake powder called *Oxide*, or *Metallic Calx*; and the oxides, when urged by a ſtronger heat, are reduced into a vitriform ſubſtance, known by the name of *Metallic Glaſs*. They acquire weight in their tranſition to the ſtate of oxide; a circumſtance that has led ſeveral chemiſts into error, who imagined they had increaſed the weight of the metal. Stahl pretended that the calcination of metals aroſe from the diſengagement of phlogiſton; and he conſidered their calces as an earth, or metallic baſis. Mr. Boyle affirmed that the increaſe of weight in calcined metals was owing to the combination of the matter of fire; and Dr. Boerhaave ventured to attribute it to the ſurrounding bodies, which depoſited themſelves upon the metal.

We find, however, that Jean Rey, a phyſician, in the year 1630, attributed the increaſe of weight in calcined metals to the combination of air with the metal. But it is, as we have already ſeen, to Mr. Lavoiſier that we are indebted for the proofs that the calcination of metals is owing merely to the fixation of oxigenous gas, and their reduction to the diſengagement of this gas, effected by ſimple heat, or by its combination with various baſes in ſuch inſtances wherein its adheſion to the metal is too ſtrong to be overcome by mere heat. The facts upon which this celebrated chemiſt has eſtabliſhed his opinion, are the following: Metals are not oxidated either in a vacuum, or in air which contains no part of oxigenous gas; though ſeveral chemiſts, as Dr. Prieſtley, Mr. Lametherie, &c. appear to have oxidated lead, tin, and mercury, in the carbonic acid. But this ſuppoſed oxide is nothing but a metallic carbonate, or the combination of a metal with an acid, which is very far from calcination or oxidation.

Metals incloſed under a glaſs, and properly heated, are oxidated only by abſorbing the oxigenous gas contained in the maſs of air which is inſulated; and when this abſorption is ended, it is impoſſible to carry the oxidation any further. The metals oxidated in an atmoſphere of oxigenous gas abſorb it to the laſt drop; and ſuch oxidated metals as are capable of being reduced in cloſe veſſels, give out, on their return to the metallic ſtate, the ſame quantity of oxigenous gas as they had before abſorbed. This doctrine ſeems to be eſtabliſhed on ſufficient proof. The concurrence of air and of humidity ſingularly aſſiſts the alteration of metals. The water is decompoſed in this proceſs, and its hydrogene is diſſipated, while its oxigene combines with the metal. This is doubtleſs the theory of ſuch oxidations as are effected beneath the ſurface of water; and when we find oxides, or metallic calces, in the bowels of the earth, defended from the contact of air, the facts ought to be referred only to the decompoſition of water, or of acids which have oxigene for their baſe. Hence it follows that the alteration of a metal will be the more ſpeedy: 1. In proportion as the affinity of the metal to oxigenous gas is ſtronger. 2. As the quantity of oxigenous gas is greater. 3. As the air is more humid, &c. Metals decompoſe certain ſubſtances in order to unite with their oxigene, and by that means to paſs to the ſtate of oxide. This is obſervable in caſes where the nitric acid is digeſted upon certain metals.

In the claſſification of metals *ductility* ſerves as a leading character. They may be diſtinguiſhed into ſuch as are ductile, and ſuch as do not poſſeſs this property. The name of *Metal* has been peculiarly applied to the former, and that of *Semi-metal* to the latter kind. Among the metals there are alſo ſome which are changeable by expoſure to air, while others are not ſenſibly altered in the ſame ſituation. This difference has cauſed a ſubdiviſion of the metals into *perfect* and *imperfect* metals. It will be proper to begin by treating of the ſemi-metals, as approaching, in general, the neareſt to the ſaline or ſtony ſubſtances in their qualities; and to conclude with the perfect metals, as poſſeſſing the metallic qualities in a greater degree.

Sect. II. *Of Arſenic.*

THIS ſubſtance which, when pure, is called *Regulus of Arſenic*, is a metallic oxide of a glittering whiteneſs, and ſometimes of a vitreous appearance; exciting an impreſſion of an acrid taſte on the tongue; volatile when expoſed to fire, in which ſituation it riſes in the form of a white fume, with a very evident ſmell of garlic. But although it be moſt commonly met with under this form, it may be reduced to the metallic ſtate by treating it with oils, ſoaps, or charcoal, in cloſed veſſels; a circumſtance with which Becher ſeems to have been acquainted. In this caſe the arſenic which ſublimes is of a brilliant grey colour, reſembling ſteel, but it ſpeedily becomes black in the air: it forms cryſtals, which Mr. De Liſle conſiders as aluminiform octahedrons. Arſenic is ſometimes found native; and it is met with in ſtalactites, or in protuberant depoſitions formed of layers more or leſs diſtinct and concentric, which are ſeparable from each other like the coats of an onion, or the laminæ of ſhells, from which it has obtained the name

of *Testaceous Arsenic.* In other instances the masses are formed of very small scales, which render the surface of the specimen sometimes granulated, and sometimes full of small cavities: it is then called *Scaly Arsenic.* Arsenic is also found in friable masses, possessing scarcely any consistence. In these various forms it is received from Bohemia, Hungary, Saxony, Saint Marie aux Mines, and other places. This semi-metal is volatilized by an heat of about 144 degrees of Reaumur. In order to set fire to this metal, it must be thrown into a crucible strongly ignited, and then it exhibits a blue flame, and rises in the form of a white oxide. If it be sublimed by a gentle heat, it crystallizes in trihedral pyramids or in octahedrons. It is not soluble in in water. According to Brisson its specific gravity is 57633. In fracture it resembles steel, but easily tarnishes. From the observations of Bergman it seems, that arsenic exists in the metallic state in its combinations with cobalt in the testaceous cobalt ore, and with iron in *mispickel.* It unites by fusion with most of the metals; but those which were ductile before this addition, become brittle afterwards. Such as are of difficult fusion alone flow more easily by heat, with the addition of arsenic; but those which are very fusible become refractory by the same addition. The yellow or red metals become white with this alloy. This substance is often combined with metals in various ores, and is disengaged from them by calcination. If arsenic be sublimed by a strong fire in closed vessels, it becomes transparent like glass; but its surface is soon rendered opake again by exposure to the air. It is not rare to find arsenical glass in the arsenic of commerce; it is yellowish, and soon loses its transparency by exposure to the air. This glass is sometimes found native in the cobalt mines, and among volcanic products. When exposed to fire in close vessels, it is volatilized by a moderate heat into a white crystalline powder, known by the name of *Flowers of Arsenic.* Eighty parts of distilled water, at the temperature of 59 degrees, are required to dissolve one part of the oxide of arsenic; but fifteen are sufficient at the boiling heat. One part of arsenic is soluble in between seventy and eighty parts of alcohol at the boiling point. The oxide of arsenic partakes therefore of the properties of saline substances, and differs from the other metallic oxides in being perfectly soluble in water; and because the other metallic oxides are without smell, and fixed in the fire; and because those oxides do not contract any union with metals; but, on the contrary, it resembles the metallic oxides, in becoming converted into a metallic glass by a strong heat; and in forming an opake insoluble substance, possessing the metallic brilliancy when deprived of oxigene. The oxide of arsenic is capable of combining with sulphur; and the result is either *orpiment* or *realgar*, according to the manner of operating. Most chemists have a notion that the realgar contains more sulphur than the orpiment; and they have prescribed different proportions to form these two substances. But it has been shown by Mr. Bucquet, that this difference of colour arises simply from the manner of applying the fire, nothing more being necessary to convert orpiment into realgar, than the exposing it to a strong heat. From the same mixture either of these products may be obtained, according to the manner of applying the heat.

Orpiment and realgar are found native in certain places, and they have been described by different mineralogists. Crystals of the latter have been found in Solfatara near Naples, and other places. Realgar is common in China, where it is made into vases, pagods, and other ornamental works; and it is often found in the waters of volcanos, in compressed hexahedral prisms, terminating in two tetrahedral summits. Orpiment is less scarce than the realgar. Lime and the alkalis decompose these two substances, and disengage the oxide of arsenic from them.

Both the acids and the alkalis exhibit interesting phenomena with arsenic. The sulphuric acid, when boiled on the oxide of arsenic, attacks and dissolves it; but this oxide is precipitated by cooling. If the whole of the acid be dissipated by a strong heat, the arsenical acid remains behind. The nitric acid, assisted by heat, dissolves the oxide of arsenic, and forms a deliquescent salt. The muriatic acid acts on arsenic very feebly, whether heated or cooled, as has been observed by Mr. Bayen and others.

In order to form the sublimed muriate of arsenic, or *butter of arsenic*, equal parts of orpiment and corrosive sublimate of mercury are mixed together. The mixture is distilled by a gentle heat; and the receiver is found to contain a blackish corrosive liquor, which forms the sublimed muriate of arsenic. Mr. Sage has observed, that cinnabar comes over if the heat be increased. If pure pot-ash be boiled on the oxide of arsenic, the alkali becomes brown, gradually thickens, and at last forms a hard brittle mass. This arsenical salt, which was discovered by Mr. Macquer, is deliquescent. It is soluble in water, which lets fall brown flocks. It is decomposed by fire, and the arsenic escapes. Acids deprive it of its alkali, &c. Soda exhibits phenomena nearly similar, with this oxide: and the above chemist has even affirmed, that he obtained this salt in crystals. Mr. Chaptal has found that ammoniac dissolves the oxide of arsenic by heat; and has several times obtained crystals of arsenic by spontaneous evaporation. He is even of opinion that the alkali is decomposed in these circumstances, and that the nitrogene is dissipated, while the hydrogene unites with the oxigene of the oxide, and forms water. The oxide of arsenic hastens the vitrification of all the earths; but the glasses into which it enters as a component part, have the property of becoming easily tarnished. If equal parts of nitre and oxide of arsenic be distilled in a retort, they afford a very red and almost incoercible nitric acid. Mr. Macquer carefully examined the residue in the retort after the distillation, and found that it was a salt soluble in water, capable of crystallizing in tetrahedral prisms terminated by four-sided pyramids, unalterable in the air, and fusible by a moderate heat, but without becoming alkalized. He called it the *Neutral Arsenical Salt*; and supposed that no acid could decompose it. Mr. Pelletier has, however, shown that the sulphuric acid, when distilled with it, disengages its acid. The arseniate of soda differs little from the arseniate of pot-ash. Mr. Pelletier has obtained this salt crystallized in hexahedral prisms, terminated by planes perpendicular to their axes.

Arsenic Acid.—From these experiments Mr. Macquer had shown that arsenic answered the purpose of an acid in these combinations. There remained only one step therefore to be made, to prove that it was really changed into an acid in these several operations: and it is to the celebrated Scheele that we are indebted for this discovery. His fine experiments upon manganese naturally led him to it. He has given two processes to obtain this arsenical acid; the first is by means of the oxigenated muriatic acid, and the other by the nitric acid. These acids are distilled from the oxide of arsenic: the muriatic acid abandons its oxigene to the oxide of arsenic, and resumes the characters of the ordinary muriatic acid. The nitric acid is itself decomposed; and one of its principles is dissipated, while the other is fixed and combines with the arsenical oxide. At present this acid is obtained by distilling six parts of nitric acid from one of the oxide of arsenic. It has also been proposed by Mr. Pelletier to decompose the nitrate of ammoniac by the oxide of arsenic. The residue in the retort is the arseniate of ammoniac, from which the alkali may be driven by a fire long kept up. The residue is a vitreous mass, strongly attracting humidity, and falling into deliquium. It is the pure arsenical acid. Mr. Pelletier has likewise decomposed the neutral arsenical salt, by mixing it

with half a part of oil of vitriol, and urging the fire to fuch a degree as to ignite the veffels. The refidue at the bottom of the retort is a white mafs, which attracts humidity, and is the arfenical acid. A white powder is obfervable, which is found to be the fulphate of pot-afh or of foda, accordingly as the arfenical falt has foda or pot afh for its bafis. From the various proceffes made ufe of to form the arfenical acid, it is evident that this fubftance is nothing but the arfenical oxide, faturated with the oxigene which it takes from the various bodies digefted upon it. The nitric acid, or the nitrates ufed for this purpofe, are decompofed; the nitrous gas paffes over very abundantly, and the oxigene remains mixed and united with the oxide of arfenic. This acid poffeffes the concrete form; but it foon attracts the humidity of the air, and becomes refolved into a fluid. It is fixed in the fire; but if it be heated in contact with a coaly fubftance, it is decompofed, and the oxide exhales in the form of fumes. It is reduced into arfenic, according to Mr. Pelletier, by paffing hydrogenous gas through it. At the temperature of 59 degrees of Fahrenheit's thermometer, this acid requires only two-thirds of its weight of water to diffolve it; whereas one part of the oxide of arfenic requires twenty-four of water to diffolve it at the fame temperature. This acid, when diffolved in water, may be again concentrated, and carried to the ftate of a tranfparent glafs without any alteration; for it is not by this treatment deprived of its power of attracting humidity from the air. When it is in this ftate of concentration, it acts ftrongly on the crucible, and diffolves the alumine of it, as is evident from the experiments of Mr. Berthollet. The arfenical acid, faturated with ammoniac, and duly evaporated, forms a falt cryftallized in rhomboides; which, when urged by heat, lofes firft its water of cryftallization, then its alkali, and is refolved into a vitreous mafs. Bergman obferves that barytes and magnefia have a ftronger affinity with this acid than the alkalis, and that lime decompofes the neutral falts with bafe of alkali.

Sect. III. *Of Cobalt.*

This is a femi-metal of a whitifh grey colour, inclining a little to red, of a fine clofe grain, very brittle, and eafily reducible to powder by the action of a peftle. It is a fubftance which was employed by artifts to give a blue colour to glafs, long before it was fuppofed to contain any metallic particles. It is, however, to Brandt, a Swedifh mineralogift, that we are indebted for our knowledge of the properties of this femi-metal. This femi-metal is combined in the bowels of the earth with fulphur, arfenic, and other metallic fubftances.

Cobalt, in the ftate of an oxide, is of a blackifh grey colour, and when cleared of arfenic is known by the name of *Zaffer*. The zaffer of commerce is mixed with three-fourths of fand. This oxide, fufed with three parts of fand, and one of pot-afh, forms a blue glafs, which, when pounded, fifted, and afterwards ground in mills, included in large cafks, forms *Smalt*. In order to obtain the blue of various degrees of finenefs, the fmalt is agitated in cafks filled with water, and pierced with three openings at different heights. The water of the upper cock carries out the lighteft blue, which is called *Azure of the Firft Fire*: the heavier particles fall more fpeedily; and the azure brought out by the water of the three cocks, forms the different degrees of finenefs known under the names of *Azure of the Firft, Second,* and *Third Fire.*

Zaffer, when melted with three times its own weight of black flux, a little tallow, and a little marine falt, affords the femi-metal improperly known by the name of *Regulus of Cobalt.* It is very difficult to reduce zaffer; a great quantity of flux muft be employed, and care muft be taken to keep the crucible long enough red-hot, in order that the matter may become very fluid, and fettle, and in order too that the *fcoriæ* may melt into a blue glafs; the cobalt is then precipitated, and accumulated under the fcoriæ in a metallic button. When cobalt is expofed to fire, it does not melt till it becomes very red. This femi-metal is very difficult of fufion, and appears very fixed in the fire: it is not certain whether it can be volatilized in clofe veffels. When fuffered to cool flowly, it cryftallizes into needle-fhaped prifms, difpofed one over another, and bundled together, having a pretty exact refemblance to a mafs of bafaltes crumbled down into pieces. All that is neceffary in order to fucceed in effecting this cryftallization is, to melt a quantity of cobalt in a crucible till it fuffer a kind of ebullition, and then taking the veffel out of the fire, to fet it upon one fide, as foon as the furface of the femi-metal which it contains becomes fixed. This inclination of the veffel caufes that part of the metal which is ftill in a ftate of fufion to run off, while that which adheres to the fides of the veffel in lumps, formed by the cooling of the furfaces of the cobalt, is fringed with prifmatic cryftals. If melted cobalt be expofed to the air, it becomes in a fhort time covered over with a dufky pellicle, which is nothing but an oxide of this femi-metal, formed by its combination with the oxigene of the atmofphere. This oxide may be produced more readily, and in any quantity, by reducing this femi-metal to a powder, and expofing it in a fhallow veffel under the muffle of a cupelling furnace, ftirring it frequently to change the furfaces. This powder, after being kept red-hot for fome time, lofes its brilliancy, gains an increafe of weight, and becomes black. The greateft force of fire is requifite to melt this black oxide of cobalt into a deep blue glafs. This femi-metal does not combine with earths, but its oxide unites with them by fufion to form a very fine blue glafs, which no intenfity of fire can render volatile. This property of the oxide of cobalt renders it highly ufeful in painting enamels, porcelain, and pottery. This fubftance has been found to be decompofed by barytes, magnefia, lime, and alkalis, which precipitate the cobalt in the form of an oxide.

Cobalt is diffolved by all the acids, but with different phenomena according to the ftate of the femi-metal and the acid employed. If one part of this femi-metal be diftilled with four parts of fulphuric acid, the fulphureous acid is produced, and the refidue in the retort is the fulphate of cobalt, foluble in water, and capable of cryftallizing in tetrahedral rhomboidal cryftals, terminating in a dihedral fummit.

If one hundred grains of cobalt be diffolved in the fulphuric acid, and precipitated by foda, they afford one hundred and forty grains of precipitate; and if the precipitation be made by means of chalk, one hundred and fixty.

Cobalt is diffolved by the nitric acid with effervefcence; and the folution affords cryftals in the form of needles, which have not hitherto been ftrictly examined. This falt is deliquefcent, boils on the coals without detonating, and leaves a deep red oxide. Mr. Chaptal has met with this falt in very fhort beautiful hexahedral pyramids. On charcoal it both fufes and decrepitates.

It has not been found that the muriatic acid diffolves cobalt in the cold; but by the affiftance of heat it diffolves a part of it. This acid acts more effectually upon the zaffer, and the folution is of a very fine green, and when diluted with water conftitutes a very fingular *fympathetic ink,* which paffes from a lilac, or violet colour, to purple, green, and black. Cobalt is alfo diffolved by the nitro-muriatic acid, and forms the fympathetic ink, which has been called by Helot the *Ink of Bifmuth.*

Zaffer is alfo diffolved by ammoniac, and produces a liquor which has a moft beautiful red colour.

Sect. IV. *Of Nickel.*

This is a femi-metal of a reddifh caft, of great hardnefs,

and very brittle. It was obtained from its ore by Cronftedt in the year 1751, who determined it to be a new femi-metal. The fpecific gravity of fufed nickel is pretty confiderable. To obtain nickel from its ore, the arfenic which adheres to it very intimately muft be firft difengaged, and then the oxide be fufed with three parts of black flux and a little coal. It is very difficult, however, to diffipate or remove all the arfenic by the firft proceffes of torrefaction; therefore, the metal, when urged by a violent fire, ftill fuffers this fubftance to fly off. The methods that have been propofed by Bergmann and Arvidfon for the purification of nickel, confift in repeated calcinations and reductions; but thefe operations only feparate the arfenic; and Bergmann has allowed that he did not even fucceed in completely depriving it of its iron, though he treated it by every fuitable method. He confiders it as a particular modification of iron. Nickel when heated in the air, is calcined into a green oxide; and the purer the nickel, fo much the deeper is the colour of the oxide. It is not known whether this oxide be fufible into a glafs. It is however reducible with fluxes and combuftible matters, which decompofe it as well as every other metallic oxide. The effects of air and water on nickel are not yet determined. When its oxide is fufed with vitrifiable matters in making glafs, it communicates to them an hyacinth colour more or lefs red. The manner in which lime, magnefia, and the three pure alkalis act on nickel, is alfo ftill unknown.

When the fulphuric acid is diftilled upon nickel, it affords fulphureous acid, and leaves a greyifh refidue, which, on being diffolved in water, communicates a green colour to it. The fulphate of nickel has been found to effloresce in the air. The nitric acid attacks nickel very ftrongly, and the folution, when evaporated, affords cryftals of a beautiful green colour, in cubes of a rhomboidal figure. It has alfo been obferved by Bergmann that this acid diffolves the oxide of nickel, and forms with it deliquefcent cryftals of a fine emerald green colour, and of a rhomboidal fhape.

When heated, the muriatic acid diffolves nickel; and the folution produces cryftals of the moft beautiful emerald green, and of the figure of long rhomboidal octahedrons. We have been informed by Cronftedt that nickel combines with fulphur by fufion, and that the refult is a hard yellow mineral, with fmall brilliant facets, which he has diffolved in the fulphure of pot-afh, and by that means formed a compound refembling the yellow ores of copper.

Nickel is found not to amalgamate with mercury, nor has it hitherto been applied to any particular ufe.

Sect. V. *Of Bifmuth.*

This is a femi-metal of a fhining yellowifh white, but which, upon being expofed to the air, acquires a reddifh tinge. It is difpofed in plates, or layers, is harder than lead, but eafily broken, and reduced to powder. The broken pieces exhibit large fhining facets in a variety of pofitions. Thin pieces of this femi-metal are in fome degree fonorous.

This femi-metal is the moft eafily fufed of any after tin. It is found combined with various fubftances in the bowels of the earth.

When heated to rednefs it burns with a blue flame, fcarcely perceptible; and its oxide rifes in the form of a yellowifh fume, which, when condenfed, forms the *flowers of bifmuth*. In paffing to the ftate of an oxide, its weight is confiderably increafed. Bifmuth has been converted into a glafs of a dull violet colour, by Mr. Darcet. It may alfo be fubftituted inftead of lead, in the procefs of cupellation, as its vitrification is even more fpeedy than that fubftance.

If the fulphuric acid be boiled on bifmuth, fulphureous acid efcapes, and the femi-metal is partly diffolved, but the fulphate of bifmuth does not cryftallize, but is very deliquefcent. The nitric acid attacks bifmuth, and is very fpeedily decompofed. Nitrous gas is difengaged, while the oxigene is fixed in combination with the metal. There is neverthelefs a portion diffolved which is capable of forming a falt in rhomboidal, tetrahedral prifms, terminating in a tetrahedral pyramid with unequal facets. This nitre detonates weakly with reddifh fcintillations; and melts, fwells up, and leaves an oxide of a greenifh yellow colour behind. In the air this falt lofes its tranfparency, and its water of cryftallization is at the fame time diffipated.

Bifmuth is not acted upon by the muriatic acid, except it be expofed to it for a confiderable time, and the acid be highly concentrated. The muriate of bifmuth is of difficult cryftallization, and attracts the humidity of the air ftrongly. Water precipitates this femi-metal from all its folutions; and the precipitate, when well wafhed, is known by the name of *Magiftery of Bifmuth*, which is ufed as a pigment for the fkin: the ftrong fulphureous vapours, and even the animal tranfpiration, convert it into metal, and alter its colours. A pomatum made with the magiftery of bifmuth is employed by the hair-dreffers, for converting hair to a black colour. This fubftance is alfo ufed by the pewterers to give hardnefs to the metallic compofition of pewter. The various folutions of the *white oxide of Bifmuth* form fympathetic inks, which are more or lefs curious, in proportion to the facility with which this oxide is altered and rendered black. This metallic fubftance unites with all the metals; but very difficultly, in the way of fufion, with the other femi-metals, or the metallic oxides; and antimony, zinc, cobalt, and arfenic, entirely reject an union with it. When fufed with gold it renders it *eager*, and communicates to it its own colour. Silver is not rendered fo brittle as gold by it; the red colour of copper is leffened by it, but it is deprived of its own colour by uniting with lead; the two metals, in this cafe, forming an alloy of a dark grey colour. Bifmuth mixed in a fmall proportion with tin, gives it a greater degree of brilliancy and hardnefs. By a violent degree of heat it can be united with iron. This femi-metal amalgamates with mercury, and forms a fluid alloy; a circumftance which has induced fome unprincipled drug merchants to mix it with that metal. The fraud may be known from the mercury being lefs fluid than before, and no other teft is neceffary than to diffolve the mixture in fpirit of nitre; as the bifmuth will be precipitated by the addition of water. The property of completely amalgamating with mercury may however caufe it to be applied with advantage in fome of the arts, as in the filvering of glaffes, &c. This may be done by an amalgam of tin, bifmuth, and mercury. On this account it has probably obtained the name of tin-glafs. Mr. Darcet has formed a fufible alloy; which confifts of eight parts of bifmuth, five of lead, and three of tin. It flows like mercury, and diffolves in water at the feventy-third degree of Reaumur, or the one hundred and ninety-feventh of Fahrenheit.

Sect. VI. *Of Antimony.*

This femi-metal is ponderous, of a fparkling or filvery white colour, and of a laminated or fcaly texture, its furface exhibiting a kind of ftar-like cryftals. It is found in different ftates in the bowels of the earth. The *glafs of antimony* is produced by the flow and gradual calcination of crude antimony. In this cafe the ore affords a grey oxide, which, when urged by a violent heat, is converted into a reddifh, and partly tranfparent glafs of antimony. This tranfparency, however, depends upon the perfection of the fufion. The highly corrofive quality of the *glafs of antimony* is corrected by mixing it with yellow wax, and afterwards burning it off. This is called *cerated antimony*. Antimony is difficult of fufion; but when once melted, it emits a white fume known by the name of *Flowers of Antimony*. Thefe fumes, when collected, form very brilliant prifmatic tetrahedral cryftals; and Mr. Pelletier, a French chemift, has obtained them in tranfparent octahedrons. The ar-

gentine flowers of antimony are soluble in water, which they render emetic; and in volatility and solubility this sublimed oxide has a resemblance to the oxide of arsenic, as has been shown by Mr. Rouelle.

The change that antimony undergoes by exposure to the air, is very slight. The sulphuric acid, by slow ebullition upon this metal, is partly decomposed. Sulphureous gas first escapes, and towards the end of the operation, sulphur itself is sublimed. If four parts of the acid be used with one of the antimony, the residue, after the action of the acid, consists of the metallic oxide, with a small quantity of the sulphate of antimony, which may be separated by means of distilled water. This sulphate is very deliquescent, and can easily be decomposed in the fire. The nitric acid is also decomposed easily upon this semi-metal. It oxidates a considerable part, and dissolves a portion, which may be suspended in water, and forms a very deliquescent salt, which can be decomposed by heat. The oxide prepared by this means is very white, and very difficult of reduction, and, in fact, is a true *bezoar mineral*.

It is only by long digestion that the muriatic acid can be made to act upon antimony. Mr. Fourcroy has observed that this acid, when long digested upon the metal, dissolves it; and that the mixture of antimony, obtained by a strong evaporation in the form of small needles, is very deliquescent, fusible in the fire, and also volatile. It has been shewn by Mr. Monnet, that twelve grains of the oxide of antimony are sufficient to saturate half an ounce of the common muriatic acid; and it has been constantly found both by Monnet and De Fourcroy that in this process there is a portion of the muriate of antimony which is not volatilized by the fire: this arises from its being strongly oxidated or calcined. If two parts of the corrosive muriate of mercury, and one of antimony, be distilled together, a very slight degree of heat forces over a butyraceous matter, which is called *butter of antimony*, or the sublimed muriate of antimony. It is probable that the acid in this composition is in the state of oxigenated muriatic acid, as is the case in corrosive sublimate. By a very gentle heat the sublimed muriate of antimony becomes fluid; and by virtue of this property it can be conveniently poured from one vessel to another: nothing more is necessary than to plunge the bottle which contains it into hot water, and the muriate may then be poured out in its liquid state. Mr. Chaptal has frequently observed this muriate of antimony crystallized in hexahedral prisms with dihedral summits: two sides of the prism are inclined, and form that which the ancient chemists distinguished by the name of crystals in the form of a rhomb. This muriate is used as an escharotic. If the salt be diluted with water, a white powder falls down, called powder of *algaroth*, or *mercurius vitæ*. This powder does not contain the smallest portion of the muriatic acid; it is merely an oxide of antimony produced by that acid. Simple water has also some action upon this semi-metal; for it evidently becomes purgative by remaining in contact with it. Wine, and the acetous acid, completely dissolve it: the *antimonial wine* is, however, an uncertain remedy; as it is impossible to determine with absolute certainty the degree of its energy, because that depends upon the variable degree of acidity of the wine made use of. Emetic wine ought not therefore to be used but in external applications. This semi-metal is also dissolved by the gastric fluids, as the operation of the famous *perpetual pills* clearly proved. The acid of tartar with antimony forms a very well known salt, which is much employed in medicine. It is known by the name of *Antimonium Tartarisatum*, emetic tartar, and stibiated tartar. In the new nomenclature of chemistry, it is distinguished by the title of *Antimoniated Tartrite of Pot-ash*.

In the preparation of this remedy no uniform process has been recommended, by which it may always have the same strength, and produce the same effects. In making it some chemists have prescribed the *crocus metallorum*, or semi-vitreous oxide of sulphurated antimony; others the *glass of antimony*; some the *liver of antimony*, or sulphurated oxide of antimony, and others the sublimed oxide: some also advise the combination of several of these substances. In general, however, they employ *cream of tartar*, or the acidulous tartrite of pot-ash, as a solvent. The processes have not only varied in the choice of the substances employed, but likewise in the proportions in which they are to be used. There appears also to have been a great variation in the quantity of water made use of as a vehicle, which is not an indifferent circumstance; and likewise in the time prescribed to digest the substances together; a matter of the greatest consequence to be ascertained, as the saturation of the acid depends absolutely upon it. Attention is also necessary to the choice of vessels, as they have been found to influence the effect of this remedy. These variations in the process must necessarily have influenced the result; it is therefore not extraordinary that those who analysed different antimoniated tartrites of pot-ash should have found different proportions of the metal in a certain quantity of the salt. It is, therefore, of the greatest importance to point out an uniform process for the preparation of this medicine, and by which the product may be invariable.

Professor Chaptal has recommended the following as a very accurate process for making *Tartarised Antimony* or *Emetic Tartar*: Take very transparent glass of antimony, grind it fine, and boil it in water, with an equal weight of cream of tartar, until this salt be saturated. By filtration, and evaporation with a gentle heat, and subsequent repose, crystals of the antimoniated tartrite of pot-ash are obtained, whose degrees of emeticity are sufficiently constant. The crystals may be obtained in several successive products by repeated evaporations. Macquer has recommended the powder of *Algaroth*, in which he has been followed by different French chemists, and by Bergman with a few trifling alterations. His process is this: Take five ounces of cream of tartar reduced into powder, and two ounces two drachms of the powder of algaroth precipitated by hot water, washed and dried. Add water to these, and boil them gently. The crystals of tartarised antimony, or emetic tartar, may then be obtained, by filtration and evaporation. The antimoniated tartrite of pot-ash crystallizes in trihedral pyramids. It is very transparent, is decomposed on the fire with crackling, and leaves a coaly residue. Sixty parts of water dissolve it. It effloresces in the air, and becomes farinaceous. The solutions of this salt throw down a mucilage, which fixes, and forms a pellicle of considerable thickness: it is the mucilage of cream of tartar, which is insoluble in water, but partly soluble in alcohol. The sulphuric acid blackens it, but does not itself become coloured till after a long time. The nitric acid dissolves it partly; and is itself decomposed, with the ejection of a great deal of nitrous air or gas.

The antimoniated tartrite of pot-ash is decomposed by lime and the alkalis. Antimony, properly mixed with the nitrate, decomposes that salt completely. Equal parts of the semi-metal and nitre being thrown into an ignited crucible, the salt detonates, its acid is decomposed; and at the end of the operation the crucible is found to contain the alkali which served as the base of the nitrate, and the antimony reduced to the state of white oxide: this is called *Diaphoretic Antimony*. The same preparation may be made by using the sulphure of antimony; in which case three parts of the nitrate are used to one of the crude antimony. The residue in the crucible, after the detonation, is composed of the oxide of antimony, fixed alkali, a portion of the nitrate not decomposed, and a small quantity of sulphate of pot-ash. Water deprives it of all the salts it contains; and leaves only the oxide of antimony, which is called *Washed Diaphoretic Antimony*. If a small quantity of acid be poured on the fluid which holds the salts in solution, a small portion of the oxide of antimony falls down, which was dis-

folved by the alkali of the nitre. This precipitate forms the *ceruſe of antimony*. Equal parts of the fulphure of antimony and of nitrate, detonated in an ignited crucible, form the *liver of antimony*, or fulphurated oxide of antimony; which, when pulverifed and wafhed, produces the faffron of metals, or *crocus metallorum*. The oxides of antimony have generally been confidered as very difficult of reduction; but Mr. Chaptal has found them reducible with the greateft facility by the black flux. The alkalis do not fenfibly act upon antimony: but the fulphures of alkali diffolve it completely; and it is upon this principle that an operation is founded by which a remedy is obtained that was once held in high eftimation, and known by the name of *Kermes Mineral*. The preparation is merely a red fulphurated oxide of antimony. Glauber firft pointed out this remedy, and made it with antimony and the folution of nitre fixed by charcoal. By fome this preparation is alfo made by boiling pounded fulphure of antimony, with one fourth its weight of fixed nitre or pot-afh in twice its weight of pure water, and afterwards filtering the folution. As this folution cools the kermes falls down, and is dried for ufe. The liquor which remains after the kermes is fallen down, contains ftill more kermes, which may be difengaged by means of an acid. This kermes, which is paler than the former, is known by the name of *Golden Sulphur of Antimony*, or the orange-coloured fulphurated oxide of antimony. At prefent, however, this procefs is not followed. The procefs which Mr. Chaptal has found the moft convenient, confifts in boiling ten or twelve pounds of pure alkaline folution with two pounds of the fulphure of antimony. The ebullition muft be continued for half an hour, after which the fluid is filtered; and much kermes is obtained by mere cooling. He digefts new alkali on the antimony, until it be confumed, and by this means obtains kermes of a beautiful tufted appearance.

If lime or lime-water be digefted upon pulverized antimony, at the end of a certain time, even in the cold, a kind of kermes, or golden fulphur of antimony of a beautiful red colour, is produced.

Sect. VII. *Of Zinc.*

This is a metallic fubftance of a blueifh white colour, brighter than lead, and very difficultly reducible into powder, but capable of being extended into very thin plates by the equal and gradual preffure of the flatting mill. This laft property would feem to prove it to be an intermediate fubftance between the femi-metals and the metals. It was firft noticed by Mr. Sage. This fubftance is found in various ftates of nature.

In the native ftate it is very rare, if it exift at all. When in combination with fulphure it forms what is commonly called *Blende* or *falſe galena*. It is moft frequently met with in the ftate of an oxide, in which cafe it conftitutes what is known by the name of *Lapis Calaminaris*.

It yields beneath the hammer, without extending itfelf; but if it be caft into fmall plates, it can then be laminated, and reduced into very thin and very flexible leaves. Mr. Briffon has found the fpecific gravity of fufed zinc to be 7.1908.

When heated, this fubftance may be eafily pulverized; but the operation is very difficult without this precaution, as it wears, choaks up, and deftroys files in a very fhort time: befides which, they have not much action upon it. It may likewife be fufed and poured into water. Thefe are the moft eafy methods of reducing it to powder. When treated in clofe veffels it fublimes without decompofition; but, if calcined in the open air, it becomes covered with a grey powder, which is a true oxide; and, when heated to rednefs, takes fire, emits a blue flame; and white flocks iffue from it, which are called Flowers of Zinc, or *Philoſophical Wool*. This oxide may be fufed into glafs by an exceedingly violent heat, and the glafs is of a beautiful yellow colour. When laminated into very thin leaves, it takes fire by the flame of a taper, and burns with a greenifh blue flame.

Zinc is confidered by Mr. De Laffone as a fort of metallic phofphorus. Water appears to act in fome degree upon zinc. For if water be poured on this femi-metal at the times when it begins to be ignited, the fluid is decompofed, and a great deal of hydrogenous gas is difengaged; a fact that has been obferved by Mr. Lavoifier and other chemifts. The fulphuric acid diffolves this fubftance in the cold, and produces much hydrogenous gas; and by evaporation a falt may be obtained in tetrahedral prifmatic cryftals, terminated by a four-fided pyramid Mr. Bucquet thinks that thefe prifms are rhomboidal. This falt is known by the name of *Vitriol of Zinc*, *White Vitriol*, or *Sulphate of Zinc*: its tafte is highly ftyptic. It is not much altered by expofure to air when pure; but at a degree of heat lefs than is required by the fulphate of iron, its acid efcapes.

The nitric acid, even when diluted with water, attacks zinc with vehemence. In this operation a great part of the acid is decompofed; but if the refidue be concentrated by flow evaporation, cryftals are obtained in compreffed and ftriated tetrahedral prifms, terminated by pyramids with four fides. It has alfo been obferved by Mr. De Fourcroy, that this falt melts upon heated coals, and fpreads around with decrepitation, and a fmall reddifh flame. If it be expofed to heat in a crucible it emits red vapours, affumes the confiftence of a jelly, and preferves this foftnefs for a certain time. This nitrate of zinc is very deliquefcent. The muriatic acid attacks zinc with effervefcence. Hydrogenous gas is produced, and black flocks are precipitated, which have been taken by fome for fulphur, and by others for iron, but which Mr. De Laffone confiders as an irreducible oxide of zinc. An evaporated folution of this kind becomes thick, and refufes to cryftallize; but when heated it fuffers a very concentrated acid to efcape, and by diftillation the muriate itfelf is fublimed.

Mr. De Laffone has fhown that the pure alkalis when boiled on zinc obtain a yellow colour, and diffolve a part of the metal. If ammoniac be digefted in the cold, upon this femi-metal, it difengages hydrogenous gas. This feems to arife from the decompofition of the water, which alone, and without any mixture, is decompofed upon ignited zinc, as has been feen above. If zinc be mixed with the nitrate of pot-afh, and thrown into an ignited crucible, it caufes this falt to detonate very ftrongly; Mr. Monnet has obferved that it decompofes the muriate of ammoniac by fimple trituration. A folution of alum, boiled upon the filings of zinc, is decompofed, and affords the fulphate of zinc, as has been fhown by Mr. Pott; and if zinc be fufed with antimony it forms an alloy, which is hard and very brittle. This fubftance unites with tin and copper, and forms bronze, but when combined with copper alone it forms brafs. When mixed with gunpowder, it produces the white and brilliant ftars that are obferved in artificial fire-works.

This femi-metal has been propofed as a fubftitute for tin, for the internal lining of copper veffels; and it has been fhown by Mr. Malouin to be capable of a more uniform extenfion on the copper, and to be harder than tin. It has, however, been objected to as being capable of diffolution by vegetable acids, and that this faline product is dangerous; but Mr. De la Planche has made a variety of experiments on this fubject, from which he is convinced that the falts of zinc even when taken in a more confiderable dofe than the aliments prepared in veffels tinned with this femi-metal can contain, are not dangerous.

The precipitate of zinc has been employed in fome of the arts by Mr. De Morveau in the room of white lead, with the greateft advantage. The intention of the artift is perfectly anfwered by it, and its ufe is not attended with any dangerous confequences.

Sect. VIII. *Of Manganese.*

This is a mineral fubftance of a grey or blackifh colour, foiling the fingers, and ufed in glafs-houfes under the title of the *Soap* of the *Glafs-makers*. It is a femi-metal which poffeffes properties of a particular kind. This fubftance appears to be always found in the ftate of an oxide; but which exhibits a great many varieties.

It has been fhown by Mr. Scheele that the afhes of vegetables contain manganefe: and that it is to this mineral that the colour of calcined pot-afh is owing. To extract it, three parts of fixed alkali, one of fifted afhes, and one-eighth of nitrate of pot-afh, muft be fufed together. The fluid mixture muft then be poured into an iron mortar, where it congeals into a greenifh mafs. This being pounded, and boiled in pure water, muft be filtrated, and faturated with fulphuric acid. At the end of a certain time, a brown powder is depofited, which poffeffes the properties of manganefe. In order to reduce manganefe to the metallic ftate, a crucible is lined with charcoal; and into a hole made in this charcoal, a ball of manganefe, previoufly kneaded with oil and gum ammoniac, is to be put; after which the hole is to be covered with powder of charcoal. Another crucible muft then be fitted on, and the veffels expofed to a violent fire for an hour and a half. The button which is obtained in this cafe has almoft always afperities on its furface. Globules appear which fcarcely adhere to the mafs; and thefe portions are ufually of a very deep green, while the internal part has a blueifh caft. This metal is more infufible than iron; and Mr. Chaptal has frequently obferved, when the fire has not been fufficiently ftrong to fufe the manganefe, that feveral globules of iron have appeared difperfed through the agglutinated oxide. Bergman has eftimated the fpecific gravity of manganefe to be to that of water, nearly as 6850 to 1000. If the oxide of manganefe be ftrongly heated in clofe veffels, it affords a prodigious quantity of oxigenous gas, and begins to afford it at a degree of heat lefs than is neceffary to difengage it from the oxides of mercury: a ftrong fire is however required to difengage the laft portions. In the trials of profeffor Chaptal four ounces of the manganefe of *Cevennes* afforded nine pints of oxigenous gas. The refidue in the retort was a grey oxide; one part of which was incrufted in the fufed glafs, and had communicated to it a very rich violet colour. If the oxide of manganefe be diftilled with charcoal it affords the carbonic acid: but, if it be calcined in an open veffel, it is reduced into a grey powder, which lofes much of its weight when the fire is very ftrong; and at laft agglutinates, and forms a greenifh mafs. But if it be mixed with charcoal, it does not fuffer any perceptible change in its colour. When manganefe is expofed to a very violent heat, it vitrifies, and affords a glafs of an obfcure yellow colour. The iron which is mixed with it preferves its metallic form. It is eafily changed in the air, and refolved into a brown powder of a greater weight than the femi-metal itfelf, which is a fure proof of oxidation. It unites eafily by fufion with all the metals except pure mercury. Copper alloyed with a certain quantity of manganefe is ftill very malleable. It has been obferved by Bergman, that if a mixture of the phofphate of urine with a fmall quantity of oxide of manganefe be placed upon charcoal, and kept in fufion for a few inftants by means of the blue interior flame of the blow-pipe, a tranfparent glafs will be produced, of a blue colour inclining to red; which, when charged with a certain quantity of the falt, affumes the colour of a ruby. When kept in fufion for a longer time, a flight effervefcence is perceived, and all the colour difappears. If the tranfparent globule be then foftened by the exterior flame, the colour foon returns, and may be again effaced by keeping up the fufion for a time. The fmalleft portion of nitrate, added to the glafs, immediately reftores the red colour; and, on the contrary, it is deftroyed by the addition of fulphuric falts. This globule of glafs, taken from the charcoal, and fufed in the fpoon of perfect metal, becomes red, and does not change again.

Manganefe is attacked by the fulphuric acid, and hydrogenous gas is produced. It is diffolved more flowly than iron; and a fmell is difengaged fimilar to that which is afforded by the folution of iron by the muriatic acid. In this cafe the folution is as colourlefs as water, and affords by evaporation tranfparent colourlefs cryftals in the form of parallelopipeds, which are of a bitter tafte. Cryftals have alfo been obtained in tetrahedral prifms, terminated by four-fided pyramids, by Mr. Sage. This falt is found to effloresce in the air. If the fulphuric acid be poured on the oxide of manganefe, and its action be affifted by a gentle heat, an aftonifhing quantity of oxigenous gas is difengaged. The oxide of manganefe of *Cevennes* afforded Mr. Chaptal five pints and a half in the ounce. If this oxide be deprived of its oxigene, the refidue is a white powder, foluble in water, which by evaporation affords the fulphate of manganefe, which we have noticed above.

It has been obferved by Bergman that coaly matter, fuch as fugar, honey, and gum, promoted the action of the acid. This feems to depend on the combination of the oxigene with thefe agents, to form the carbonic acid; while the fulphuric acid acts upon the metal itfelf with greater facility. This femi metal is precipitated from its folutions by the alkalis, in the form of a whitifh gelatinous matter; but this precipitate foon lofes its colour, and becomes black by the contact of the air. This phenomenon is attributed by Mr. Chaptal to the abforption of oxigenous gas. He has been convinced of this truth by agitating the precipitate in bottles filled with this gas; as in this fituation the black colour is produced in one or two minutes, and a confiderable part of the gas is abforbed. Manganefe is diffolved with effervefcence by the nitric acid; and there always remains a black, fpongy, and friable body, which appeared to Bergman to have the characters of molybdena; a fimilar refidue is alfo produced by other folvents. The folution of the nitrate of manganefe has generally a dull colour, and with difficulty affumes the red colour. This folution does not afford folid cryftals, even when evaporated flowly.

The oxides of manganefe are foluble in the nitric acid; but it is obfervable that this acid is not decompofed upon them, as it finds the metal in the ftate of oxide. If coaly fubftances be added to affift the folution, carbonic acid is produced; but when the nitrous or fuming nitric acid is ufed, the folution is made without the affiftance of thefe coaly fubftances, becaufe the excefs of nitrous gas feizes the oxigene of the oxide. Thefe folutions have not been found to cryftallize. The muriatic acid alfo diffolves manganefe; but when it is digefted upon the oxide it feizes the oxigene, and paffes in vapour through the water. This vapour is known by the name of *Oxigenated Muriatic Acid*, the properties of which have been explained before.

In this cafe the refidue in the retort confifts of a portion of acid combined with the manganefe; which by evaporation affords a faline mafs, that attracts the humidity of the atmofphere.

The fluoric acid combined with manganefe affords a falt of a very fparing folubility, and which this acid diffolves but little of: but by decompofing the fulphate, the citrate, or the muriate of manganefe, by means of the fluate of ammoniac, a fluate of manganefe is precipitated; and the fame phenomenon is exhibited with the phofphoric acid. The acetous acid has but a weak action upon this fubftance. If it be digefted upon the oxide of manganefe, it acquires the property of diffolving copper, and forms the beautiful acetate of copper, or *cryftals of Venus*; but the fame acid, digefted on copper, forms *verdigris*, or fimply corrodes the metal. This circumftance fhews that the acetous acid becomes charged with oxigenous gas, by the affiftance of which it is enabled to diffolve the copper.

By the oxalic acid not only manganefe, but alfo the black oxide of manganefe is diffolved, and the faturated folution depofits a white powder if there be not an excefs of acid. This falt is blackened by the fire, but eafily refumes the milky colour in the fame acid. The oxalic acid precipitates it in the form of fmall cryftalline grains, when poured into folutions made by the fulphuric, nitric, or muriatic acids. The acidulous tartrite of pot-afh diffolves the black oxide, even in the cold; and the tartrite of pot-afh added to any folution whatever of manganefe, throws down a precipitate which is a real tartrite of manganefe. Both manganefe and the black oxide are attacked by the carbonic acid; and the folution becomes covered in the open air with a pellicle, which confifts of the manganefe that is feparated and oxidated; and which is white when deftitute of iron.

Mr. Scheele has obferved, that when the muriate of ammoniac is diftilled with this oxide of manganefe, an elaftic fluid is difengaged, which is one of the principles of ammoniac; and Mr. Berthollet has fhewn that, when ammoniac is difengaged by a metallic oxide, a portion of it is decompofed. The oxigene of the oxide unites to the hydrogenous gas of the alkali to form water, and the nitrogene gas is fet at liberty. Eight parts of oxidated manganefe take up, by a gentle heat, in a glafs retort, three parts of fulphur, and produce a greenifh yellow coloured mafs, which acids attack with an effervefcence and hepatic fmell. Manganefe itfelf does not appear to combine with fulphur. In order to feparate iron from manganefe, the alloy muft be diffolved in the nitric acid, and evaporated to drynefs. The refidue muft then be ftrongly calcined, and digefted with weak nitric acid, and a fmall quantity of fugar. In this cafe the acid takes up the manganefe, which may be precipitated by the carbonate of pot-afh. The alloy may alfo be put into a folution of the fulphate of iron; in which cafe the acid abandons the iron in order to unite with the manganefe. The iron having lefs affinity with the acid than the manganefe, may likewife be precipitated by a few drops of alkali.

Sect. IX. *Of Lead.*

This is the fofteft, the leaft tenacious, the leaft fonorous, and the leaft elaftic, of all the metals. It has a dark white colour inclining a little to blue. It tarnifhes when expofed to the air; and is fufed by a gentle heat. Lead is found in various ftates of ore.

If lead be kept for fome time in fufion, it becomes covered with a grey oxide; which, when expofed to a more violent heat than is capable of keeping it ignited, affumes a deep yellow colour, in which ftate it is called *Maffícot*. This may be converted into the red oxide, or *minium*, by the following procefs: Lead on being converted into *mafficot*, is thrown out and cooled by pouring water upon it; it is then carried to the mill, and ground into very fine powder, which is wafhed in water. The particles of lead which could not be pulverized in the mill, remain in the veffel where the wafhing is performed. This oxide of lead is then fpread out upon the hearth of the furnace in which it is calcined. Lines are drawn on its furface; and it is ftirred frequently to prevent its clotting together, and the fire is afterwards kept up for forty-eight hours. When the minium is taken out of the furnace, it is put into large fieves of wood, and paffed through very fine net work, or cloth of iron wire, placed over the cafks that are deftined to receive it.

Mr. Geoffroy fuppofed that, in order to form minium, no greater heat was required than one hundred and twenty degrees of Reaumur's thermometer. This heat is not however fuitable to works on a large fcale; as in thefe the roof of the furnace is kept at a red heat. By calcination the lead increafes in weight ten pounds in every hundred.

When urged by a ftronger heat, thefe oxides are converted into a yellow glafs, fo very fufible, that it penetrates and deftroys the beft crucibles. It is ufed in glafs-houfes, on account of its fufibility, not only to affift the fufion, but likewife to render the glafs fofter, more ponderous, of a more unctuous feel, and more fufceptible of being cut and polifhed; and on thefe accounts it is made a part of the compofition of flint and cryftal glafs.

If the oxides of lead be diftilled without addition, they afford oxigenous gas by a violent heat. Dr. Prieftley even procured it from minium, part of which was converted into globules of metal. If thefe oxides be fufed with coaly matter, the metal becomes revived. When the fulphuric acid is boiled upon lead it affords much fulphureous acid; and an oxide is formed, which arifes from a combination of the oxigene of the acid with the lead. But ftill a portion of the lead is diffolved; for if a fufficient quantity of water be poured on the refidue, a very cauftic falt is obtained by evaporation, in tetrahedral prifms, foluble in eighteen times their weight of water. This fulphate can be decompofed both by fire, lime and the alkalis. If very hot fulphureous acid be poured into a leaden veffel, it inftantly corrodes and deftroys it.

If the nitric acid be concentrated, it is readily decompofed upon lead, and converts it into a white oxide; but if the acid be weak it diffolves the metal, and forms cryftals of an opake white, in the form of fegments of a three-fided prifm. In the fire this falt decrepitates, and is fufed with a yellowifh flame upon ignited coals. The oxide of lead becomes yellow, and is reduced into globules of metal. The fuphuric acid takes lead from the nitric acid.

The muriatic acid, when affifted by heat, oxidates lead, and diffolves a portion of it. The falt produced in this cafe cryftallizes in ftriated hexahedral prifms. It is flightly deliquefcent, and both lime and the alkalis decompofe it. If the fame acid be poured on litharge it decompofes it inftantly, and a confiderable degree of heat is produced. The folution affords fine octahedral cryftals, of an opake white colour, a ftyptic tafte, and which are very heavy.

If thrown on coals this falt decrepitates; and when the fire is increafed, its water of cryftallization is forced off, and it becomes converted into a mafs of a beautiful yellow colour. Three parts of water, at fixty-fix degrees of temperature, diffolve one part of this falt; and boiling water more than its own weight. The pure alkalis precipitate it in the form of a *magma*. The affinity of the muriatic acid with the oxide of lead is fo ftrong, that it is capable of decompofing all its combinations. Both minium and litharge decompofe the muriate of ammoniac, and, when triturated with marine falt, feparate the foda. When the muriates of lead are calcined or fufed they afford a pigment which is of a beautiful yellow colour.

Lead is corroded by the acetous acid, and a white oxide is produced, which is known by the name of *White Lead*. In order to prepare *White Lead*, the metal is melted, and caft into plates about half a line in thicknefs, four or five inches wide, and two feet long. Thefe are rolled up in a fpiral form, in fuch a manner that the revolutions remain at the diftance of half an inch from each other. They are then placed in pots, upon three points, which project from the infide at about one third of the height. Malt vinegar is poured into thefe pots to the height of the bottom of the lead, and they are buried in dung beneath fheds. A great number of thefe are difpofed befide each other, and feveral ftrata are formed. Care is taken to cover each pot with a plate of lead and boards. At the expiration of a month or fix weeks they are taken out, and the *White Lead* is feparated. This white oxide is then ground in mills, and afterwards put into a vat, from which it is taken out to dry. The drying is performed in the fhade, becaufe the fun impairs the colour. For this purpofe it is put into fmall conical earthen pots, and carefully dried and wrapped up for ufe.

The difference between ceruſe and white lead, conſiſts in the quantity of chalk that is mixed with the former. All the oxides of lead are ſoluble in vinegar; and the ſolution of the acetate of lead when duly concentrated, cryſtallizes in efflorescent tetrahedral priſms, and forms the *Salt of Saturn*, or *Sugar of Lead*. The cauſtic alkalis alſo diſſolve the oxides of lead, and the metal may be precipitated by the addition of acids. But if the alkaline ſolution be concentrated, the lead re-appears nearly in the metallic form, and the alkali is found to have acquired a faint peculiar taſte.

In reſpect to metallic ſubſtances, neither nickel, mangaueſe, cobalt, nor zinc, can be made to combine with lead by fuſion; but antimony forms with it a brittle mixture with ſmall brilliant facets, in colour and texture reſembling iron or ſteel, according to the proportions in which the principles of the mixture are combined together; the ſpecific gravity of this compound is greater than that of the two metallic ſubſtances when taken ſeparately. Lead unites with biſmuth, and forms by this combination a mixed metal of a fine cloſe grain, and very brittle. Mercury diſſolves lead with the greateſt facility. This amalgam is formed by pouring hot mercury into melted lead. It is white and ſparkling, and after a certain length of time becomes ſolid: when triturated with an amalgam of biſmuth, it becomes as fluid as running mercury. It is deſerving of notice, that this extraordinary phenomenon takes place in the union of three metallic ſubſtances which are very fuſible, very ponderous, and more or leſs volatile. This metal combines readily with tin by fuſion. Two parts of lead and one of tin conſtitute a mixture more fuſible than either of the two metals when ſeparate, and form the ſolder uſed by plumbers; and eight parts of biſmuth, five of lead, aud three of tin, conſtitute a mixture which is ſo fuſible, that the heat of boiling water is ſufficient to melt it.

Lead when reduced to the form of an oxide enters into the compoſition of glaſſes, cryſtals, and enamels; and poſſeſſes the advantage of facilitating the fuſion of the glaſs, giving it an unctuous feel, and a degree of ſoftneſs, which renders it capable of being cut and poliſhed. Ceruſe and white lead are much uſed by painters; and theſe oxides poſſeſs the ſingular advantage of not being perceptibly altered by their mixture with oil; and form, by their whiteneſs and body, a baſis or receiver, which is very ſuitable for a variety of colours. Litharge is alſo employed in ſome manufactories to decompoſe ſea-ſalt; and the muriate of lead which is conſtituted in this way, forms by fuſion a ſuperb yellow, very much uſed in varniſh colours.

The oxides of lead are alſo frequently employed to harden oils, or to render them more drying. In theſe caſes the oxigene of the oxide combines with the oil, and cauſes it to approach nearer to the nature of reſins.

Sect. X. *Of Tin.*

This is a metal of a whitiſh yellow colour, ſofter, leſs elaſtic, and leſs ſonorous, than any other metal except lead. It is alſo very flexible, and produces a crackling noiſe when bended; a property that no other metal but zinc poſſeſſes, and even in that it is much leſs remarkable.

Tin is very ſoft, and the lighteſt of any of the entire metals. It is very ductile under the hammer, and its tenacity is ſuch, that a wire of one tenth of an inch in diameter is capable of ſupporting forty-nine pounds eight ounces without breaking.

All the different kinds of tin enter into fuſion with conſiderable facility, as it is the moſt fuſible of the metals. If it be kept in fuſion for a little time, expoſed to the action of the air, the ſurface becomes wrinkled, and covered with a grey pellicle; and if this firſt covering be taken off, the tin appears with all its brilliancy; but it ſoon becomes dull, and is again oxidated. By calcination this metal gains one-tenth of its weight. If the oxide be white, it is called *putty*. This putty is uſed to poliſh hard bodies, and to render glaſs opake, which converts it into enamel. Geoffroy has obſerved that tin takes fire by a violent heat, and that a white oxide is ſublimed, while part of the metal is converted into a glaſs of an hyacinthine colour. If this metal be kept in fuſion in a lined crucible, and the ſurface covered with a quantity of charcoal to prevent its calcination, it becomes whiter, more ſonorous, and harder, provided the fire be kept up for eight hours or more. Tin, as well as ſome other metals, acquire a brilliancy not uſually poſſeſſed, by pouring them out at the moment before they would congeal in the crucible. This management guards them from the oxidation they ſuffer in cooling, when they are poured out too hot. If tin be diſtilled in cloſe veſſels, it affords a white ſublimate in the neck of the retort.

Acids act upon tin variouſly, according to the degree of purity of the metal. Common ſulphuric acid diſſolves tin by the aſſiſtance of heat; but part of the acid is decompoſed, and flies off in the form of very penetrating ſulphureous acid. Water alone precipitates this oxidated metal. The ſulphuric acid diſſolves the oxide of tin with much greater facility. The nitric acid ſeizes this metal with great avidity; and the decompoſition of the ſolvent is ſo ſpeedy, that the metal is ſeen to be precipitated almoſt inſtantly in the form of a white oxide. If this acid be loaded with all the tin it is capable of calcining, and the oxide be waſhed with a conſiderable quantity of diſtilled water, a ſalt may be obtained by evaporation, which detonates alone in a crucible well heated, and which burns with a white and thick flame, like that of phoſphorus. If the nitrate of tin be diſtilled in a retort, it ſwells up, boils, and fills the receiver with a white and thick vapour, that ſmells like the nitric acid. The muriatic acid diſſolves tin both when hot and cold; and during the effervesſcence, a very fetid gas is diſengaged. The ſolution is yellowiſh, and affords needle-form cryſtals by evaporation, which attract the humidity of the air. Mr. Baumé, who has been much in the habit of preparing this muriate of tin, obſerves, that it differs according to the ſtate of the acid employed.

Mr. Monnet has obtained, by the diſtillation of a muriate of tin, a fat matter, a true *butter of tin*, and a liquor which has a reſemblance to that of *Libavius*. Tin is readily diſſolved by the oxigenated muriatic acid; and the ſalt which it produces poſſeſſes all the characters of the ordinary muriate.

The liquor, which is known by the title of the *fuming liquor of Libavius*, is ſuppoſed by Mr. Chaptal to be a muriate of tin, in which the acid is in the ſtate of the oxigenated muriatic acid. To make this preparation, tin is amalgamated with one-fifth of mercury; and this amalgam in powder is mixed with an equal weight of corroſive ſublimate. The whole is then introduced into a retort, that has a receiver fitted to it, and the diſtillation is begun by a gentle heat. An inſipid liquor paſſes over firſt, which is followed by a ſudden eruption of white vapours, which condenſe into a tranſparent liquor that emits a conſiderable quantity of vapours by mere expoſure to the air. The reſidue in the retort, according to the analyſis of Mr. Rouelle, junior, conſiſts of a ſlight lining in the neck of the retort, which contains a ſmall portion of the fuming liquor, ſome muriate of tin, muriate of mercury, and running mercury. The bottom of the veſſel contains an amalgam of tin and mercury; above which lies a muriate of tin of a grey white colour, ſolid and compact, and which is capable of being volatilized by an intenſe heat. Tin is diſſolved with rapidity by the nitro-muriatic acid; a violent heat is excited; and when the very concentrated acid has diſſolved too much of the metal, it happens that a magma is produced reſembling pitch.

This metal is alſo ſoluble in the vegetable acids; and it has been ſhewn by Margraff, that vinegar corrodes it by a gentle heat.

Aurum Muſivum, or *Moſaic Gold*, is formed by the combina-

tion of tin with fulphur. The procefs defcribed by the Marquis de Bullion is probably the moft convenient for this preparation: it confifts in forming an amalgam of eight ounces of tin and the fame weight of mercury. For this purpofe, a copper mortar is heated, and mercury poured into it; and when it has acquired a certain degree of heat, the melted tin is poured in, and the mixture agitated and triturated till cold. Six ounces of fulphur, and four ounces of fal ammoniac, are then mixed; and the whole put into a matrafs, which is to be placed on a fand-bath, and heated to fuch a degree as to caufe a faint ignition in the bottom of the matrafs. The fire muft be kept up for three hours. The aurum mufivum obtained in this way is generally beautiful: but if, inftead of placing the matrafs on the fand, it be immediately expofed upon the coals, and ftrongly and fuddenly heated, the mixture will take fire, and a fublimate will be formed in the neck of the veffel, which confifts of the moft beautiful aurum mufivum. In ftrictnefs, however, neither mercury nor fal ammoniac is neceffary to the production of aurum mufivum. For if eight ounces of tin diffolved in the muriatic acid, and precipitated by the carbonate of foda, be mixed with four ounces of fulphur, a fine aurum mufivum will be produced. This aurum mufivum is not, however, capable of increafing the effects of the electrical machine; which fhews that the compofition owes its virtue in that refpect to the mercury it contains, which is in the proportion of fix to one in the firft procefs. The chief ufes of aurum mufivum are thofe of giving a beautiful colour to bronze, and of increafing the effects of the electrical machine by being rubbed on the cufhions. Another amalgam has been defcribed by Baron Kienmayer, which is compofed of two parts of mercury, one of zinc, and one of tin: the zinc and the tin are to be fufed, and mixed together with the mercury; and the mixture agitated in a wooden box, rubbed internally with chalk. The mafs is then to be reduced to a fine powder, and employed in that ftate, or mixed with greafe. The effect of this amalgam in increafing the power of electrical machines is very great.

Tin when alloyed with copper forms bronze, or bell-metal; and feven parts of bifmuth, five of lead, and three of tin, conftitute an alloy that liquefies in boiling water.

Sect. XI. *Of Iron.*

This is a metal of a white livid colour inclining to grey. In lightnefs it is the next to tin. A cubic foot of forged iron weighs five hundred and forty-five pounds; and the fpecific gravity of it is 7.2070. This metal is very hard, fufceptible of a fine polifh, and difficult of fufion. It is capable of being drawn into a fine wire, that can fupport a confiderable weight. Iron exifts in different ftates, and is very generally diffufed in nature. Though very hard and refractory, iron is eafily oxidated. When a bar of iron is heated for a long time in the forge furnace, it becomes oxidated at its furface, and the coatings of metal which have paffed to the ftate of an oxide, are feparated from the mafs in the form of fcales. When this metal is fo altered that it is no longer attracted by the magnet, it forms an oxide of a reddifh brown colour, which is known by the name of the Brown Oxide of Iron, or *Aftringent Saffron of Mars*. But the colour of this oxide varies according to the degree of oxidation. It is yellow, of a poppy-colour, or red, and is reduced with facility into a black powder on being heated with coaly fubftances.

By the combined action of air and water a martial oxide is conftituted, which has been known by the name of *Aperitive Saffron of Mars*. It is produced by the combination of oxigenous gas and carbonic acid gas with the iron. Iron on being expofed to a humid atmofphere is alfo foon caufed to ruft, in which cafe it paffes to the ftate of *aperitive faffron of Mars*; which preparation is a genuine carbonate of iron. This metal is likewife acted upon by water. For if iron filings be put into this fluid, and be frequently agitated, the iron becomes divided, blackens; and by decanting the turbid water, a black powder is thrown down, which is called *Martial Æthiops*, or the Black Oxide of Iron. It is produced by a degree of oxidation or calcination, effected by the air that was contained in the water, and ftill farther by the water itfelf being decompofed. Both the fixed and volatile alkalis, in the fluid ftate, when digefted upon iron, oxidate a flight portion, which finks down in the form of an *æthiops*.

Iron is acted upon in a greater or lefs degree by all the acids. If the concentrated fulphuric acid be boiled upon this metal, it is decompofed, and the mixture, on being diftilled to drynefs, leaves in the retort fublimed fulphur, and a white mafs, partly foluble in water, but incapable of being cryftallized.

If diluted fulphuric acid be poured upon iron, a confiderable effervefcence takes place from the difengagement of hydrogenous gas. In this cafe the water is decompofed, and its oxigene is employed to calcine the metal, while the hydrogene is difengaged: the acid therefore acts upon and diffolves the metal without being decompofed. If this folution be concentrated by evaporation, it affords the fulphate of iron.

If the nitric acid be thrown upon iron it is decompofed rapidly, and the folution is of a red brown colour, which after fome time fuffers the oxide of iron to fall down. If new iron be put into this folution, the acid feizes it, and the oxide which it previoufly held in folution is let fall. But if the folutions be concentrated, *martial ochre* of a red brown colour is precipitated; and the concentration, on being carried ftill farther, produces a reddifh jelly, partially foluble in water.

This metal, when precipitated from its folution by the carbonate of pot-afh, is eafily diffolved by the fuperabundant alkali, and conftitutes *Stahl's martial alkaline tincture*.

It has been propofed by fome chemifts to precipitate the iron by the cauftic alkali; and Mr. Fourcroy has fhewn that the great difference obferved in the martial precipitates depends either on the nature of the acid, the manner of operating at the time of making the precipitates, or the quality of the precipitant employed.

Iron is attacked with vehemence by the diluted muriatic acid, and hydrogenous gas is difengaged, which proceeds from the decompofition of the water. If the folution be concentrated, and left to cool when of the thicknefs of fyrup, a *magma* is formed, and thin, flattened, very deliquefcent cryftals are perceived. Very fingular phenomena were obferved by the Duke D'Ayen on diftilling the muriate of iron in a retort. The firft product was an acid phlegm at a ftronger heat, a non-deliquefcent muriate of iron fublimed, at the fame time that very tranfparent cryftals rofe to the roof of the retort, in the form of the blades of razors, which decompofed the light in the fame manner as the beft prifms. At the bottom of the retort there remained a ftyptic deliquefcent falt, of a brilliant colour, and a foliated appearance, which exactly refembled the large plated talc, called *Mufcovy Glafs*. This laft falt, on being expofed to a violent heat, afforded a fublimate more extraordinary than the former products. It was an opake fubftance, truly metallic, which exhibited fections of hexahedral prifms, polifhed like fteel; and was in reality iron reduced and fublimed.

It has been long known that iron is capable of being precipitated from its folutions by vegetable aftringent fubftances; and that the black dyes, and the fabrication of ink, depended upon this circumftance.

It is, however, but lately that an acid has been fhewn to exift in thefe fubftances, which combines with the iron, and which may be obtained from aftringent vegetables, either by fimple diftillation, or mere digeftion in cold water. The following is a very convenient procefs for this purpofe: Infufe one pound of

powder of nut-galls in two pints and rather more than a half of pure water. then leave the mixture for three or four days, frequently ſhaking it. Filter the liquor, and leave it in a veſſel ſimply covered with blotting paper. The fluid ſoon becomes covered with a thick pellicle of mouldineſs, and a precipitate falls down in proportion as the infuſion evaporates. If theſe precipitates be collected, and diſſolved in boiling water, they form a liquid of a browniſh yellow colour, which, on being evaporated by a gentle heat, depoſits a precipitate reſembling fine ſand, and having ſtar-like cryſtals. This ſalt is grey, and cannot even by repeated ſolution and cryſtallization be obtained of a white colour.

It is an acid, that effervefces with chalk, and which reddens the infuſion of turnſole. Half an ounce of this ſalt is capable of being diſſolved in one ounce and a half of boiling water, or in twelve ounces of water which is cold.

Spirit of wine when boiling diſſolves its own weight of this acid, but when cold it only diſſolves one-fourth. In the fire this ſalt is inflammable, and it melts and leaves a coal of difficult incineration. If this acid be diſtilled in a retort, it becomes at firſt fluid, afterwards gives out an acid phlegm, but no oil; and, towards the end, a white ſublimate ariſes, which attaches itſelf to the neck of the retort, and remains fluid as long as it is hot, but cryſtallizes on cooling. A great deal of coal is found in the retort.

In taſte and ſmell this ſublimate nearly reſembles the acid of benzoin. It is as ſoluble in water as in ſpirit of wine, and precipitates metallic ſolutions with their different colours, and iron black. If the ſolution of the ſalt of the nut-galls be poured into a ſolution of gold, it renders it of a dark green; and throws down a brown powder, which is revived gold. The ſolution of ſilver becomes brown; and at length lets fall a grey powder, which is revived ſilver. The ſolution of mercury affords a precipitate of a yellow orange colour; and the ſolution of copper yields a brown precipitate. The ſolution of iron becomes black; and the ſolution of the acetite of lead depoſits a white precipitate. This ſalt has been found to be converted into the oxalic acid, on the nitric acid being diſtilled from it.

Ink has therefore for its baſis a ſolution of iron in the gallic acid. See Ink.

Iron is likewiſe diſſolved with facility by the vegetable acid; and it is this acid which holds the metal ſuſpended in vegetables. It may be precipitated from wine by means of alkalis in the form of æthiops. The acidulous tartrite of pot-aſh, or cream of tartar, alſo diſſolves iron; and the different degrees of concentration of this ſolution form different preparations, as the ſoluble *martial tartar*, &c.

If iron be diſſolved in the oxalic acid, the ſolution affords priſmatic cryſtals of a greeniſh yellow colour, and of a taſte ſomewhat aſtringent, ſoluble in water, and which efferveſce with heat. When iron is diſſolved in the pruſſic acid, it conſtitutes *Pruſſian Blue*, or the pruſſiate of iron. The diſcovery of this preparation originated in a curious miſtake. A Pruſſian chemiſt, of the name of Dieſbach, anxious to precipitate a decoction of cochineal by fixed alkali, procured from a perſon, named Dippel, an alkali on which animal oil had been frequently diſtilled. The decoction of the cochineal being impregnated with the ſulphate of iron, the fluid on adding the alkali inſtantly afforded a beautiful blue. The *Pruſſian Blue* was firſt announced at Berlin about the year 1710, but no account of any proceſs was given; this was ſupplied in 1724 by Woodward, and inſerted in the Philoſophical Tranſactions.

In order to prepare *Pruſſian Blue*, four ounces of alkali are mixed with the ſame weight of dried bullock's blood, and the materials expoſed in a crucible, which is covered in order to ſtifle the flame; the fire is kept up until the compoſition be converted into a red-hot coal. This carbone or charcoal is thrown into water, and the fluid afterwards filtered, and concentrated, by means of evaporation. This liquor is denominated the *Phlogiſticated Alkali*. Two ounces of the ſulphate of iron, and four ounces of the ſulphate of alumine, are then to be diſſolved in a pint of water. The two ſolutions, on being mixed, afford a blueiſh depoſition, which is rendered ſtill more intenſe by being waſhed with muriatic acid.

This is the proceſs generally uſed in the laboratories of chemiſts, but in works in the large way a different method is purſued. Equal quantities of the raſpings of horns, clippings of ſkins, or other animal ſubſtances, are to be converted into charcoal. Ten pounds of this coal are then mixed with thirty pounds of pot-aſh, and the mixture is calcined in an iron veſſel. After twelve hours ignition, the mixture acquires the form of a ſoft paſte, which is poured out into veſſels of water. The water is then filtered; and the ſolution mixed with another, conſiſting of three parts of alum, and one of ſulphate of iron. *Pruſſian Blue* has alſo been made by Mr. Chaptal, by calcining and burning in the ſame veſſel equal parts of the ſhavings of horns and tartar. He received the animal oil and the ammoniac, afforded by the calcination of theſe ſubſtances, in large caſks, that communicated with each other, and formed an apparatus in ſome degree reſembling Woulfe's. Some vegetable ſubſtances when treated with alkali have alſo been found to communicate to it the property of precipitating iron of a blue colour.

On the nature of this preparation much unſatisfactory reaſoning has been employed; by Brown and Geoffroy it has been ſuppoſed to be the *phlogiſton* of iron developed in the *lixivium* of blood. The abbé Menon believed that the colour of iron was blue, and that it was therefore precipitated in its natural colour by the *phlogiſticated alkali*. Theſe ſuppoſitions were refuted by Mr. Macquer, who has conſidered *Pruſſian Blue* as iron ſuperſaturated with phlogiſton. He has ſhewn that the blue is not ſoluble in any degree in acids; but that the alkalis are capable of diſſolving the colouring matter of the *Pruſſian Blue*, and of becoming ſaturated with it in ſuch a manner as to be no longer capable of efferveſcing.

It has been affirmed by Mr. Sage, that the iron was ſaturated with the phoſphoric acid; and Bergman ſeems to have ſuſpected the exiſtence of ſome animal acid. But Scheele has afforded greater certainty than any other chemiſt on this ſubject; he has ſhewn that the lixivium of blood, expoſed for a certain time to the air, loſes the property of precipitating iron of a blue colour; this circumſtance he conſiders as depending on the carbonic acid of the atmoſphere, which diſengages the colouring part. By adding a ſmall quantity of ſulphate of iron to this lixivium, it is no longer changed in conſequence of its remaining in the carbonic acid; and by boiling this lixivium upon an oxide of iron, it is no longer capable of change in the carbonic acid. It is therefore evident that the iron has the property of fixing and retaining the colouring principle; but in order to produce this effect it muſt not be in the ſtate of an oxide.

When *Pruſſian Blue* is managed in the way of diſtillation with the ſulphuric acid, it permits a fluid to eſcape, which holds the pruſſic acid in ſolution, and which can be precipitated upon iron. In order to obtain this acid in a ſtate of purity, Scheele has given a proceſs, which conſiſts in putting two ounces of pulverized *Pruſſian Blue* into a glaſs cucurbit, with one ounce of red precipitate, and ſix ounces of water. This mixture is to be boiled for ſome minutes, continually ſtirring it. It then aſſumes a yellow colour inclining to green. The fluid being filtered, two ounces of boiling water are to be thrown on the reſidue. This liquor is a pruſſiate of mercury, which cannot be decompoſed either by alkalis or acids. The ſolution is then poured into a bottle, in which an ounce of newly-made filings of iron is put: three drachms of concentrated ſulphuric acid are to be

added, and the whole agitated ſtrongly for ſeveral minutes. The mixture becomes perfectly black by the reduction of the mercury; the liquor loſes its mercurial taſte, and exhibits that of the colouring lixivium. After ſuffering it to ſtand at reſt for a time, it is decanted, put into a retort, and diſtilled by a gentle fire. The colouring principle paſſes firſt, becauſe it is more volatile than water. It is neceſſary to finiſh the operation as ſoon as one quart of the liquor has paſſed over. As this product contains a ſmall quantity of ſulphuric acid, it may be cleared of it by re-diſtilling it from pulverized chalk by a very gentle fire. The pruſſic acid then comes over in a ſtate of the greateſt purity. It is requiſite that the veſſels be well luted, as the acid would otherwiſe eſcape, on account of its great levity. It is alſo advantageous to put a ſmall quantity of water into the receivers, to abſorb the acid; and to ſurround them with pounded ice. The ſmell of the pruſſic acid is very particular, but not unpleaſant, and its taſte is in ſome degree ſweet. This acid does not redden blue paper, but it renders the ſolutions of ſoap and ſulphure of alkali turbid. It has been ſuppoſed by Mr. Weſtrumb, that the pruſſic acid is the ſame as the phoſphoric; from his having obtained *ſiderite* from Pruſſian blue, and formed animal earth by mixing the lixivium of blood with a ſolution of calcareous earth. Mr. Berthollet has furniſhed a variety of intereſting experiments on the nature of this acid and its combinations. He has ſhewn that the oxide of iron is capable of exiſting in two different ſtates in combination with the pruſſic acid. If the oxide predominates, the combination is yellowiſh; but if its proportion be leſs, the product is Pruſſian blue. It has been found that all the acids are capable of diſſolving the ſurplus of oxide which conſtitutes the difference between theſe two ſtates of combination.

The pruſſiate of pot-aſh has alſo been found to contain an oxide of iron, for on an acid being poured in, this oxide is diſſolved, and precipitated in the form of Pruſſian blue, by means of a double affinity. But the pruſſiate of pot-aſh made by a gentle heat, then evaporated to dryneſs, and afterwards re-diſſolved, and filtered, on the addition of acids, no longer affords the blue. It cryſtallizes in ſquare plates with edges cut ſlantways, forming octahedrons, the two oppoſite pyramids of which are truncated. This ſolution of the pruſſiate of pot-aſh, if it be expoſed to the ſolar light or to an intenſe heat, on being mixed with the ſulphuric acid, depoſits Pruſſian blue. In all theſe proceſſes the pruſſiate of alkali may be entirely decompoſed; for the pruſſiate of iron, when precipitated by the action of the alkaline pruſſiate, carries down with it a remarkable proportion of alkali, of which it may be cleared by repeated waſhings, which contains the alkaline pruſſiate; and the ſame holds good with reſpect to precipitations by the pruſſiates of lime and ammoniac. The pruſſiate of mercury is found to cryſtallize in tetrahedral priſms, terminating in quadrangular pyramids, the planes of which anſwer to the angles of the priſms. In its metallic ſtate iron decompoſes the pruſſiate of mercury, and deprives it both of its oxigene and acid. The oxide of mercury both decompoſes the pruſſiate of iron, and ſeizes its acid; but the pruſſiate of mercury only ſuffers an imperfect decompoſition by the ſulphuric and muriatic acids. Theſe acids however form triple ſalts with it. The precipitate of the nitrate of barytes by the pruſſic acid is evidently not the compound which it has been ſuppoſed to be by Bergman, but is in reality a triple ſalt.

The pruſſic acid is found to precipitate alumine with facility from its nitric ſolution: but the alumine notwithſtanding affords its pruſſic acid to iron.

If the oxigenated muriatic acid be mixed with the pruſſic acid, it is again changed to the ſtate of common muriatic acid; the pruſſic acid aſſuming a more lively ſmell, and becoming more volatile, is deprived of its affinity to alkalis and lime: it precipitates iron of a green colour; which colour becomes blue if the precipitate be expoſed to light, or be treated with the ſulphureous acid. If the pruſſic acid be impregnated with the oxigenated muriatic acid, and expoſed to light, it acquires the ſmell of an aromatic oil, and is collected at the bottom of the water in the form of an uninflammable oil, which riſes in vapour by a gentle heat. By repeating this proceſs it is capable of being intirely decompoſed; in which caſe the oil becomes concrete, and cryſtals are formed in the ſhape of ſmall white needles.

In this operation the acid appears to have ſuffered a partial combuſtion, at leaſt neither light nor the ſulphureous acid are capable of reſtoring it but by depriving it of oxigene. By mixing the oxigenated pruſſic acid with lime or a fixed alkali, it becomes wholly decompoſed; and volatile alkali is diſengaged; and if the alkali employed have been very cauſtic, ſuch for inſtance as the alcohol of pot-aſh, it is rendered effervefcent. Scheele's pruſſic acid is however only in part decompoſed by this proceſs; from which circumſtance Mr. Berthollet has been led to ſuppoſe that it is compoſed of hydrogene, nitrogene, and carbone. Theſe experiments do not however prove that oxigene exiſts in this acid; as the water affords that which enters into the carbonic acid, and which is produced by the diſtillation of the pruſſic acid. Pruſſian blue takes fire more eaſily than ſulphur, and detonates ſtrongly with the oxigenated muriate of pot-aſh. The pruſſiate of mercury detonates ſtill more ſtrongly with the nitrate of mercury. The gas that is produced by theſe detonations has not yet been collected. The pruſſic acid, combined with alkali and the oxide of iron, cannot be ſeparated by any acid without the intervention of heat or light; and when it is diſengaged, it is no longer capable of ſeparating iron from the weakeſt acid, unleſs it be in the way of double affinity. It is alſo ſuppoſed by Mr. Berthollet, that the elaſtic ſtate of this acid leſſens this affinity; and that it is requiſite in order that it may eaſily enter into combination, that ſome of its ſpecific heat ſhould have been loſt. It is this which renders the oxigenated acid ſo feeble. By diſtilling an ounce of Pruſſian blue, Mr. Chaptal produced one drachm and twenty-four grains of ammoniac, thirty-ſix grains of the carbonate of ammoniac, four drachms and twelve grains of oxide of iron, or alumine, and one hundred and ſixty-four inches of hydrogenous gas that burned with a blue flame. The ammoniac comes over in combination with a ſmall portion of the colouring principle, which it takes up, and holds in ſolution: this is rendered viſible by the ſulphuric acid. If ammoniac be heated upon Pruſſian blue it decompoſes it, by ſeizing the colouring matter. If lime-water be digeſted upon Pruſſian blue it diſſolves the colouring principle by means of a gentle heat; the combination in this caſe is rapid, and the water acquires a yellow colour. In filtration, the liquor paſſes of a fine bright yellow, is no longer capable of changing ſyrup of violets to a green colour, or of being precipitated by the carbonic acid. It ſeems to be completely neutralized, and affords an exceedingly fine blue, when poured into a ſolution of the ſulphate of iron. Both Mr. Fourcroy and Mr. Scheele ſuppoſe the pruſſiate of lime to be the moſt accurate means for aſcertaining the preſence of iron in mineral waters. Pruſſian blue is immediately diſcoloured, even in the cold, by the pure fixed alkalis. Heat is produced by this combination; and in experiments of this nature, the pure alkalis ought to be preferred to the carbonates of alkali.

The colouring matter of Pruſſian blue is alſo ſeized by magneſia; but with much leſs avidity than by lime-water. If a mixture of equal parts of ſteel filings and nitrate of pot-aſh be thrown into a crucible ſtrongly ignited, it detonates at the end of a certain time, with the diſengagement of a conſiderable quantity of very bright ſparks; and the reſidue, when

washed and filtered, affords an oxide of iron of a yellowish colour. Iron decomposes the muriate of ammoniac very readily. Two drachms of steel filings, and one of this salt, afforded Mr. Bucquet, by distillation in the pneumato-chemical apparatus over mercury, fifty-four cubic inches of an aeriform fluid; one half of which was alkaline gas, and the other hydrogenous gas. This decomposition depends on the strong action of the muriatic acid on the iron.

If a pound of the muriate of ammoniac in powder and an ounce of steel filings be sublimed together, they form the martial flowers, or *Ens Martis*. These flowers are merely the muriate of ammoniac, coloured, and rendered yellow by an oxide of iron. The oxide of iron decomposes the muriate of ammoniac with much greater facility; the effect depends upon a double affinity; and the ammoniac which rises is frequently effervescent.

If a mixture of good filings of steel and sulphur be moistened with a small quantity of water, it becomes heated in the course of a few hours. In this case the water is decomposed, the iron rusts, and the sulphur is converted into acid; the hydrogenous gas of the water exhales, and the heat is frequently so violent as to set the mixture on fire. There is a very striking analogy in the phenomena and effects between the inflammation of this mixture and the decomposition of pyrites.

By fusion sulphur is found to combine easily with iron, in which case it becomes a true martial pyrites.

Iron is capable of being alloyed with different metallic substances; the only alloy however of this substance that has hitherto been converted to any use in the arts, is that which it formed with tin, and which constitutes *white* iron, or tin *plates*.

Iron by cementation with carbone becomes harder, less malleable, and more fusible, in which case it forms steel. See MINERALOGY and STEEL.

Of the Carbure of Iron, or Plumbago.—This substance is found in different places; it is indestructible by heat without the presence of air. (See PLUMBAGO and BLACK LEAD.) Mr. Pelletier exposed it to distillation, in the pneumato-chemical apparatus, by a violent fire during six hours, without the plumbago having lost weight, or suffered any other change. He exposed two hundred grains in a well-closed porcelain crucible to the fire of the manufactory at Seves, and it lost only ten grains. But when it is calcined with the concurrence of air, it then burns, and leaves but a small quantity of residue. Other chemists have also observed that one hundred grains, treated under a muffle in a shallow vessel, left only ten grains of oxide of iron; and Mr. Fabroni has dissipated the whole of a portion of plumbago exposed under the muffle. If one part of plumbago and two of very caustic dry alkali be heated in a retort with the pneumato-chemical apparatus, the alkali becomes effervescent, hydrogenous gas is obtained, and the plumbago disappears. This beautiful experiment proves that the small quantity of water contained in the salt is decomposed; and that its oxigene, by combining with the carbone of the plumbago, forms the carbonic acid. Mr. Scheele has asserted that the sulphuric acid does not act upon plumbago. Mr. Pelletier has, however, observed that one hundred grains of plumbago, and four ounces of oil of vitriol, on being digested in the cold for several months, the acid acquired a green colour, and the property of congealing by a very slight degree of cold. The sulphuric acid distilled from plumbago passes to the state of the sulphureous acid; at the same time that carbonic acid is obtained, and an oxide of iron is left in the retort. The nitric acid has no action upon plumbago unless it be impure. Eight ounces of nitric acid, distilled from half a gros of purified plumbago, neither altered its shining appearance, nor deprived it of its unctuous feel. The muriatic acid dissolves the iron and the clay which contaminate native plumbago; and Berthollet and Scheele have availed themselves of this method to purify it. The liquor being decanted after digestion upon the plumbago, the residue is then washed, and submitted to distillation to separate the sulphur. The muriatic acid alone has no action upon plumbago, but the oxigenated muriatic acid dissolves it; the result being a true combustion effected by the oxigene of the acid, and the carbone of the plumbago. If ten parts of the nitrate of pot-ash be fused in a crucible, and one part of plumbago be thrown thereon by a little at a time, the salt will deflagrate, and the plumbago will be destroyed. The matter which remains in the crucible consists of very effervescent alkali, and a small portion of martial ochre. If plumbago be distilled with muriate of ammoniac, the muriate sublimes, and is coloured by the iron. These facts prove that *plumbago* is a peculiar combustible substance, a true charcoal combined with a martial basis.

SECT. XII. *Of Copper.*

THIS is a hard reddish metal, elastic, sonorous, and affording a disagreeable smell both by friction and heat. Its taste is styptic and very nauseous; it has also considerable ductility, and is reducible into thin plates and very fine threads, which have great tenacity. The specific gravity of cast copper not hammered is 7.7880. It is found in various states in the earth.

By exposure to the air, this metal is much altered; its surface becomes covered with a greenish coating or crust, which is very hard, and known to the antiquarians by the name of *Patin*. When copper is exposed to the fire, it becomes blue, yellow, and at last violet; but it does not flow until it is strongly ignited. In contact with the coals, it gives a blue greenish tinge to the flame; and a portion of it is volatilized when kept a long time in fusion. If it be heated in contact with air, it burns at its surface, and becomes changed into a blackish red oxide, which may be separated either by striking the plate that has been ignited, or by plunging it in water. This oxide, after having been pounded, and more strongly calcined, assumes a brown red colour, and is capable of being converted into a glass of a brown colour by a still more violent heat. The sulphuric acid only acts on this metal when concentrated and very hot; but in this case it dissolves it, and easily affords blue crystals of a rhomboidal form. The sulphate of copper is generally known by the names of *Blue Vitriol, Blue Copperas*, &c. For preparing the sulphate of copper, which is met with in commerce, there are two different methods employed: one consists in calcining the cupreous pyrites, and causing them to effloresce, in order to develop the salt, which is then extracted by lixiviation; the other consists in forming this pyrites artificially, burning it, and lixiviating it so that the salt may be extracted. This salt possesses a very strong styptic taste; is easily fusible by heat, which, however, dissipates its water of crystallization, and changes its colour to a bluish white. By a very strong heat the sulphuric acid may be extracted from this salt. Both lime and magnesia decompose it, and the precipitate which is thrown down is of a bluish white colour; but if it be dried in the open air it becomes green. Ammoniac also precipitates the copper in a whitish blue; but the precipitate is dissolved nearly at the moment in which it is formed; and the result is a solution of a beautiful blue colour, known by the name of *Aqua Celestis*. This salt contains thirty pounds of acid, forty-three of water, and twenty-seven of copper in the quintal.

This metal is attacked by the nitric acid with effervescence, at the same time that it becomes decomposed, and emits abundance of nitrous gas. If it be proposed to obtain this gas by the action of the acid upon the copper, it is necessary to have the precaution of weakening the acid, and to present the copper in pieces of considerable magnitude; for when these circum-

ftances are not attended to, the acid attacks the metal with fuch violence, as fuddenly to emit a prodigious quantity of gas; immediately after which an abforption takes place, and the water of the jar paffes into the bottle. In this cafe ammoniac is formed. Copper is perfectly diffolved by the diluted nitric acid, and the folution is of a blue colour. If this folution be fpeedily concentrated, no other refult is obtained but a *magma* without cryftals; but when it is left expofed to the air, cryftals in long parallelograms are formed from it. Mr. Chaptal, by leaving a folution of this nature to fpontaneous evaporation, obtained rhomboidal cryftals, which, inftead of being of a blue colour as they have been ufually defcribed, were white. They decrepitate upon the coals, emit a red gas by mere heat, and nothing is left but a grey oxide.

Copper is not diffolved by the muriatic acid, except the acid be boiling and highly concentrated, in which cafe the folution is green, and affords prifmatic cryftals of confiderable regularity, if the evaporation be flow. The muriate which is produced in this inftance is of a beautiful grafs-green colour; its tafte is cauftic, and very aftringent: it fufes by a gentle heat, and congeals into a mafs, in which the acid is fo adherent, that a very ftrong fire is required to difengage it. It is alfo very deliquefcent. Mr. Fourcroy has obferved that the oxide of this muriate is not diffolved with the fame facility by ammoniac as that of the other cupreous falts. This is probably explicable on thefe principles, that the muriatic acid fuffers the copper to be precipitated in the metallic form, inftead of giving out a portion of its oxigene, which would facilitate the action of the alkali.

It is generally known that the acetous acid, when made to act either hot or cold upon copper, only corrodes it, and in that way produces a fubftance which is diftinguifhed in commerce by the name of *Verdigris*. There are different ways of preparing this article; but the procefs which is followed at Montpellier in France, confifts in fermenting the refufe of grapes with four wine. This refufe is afterwards laid in alternate ftrata, with plates of copper fix inches long and five broad. In this ftate they are left for a certain time; after which they are taken out, and placed edgeways in a cellar, where they are fprinkled with four wine: in this fituation the verdigris fwells up; and is afterwards fcraped off, in order to be converted to different purpofes.

In other manufactories of this fubftance, the plates of copper are fprinkled over with ready-made vinegar; but the verdigris produced in this way does not contain fo much copper.

The oxides of copper, on being diffolved in vinegar, form a falt known by the name of *Cryftallized Verdigris*, or *Acetate of Copper*. In order to obtain this falt, *vinaffe* or four wine is diftilled, and the weak vinegar that is produced is boiled on the verdigris; the folution is then conveyed into a boiler, where it is concentrated until a pellicle appears. Sticks are then plunged into the bath; and at the end of a certain number of days taken out, covered with rhomboidal cryftals of a blue colour, which are proper for the purpofes of commerce. By diftillation the vinegar may be difengaged from thefe cryftals; and the refidue is a cupreous oxide, that poffeffes the characters of *pyrophorus*. When vinegar has been diftilled on manganefe, it is capable of diffolving copper; which fhews that it has taken up oxigene. The acetic acid, or radical vinegar, differs from ordinary vinegar, in containing a greater quantity of oxigene; and it is this oxigene which renders it proper to diffolve copper in the metallic ftate. The acetate of copper is alfo capable of being formed by decompofing *Salt of Saturn*, or *Sugar of Lead*, by the fulphate of copper; in this cafe the fulphate of lead falls down; and the folution, when concentrated, affords the cupreous acetate.

The pure fixed alkalis on being digefted even in the cold with filings of copper, become of a blue colour; but the metal is diffolved much more readily by ammoniac. Profeffor Chaptal put copper filings into a bottle with very cauftic ammoniac, and kept the bottle ftopped for two years; the copper was deprived of its colour, and became in appearance like to a grey clay: but a fimilar veffel, in which had been placed the fame mixture, being left open, foon afforded very fmall blue cryftals; and the whole concluded by affording only a hard ftratum of green matter, refembling *malachite*.

This metal is readily precipitated from its folutions by iron. For this purpofe nothing more is required than to leave the iron in one of the folutions of the other metal, which need not be ftrong. The phenomenon may be rendered very furprifing, by pouring the folution of the fulphate of copper upon the clean furface of a piece of iron; for this furface inftantly becomes covered with copper. The copper produced in this way is known by the name of *Copper of Cementation*. The precipitation of one metal by another has given rife to a belief that iron is capable of being converted into copper. This metal combines with moft of the others, by which means different alloys are formed. By an union with arfenic, it forms a brittle fubftance called *White Tombac*; and with bifmuth, an alloy of a reddifh white colour, which has facets of a cubical form. When mixed with antimony, a violet-coloured alloy is produced. Copper is capable of being combined with zinc by fufion, and by cementation with lapis calaminaris. By the firft of thefe proceffes *Similor*, *Pinchbeck*, or *Manheim Gold*, is produced, and by the fecond *Yellow Brafs*. If this metal be plunged in a folution of mercury, it affumes a white colour, which arifes from the mercury that is difplaced by the copper. Copper is eafily united with tin; for this purpofe it is neceffary to make the furface of the metal perfectly clean, as the oxides do not combine with the metals. This primary object is accomplifhed either by rubbing the metal intended to be tinned with the muriate of ammoniac, or by fcraping it carefully, and even by paffing a weak acid over its whole furface. This operation being performed, the tin is applied by fufing it in the veffel intended to be tinned, and then fpreading it about with a roll of old rags. The oxidation of thefe metals is to be prevented by the application of pounded rofin or pitch. See Tinning.

When copper is fufed with tin it forms bronze, or bell-metal; an alloy which is more brittle, whiter, and more fonorous, in proportion to the quantity of tin which enters into its combination; hence it is ufed to make bells. But when it is intended to be applied to the purpofe of cafting ftatues, or forming great guns, a larger proportion of copper is neceffary, as in this cafe folidity is one of the principal requifites.

This metal contracts but a very flender union with iron; but when alloyed with filver it renders it more fufible, on which account thefe two metals are combined to form folders; and hence it is that verdigris is occafionally obferved in pieces of filver, at thofe parts where joinings have been formed by means of folder. Copper precipitates filver from its folution in the nitric acid; and in the mints this method is employed to feparate the filver from the acid, after the operation of parting. See Parting.

Sect. XIII. *Of Mercury.*

This metallic fubftance differs from all other metals, by its property of retaining the fluid ftate at the ordinary temperature of the atmofphere. It poffeffes the metallic opacity and brilliancy, and even acquires malleability when deprived of fluidity by a proper degree of cold. See Cold and Congelation.

It has been determined that the weight of a cubic foot of this metal is 949 pounds, and that its fpecific gravity is 13.5681. It is met with in the earth in different ftates.

No other method has hitherto been difcovered of fixing mercury but that of extreme cold. This metallic fubftance, which is naturally fluid, is capable of rifing even by a very moderate degree of heat, as is proved by an experiment of Mr. Achard's,

who having left a dish containing twenty pounds of mercury over a furnace which was daily heated, experienced a salivation at the end of several days; as did likewise two other persons who had not quitted the chamber. The heat was estimated at about 73° of Fahrenheit. It is improper to oppose the evaporation or dilatation of this metal by heat, as considerable explosions may be produced.

When it is heated this metallic fluid boils in the same manner as other liquids, and for this purpose it does not even require a very considerable heat; the ebullition consists merely in its transition to the vaporous state: for it may be distilled like other fluids, and by that means be cleared of its impurities. Dr. Boerhaave had the patience to distil the same mercury five hundred times successively, from which he found that the metal suffered no other change than that of affording a grey powder, which might be converted again into running mercury by mere trituration.

This substance is not easily changed in the air; but if the action of the air be assisted by heat, it gradually loses its fluidity; and at the end of several months forms a red oxide, which has been distinguished by the name of *Precipitate per se*. The apparatus made use of for this operation is a very large and very flat bottle, closed with a stopper, in which there is a capillary perforation. The mercury within the bottle by this means possesses the contact of air; and by disposing the apparatus upon a sand-bath, and keeping up the state of ebullition in the fluid, the oxide may be obtained in the course of several weeks. This oxide of mercury gives out its oxigene by simple heat, without any intermedium; and the mercury resumes its metallic form: one ounce affords about a pint. A quintal of mercury takes up about eight pounds of oxigene. The red oxide of mercury, exposed to heat, sublimes in close vessels, and may be converted into a very beautiful glass. This has been constantly observed by Mr. Chaptal when he has made the red oxide by means of the nitric acid, according to the process mentioned below.

Water that has been boiled upon mercury contracts a vermifuge property from it; and that which remains over it for a length of time acquires a very evident metallic taste. The sulphuric acid does not act upon mercury unless assisted by heat. In this case sulphureous gas is disengaged, and a white powder falls down, the quantity of which becomes greater in proportion as the acid is decomposed. This oxide weighs one-third more than the mercury made use of; and it is very caustic; if hot water be poured on it, it becomes yellow; and when urged by a violent heat, it affords oxigenous gas, and the mercury resumes its natural form. This yellow oxide, obtained by means of the sulphuric acid, is known by the name of *Turbith Mineral*; and has long been considered as a sulphate of mercury. Mr. Baumé has shown that it does not contain a particle of acid; and it appears that the water which develops its yellow colour, seizes the small quantity of undecomposed acid which was mixed with the oxide. If the water which has been poured on it be evaporated, a salt is obtained in small, soft, and deliquescent needles, which may be deprived of their acid by the simple affusion of water. This fluid precipitates the mercury from them in the form of turbith.

The nitric acid which is employed in commerce, at the strength of thirty-five degrees, dissolves mercury with violence, and even without the assistance of heat. This solution is accompanied with the disengagement of a considerable quantity of nitrous gas; because it is necessary that the acid should reduce the metal to the state of oxide before it can act upon it. One part of the acid is consequently employed in disposing the metal for solution, and the other dissolves it in proportion as it is oxidated. This is what happens when the sulphuric acid is digested upon a metal; one portion is decomposed, which reduces the metal into an oxide, while the other dissolves it. The manner of effecting the solution of mercury in the nitric acid, has an influence on the properties of the mercurial nitrate. Bergman has remarked that the solution which is made slowly and quietly, without disengagement of nitrous gas, affords no precipitate on the addition of water; whereas that which is made by the assistance of heat, and with loss of nitrous gas, affords a precipitate. It therefore appears that the nitric acid, assisted by heat, is capable of becoming loaded with an excess of mercurial oxide, which it lets fall when diluted with water. The method of performing the solution, and the process made use of to crystallize it, has also an equal influence upon the form of the crystals. 1. The solution made in the cold, and left to spontaneous evaporation, affords crystals which seemed to Mr. De Lisle to be octahedral pyramids, truncated near their base, and having the four angles resulting from the junction of the bases of their pyramids likewise truncated. 2. If the same solution be evaporated by art, long and acute blades are obtained, lying one upon the other, and striated obliquely across. 3. The solution of mercury effected by heat affords flat and acute needles striated in a longitudinal manner.

The nitrate of mercury is corrosive; it detonates upon coals when it is very dry, and emits a whitish flame of a considerable brilliancy. When heated in a crucible, it is fused, and emits a considerable quantity of nitrous gas, together with its water of crystallization. The remaining oxide becomes yellow; and at length assumes a lively red colour, and forms the substance called *Red Precipitate*. In order to make a very fine red precipitate, the mercurial solution must be put into a retort, and distilled until no more vapours come over. An additional quantity of nitric acid must then be poured on the remainder, and likewise distilled off. After three or four repeated distillations, a very beautiful precipitate is obtained in small crystals, of a very superb red colour. The solution of mercurial nitrate forms mercurial water; which is of use to ascertain the presence of sulphuric and muriatic salts in mineral waters. The acids, the alkalis, the earths, and some of the metals, likewise precipitate mercury from its solution in the nitric acid; and these precipitates always consist of the oxides of mercury in a greater or less degree of perfection, upon which circumstances the variation in their colour depends.

It has been discovered by Mr. Bayen, that some of these precipitates possess the property of fulminating, when mixed with a small quantity of sublimed sulphur. Those which he has particularized are the following: 1. The precipitate of mercury from its solution in the nitric acid by the assistance of the carbonate of ammoniac. 2. The precipitate of the same fluid by lime-water. 3. The precipitate of the solution of corrosive sublimate by lime-water. Half a drachm is to be triturated with six grains of sublimed sulphur. After the detonation, a violet-coloured powder remains, which affords a fine cinnabar by sublimation.

The muriatic acid does not sensibly act upon mercury: but if it be digested for a long time upon the metal, it oxidates it, and at length dissolves the oxide, as may be concluded from the experiments of Homberg. This acid completely dissolves the mercurial oxides; and when these oxides are nearly in the metallic state, or charged with but a small quantity of oxigene, the muriate of mercury is formed. But if, on the contrary, the oxide of mercury be saturated with oxigene, the oxigenated muriate of mercury, or *corrosive sublimate of mercury*, is produced. The oxigenated muriate of mercury may be formed according to two methods; the dry or the humid. To prepare this salt in the dry way, the operator may proceed in various manners. 1. Equal parts of dried nitrate of mercury, decrepitated muriate of soda, and sulphate of iron calcined to whiteness, are mixed together. This mixture being exposed to sub-

limation, the product which arifes is corrofive fublimate. 2. In Holland running mercury is ufed inftead of the nitrate of mercury; and the fame refults may be obtained by ufing any oxide of mercury whatever. 3. Equal parts of the fulphure of mercury, and the decrepitated muriate of foda, afford the fame falt by fublimation. 4. Mr. Monet afferts that he has obtained corrofive fublimate by treating the dry muriate of foda, and a mercurial oxide, in the way of diftillation in a retort. If mercury be diffolved in the oxigenated muriatic acid, the folution, when concentrated, affords very fine corrofive fublimate. This fubftance may likewife be obtained by precipitating the mercury from mercurial water by the fame acid, and evaporating the folution. Mr. Chaptal has obtained very fine fublimate by prefenting a mercurial oxide, fufficiently loaded with oxigene, to the ordinary muriatic acid. One pound of muriatic acid, at the ftrength of twenty-five degrees, poured upon one pound of red oxide by the nitric acid, difcolours it, in a fhort time diffolves it with a violent heat; and this folution, diluted with water, and properly evaporated, affords from twelve to fourteen ounces of cryftals of corrofive fublimate. The corrofive muriate of mercury has a ftyptic tafte, followed by an exceedingly difagreeable metallic tafte. When placed on hot coals it is diffipated in fumes; when flowly heated in fubliming veffels, it rifes in prifmatic cryftals, fo much flattened, that their facets are fcarcely diftinguifhable. This falt is foluble in nineteen parts of water; and when the folution is concentrated, it affords cryftals fimilar to thofe obtained by fublimation.

This falt is decompofed by barytes, magnefia, and lime. Half a drachm of corrofive fublimate in powder, thrown into a pint of lime water, forms a yellow precipitate. This fluid is known by the name of *Phagedenic Water*.

By means of fixed alkali mercury is precipitated in an orange-coloured oxide; and by volatile alkali in the form of a white powder, which becomes brown in a fhort time. If the fame muriatic acid be combined with a lefs perfect oxide of mercury, it forms the mild muriate of mercury, or *mercurius dulcis*; and this combination may alfo be made by two methods; by the dry, or the humid. 1. In the dry way, four parts of corrofive muriate of mercury are triturated in a mortar with three of running mercury. When the mercury has difappeared, the mixture is put into phials, and fublimed three fucceffive times, in order that the combination may be more accurate. This fublimate differs from corrofive fublimate by its infolubility in water, its infipidity, and the form of its cryftals, which are tetrahedral pyramids, terminated by four-fided pyramids. To obtain this regular form, it is neceffary that the fublimation fhould be made at a moderate heat; for, if the heat be fufficient to liquefy the falt, the refult is merely a cruft, with no appearance of cryftals. As the trituration of corrofive fublimate is dangerous, on account of the powder which rifes, Mr. Baumé has recommended a fmall quantity of water to be poured upon the mixture, which accelerates the trituration, and prevents the rifing of the deftructive powder. Mr. Bailleau has likewife propofed the incorporating of corrofive fublimate with water, and triturating it with running mercury. The combination is completed by digefting the mixture on a fand-bath by a gentle heat. The matter becomes white, and requires only a fingle fublimation. Whenever it is fufpected that *mercurius dulcis* ftill retains a portion of corrofive fublimate, nothing more is neceffary to be done than to triturate it, and pour boiling water upon it; for by this means the whole of the foluble falt which may have remained, is carried off. It has been fhown by Mr. Baumé, that there is no intermediate ftate between *mercurius dulcis* and *corrofive fublimate*. If lefs mercury be added to the fublimate, a proportional quantity of *mercurius dulcis* only fublimes, and the reft rifes in the form of *corrofive fublimate*: if a greater quantity of mercury be added than is neceffary to convert the whole into *mercurius dulcis*, the excefs remains in the form of a running mercury. The fame chemift has alfo proved, that a portion of the mercury is always loft at each fublimation; and that a fmall quantity of *corrofive fublimate* is formed, which arifes from the alteration of the mercury. Hence it follows that what has been called the *Mercurial Panacea*, which is made by fubliming *mercurius dulcis* eight or nine times, is a more fufpicious remedy than the *mercurius dulcis* itfelf. *Mercurius dulcis* may likewife be made by decompofing mercurial water by a folution of the muriate of foda. The white precipitate which is obtained may be fublimed, when it will form an excellent *mercurius dulcis*. This procefs feems to have been communicated by Mr. Chaptal to the Society of Sciences at Montpellier, fome time before Mr. Scheele made it known to the world. The corrofive muriate of mercury differs therefore from the mild muriate in the ftate of its acid. Mercurial oxides are alfo equally foluble in the other acids. A folution of borax, mixed with mercurial water, forms a very abundant yellow precipitate, which is nothing elfe but the combination of the acid of borax and mercury. A fmall quantity of this falt remains in folution, which may be obtained in brilliant cryftals by means of evaporation.

The acetous acid likewife diffolves the oxide of mercury, and affords white foliated cryftals. When mercury is precipitated from a folution of the acetate of mercury, it combines with the acidulous tartrite of pot-afh, and forms the vegeto-mercurial water of Preffavin. The acetate of mercury is alfo the bafis of Keyfer's famous pills.

When mercury is artificially mixed with fulphur, it forms the red or black fulphures, known, on account of their colours, by the names of *Æthiops* or *Cinnabar*. In order to form the æthiops, or black oxide of mercury, three methods may be followed: the firft is by triturating four ounces of mercury with twelve ounces of fublimed fulphur in a glafs mortar. In this cafe the refult is a black powder, which is called *Æthiops Mineral*. In the fecond method, four ounces of fulphur are fufed in a crucible, and one ounce of mercury afterwards extinguifhed in it. The mixture readily takes fire, but the inflammation muft be prevented; and the blackifh refidue, being pounded, will afford a greenifh powder, which is a true æthiops. The third method of preparing æthiops is by pouring the fulphure of pot-afh upon mercurial water.

By fublimation thefe æthiops afford different kinds of cinnabar, or the red fulphurated oxide. But in order to make it with a greater degree of accuracy, four ounces of fublimed fulphur are fufed in an unglazed earthen pot, and one pound of mercury mixed with it by ftirring or agitation. When thefe fubftances have combined to a certain degree, the mixture fpontaneoufly takes fire, and is fuffered to burn about a minute. The flame is then fmothered, and the refidue pulverized, which forms a violet powder, ufually weighing about feventeen ounces five drachms. This powder, being fublimed, affords a fublimate of a livid red colour; which, when pounded, exhibits a fine red colour, known by the name of *Vermilion*. Three parts of cinnabar, mixed with two ounces of iron filings, afford very pure mercury by diftillation, which is called *Mercury revived from Cinnabar*. Lime, the alkalis, and moft of the metals, may be fubftituted inftead of the iron. This metallic fubftance amalgamates with moft other metals: and on this property depends the art of water-gilding, or gilding upon metals; the tinning of glaffes; the working of gold and filver mines, &c. It is likewife ufed in the conftruction of meteorological inftruments, for which purpofes it poffeffes feveral advantages over other fluids. It does not eafily freeze: is more eafily and gradually dilatable, as has been fhown by the fine experiments of Bouquet and Lavoifier; and different fpecimens of it have very nearly the fame quality.

SECT. XIV. *Of Silver.*

This is a metal of a white colour, poffeffing neither fmell nor tafte, nearly unalterable by fire, very ductile and tenacious. According to the experiments of Briffon, a cubic foot of this metal, when caft, weighs feven hundred and twelve pounds; and its fpecific gravity is alfo pretty confiderable. This metal is found in the earth in different ftates.

Silver may be rendered hard by mixing it with copper; and for this reafon it is alloyed with that metal for filverfmiths work, and other purpofes. This metal is not changed by the contact of the air. A confiderable heat is required to fufe it; but it may be volatilized by a ftrong fire without alteration, as has been proved by the experiments of the academicians of Paris, made in the focus of the lens of Mr. Trudaine. It emits a thick fume, which whitens plates of gold expofed immediately over it. Junker has alfo converted filver into glafs, by treating it in the way of reverberation in a very ftrong fire; and Macquer, by expofing filver twenty times fucceffively to the porcelain furnace of Seves, obtained a glafs of an olive-green colour. It was alfo obferved that this metal, when expofed to the focus of a burning glafs, prefented a white pulverulent matter on its furface, and a greenifh vitreous covering on the fupport upon which it was placed. But though thefe experiments clearly prove that filver is capable of combining with oxigene, the difficulty which is found in effecting this combination, and the facility with which this air is difengaged from the oxides of filver, prove that there is but little affinity between thefe two fubftances. If filver in a ftate of extreme divifion be prefented to the concentrated and boiling fulphuric acid, Mr. De Fourcroy has obferved that fulphureous gas is difengaged; and that the filver is reduced into a white matter, which is a true oxide of filver, containing a fmall quantity of fulphate, which may be obtained in fmall needles, or in plates formed by the union of thefe needles in a longitudinal manner. This falt flows by heat, and is very fixed. If this metal be precipitated by other metals or alkalis, thefe precipitates are reducible without addition.

Silver is diffolved by the nitric acid with rapidity; and much nitrous gas is difengaged. The folution is at firft blue; but this colour difappears when the filver is pure, and degenerates into a green colour, if it be alloyed with copper. The nitric acid is capable of diffolving more than half its weight of this metal; the folution then lets fall cryftals in hexagonal, triangular, or fquare plates, which are called *Nitrate of Silver*, *Lunar Nitre*, &c. The folution of thefe cryftals, generally known by the name of *Solution of Silver*, is very cauftic. It colours the fkin black, burns the epidermis, and fo completely deftroys its organization, that the fpot difappears only by the renewing of the fkin. The nitrate of filver melts on burning coals; but if it be expofed to a gentle heat, in earthen or metallic veffels, it liquefies, and may then be caft in moulds. This fufed nitrate of filver forms the *Lapis Infernalis*, or *Lunar Cauftic*. Care muft be taken to pour it out as foon as it is fufed; otherwife the acid will be difengaged, the filver be revived, and the *lapis infernalis*, or *lunar cauftic*, will lofe its virtue. The *lapis infernalis*, or *lunar cauftic*, which is made with pure filver, and prepared as above defcribed, is whitifh; but when fuffered to remain in fufion for any time, it is blackifh. This preparation is very frequently mixed with nitrate of copper; a fraud which is highly reprehenfible, as it is an alloy which renders its ufe to wounds very pernicious.

This metal may be precipitated from its folution by lime-water, alkalis, and feveral metals; and thefe laft exhibit very important phenomena. If a plate of copper be immerfed in a folution of filver diluted with water, it precipitates the metal; and this adheres at the moment of precipitation to the furface of the copper, where it forms a kind of mofs. In proportion as the filver is precipitated, the water affumes a blue tinge; which proves that the copper is diffolved in the nitric acid, in the room of the filver. When the whole of the filver is difengaged, the water is to be decanted, the filver dried, and fufed in crucibles, to be caft into ingots. This filver almoft always retains a fmall quantity of copper; of which it may, however, be deprived by cupellation with lead, which renders the filver pure: this procefs is ufed in the mints, where the parting operation of gold from filver is performed. The firft ftep confifts in feparating the filver by means of nitric acid; and this is afterwards precipitated by the addition of copper. Silver is likewife precipitated by mercury. In this operation it amalgamates with a fmall quantity of the mercury, and forms tetrahedral cryftals terminated by a tetrahedral pyramid, the cryftals of which are articulated into each other. This arrangement gives them the form of a vegetation; and has caufed the precipitate to be known by the name of *Arbor Dianæ*, or the *Tree of Diana*. Lemery, Homberg, and many other chemifts, have fucceffively publifhed proceffes to produce this phenomenon; but that which Mr. Chaptal has found to fucceed beft, is defcribed by Mr. Baume. Six gros of the folution of filver, and four of that of mercury, both well faturated, are taken, and diluted with five ounces of diftilled water. Thefe are to be put into a conical veffel; and an amalgam of feven parts of mercury, and one of filver, is to be poured in; a multitude of fmall cryftals inftantly appear to difengage themfelves from the furface of the amalgam, upon which new ones articulate themfelves; and a vegetation is produced, which perceptibly rifes under the eye of the fpectator. To render this phenomenon ftill more ftriking, the exhaufted water fhould be decanted, and frefh fubftituted: by this means any veffel whatever may be filled with thefe vegetations. The mercury which is amalgamated with the filver, in this operation, may be feparated by means of heat.

The muriatic acid does not diffolve filver, though it fpeedily diffolves its oxides; but the oxigenated muriatic acid diffolves this metal.

In order to produce a certain and fpeedy combination of the muriatic acid with filver, the acid muft be poured into a folution of the nitrate of filver. A precipitate immediately falls down, which is known by the name of *Luna Cornea*. This muriate of filver is very fufible; and runs into a grey and tranfparent fubftance, refembling horn in a confiderable degree. If a ftronger degree of heat be applied, it is decompofed, one part being volatilized, and the other reduced into filver. If the muriate of filver be expofed to the light of the fun, it becomes brown in a fhort time. Oxigenous gas is difengaged; which, according to the procefs of Mr. Berthollet, may be collected by placing it under water. Moft of the folutions of the metals have the fame property. *Lunar nitre* alfo becomes coloured, and emits its oxigene and nitrous gas. From the obfervations of Mr. Monet it appears that one pound of boiling water does not diffolve more than three or four grains of muriate of filver. The alkalis are capable of decompofing the muriate of filver, and feparating the metal. The filver may alfo be difengaged from its muriate by fufion with three parts of black flux.

The following procefs has been defcribed by Mr. Berthollet, as forming the moft dreadful and moft aftonifhing fulminating powder that has yet been difcovered: take fine filver of cupellation, and diffolve it in the nitric acid: precipitate this folution by lime-water, decant the water, and expofe the oxide for three days to the air. Mix this dried oxide in ammoniac, or volatile alkali, and it will affume the form of a black powder: decant the fluid, and leave the powder to dry in the open air. This is the *Fulminating Silver*. Mr. Berthollet is of opinion that the prefence of light has fome influence in the fuccefs of this experiment.

Neither gunpowder, nor even fulminating gold itſelf, can be compared with this new product. The contact of fire is neceſſary to cauſe gunpowder to detonate; and a determinate degree of heat is required to cauſe fulminating gold to fulminate: but the contact of a cold body is ſufficient to produce the detonation of fulminating ſilver. In ſhort, this product, when once obtained, can no longer be touched: no attempts muſt be made to incloſe it in a bottle, but it muſt be left in the capſule wherein the evaporation was performed. It is hardly neceſſary to obſerve, that the fulmination ought not to be attempted but with a ſmall quantity; the weight of a grain, for inſtance: for a larger maſs would give riſe to a dangerous detonation. In making this preparation it is neceſſary to have the face covered with a maſk with glaſs eyes; and it is prudent to dry the fulminating ſilver in ſmall metallic capſules. The following experiment will furniſh a ſufficient idea of the fulminating property of this preparation: take the ammoniac which was uſed in the converſion of the oxide of ſilver into the black precipitate which forms fulminating ſilver; put this ammoniac into a ſmall matraſs of thin glaſs, and let it be ſubjected to the degree of ebullition neceſſary to complete the combination. Take the matraſs from the fire; and a rough covering of cryſtals will be formed on its internal ſurface which is beneath the fluid. If one of theſe cryſtals beneath the cold fluid be touched, an exploſion takes place which breaks the matraſs. In reſpect to the theory of this phenomenon, it is the ſame as that of fulminating gold, which has been given by Berthollet, in the Memoirs of the Royal Academy of Sciences for the year 1785. In this operation, the oxigene, which adheres very ſlightly to the ſilver, combines with the hydrogene of the ammoniac. From the combination of the oxigene and the hydrogene, water in the ſtate of vapour is produced. This water, inſtantly vaporized, and poſſeſſing all the elaſticity and expanſive force of that ſtate, is the principal cauſe of the phenomenon; in which the nitrogene, which is diſengaged from the ammoniac, with its whole expanſibility, likewiſe bears a principal part. After the fulmination, the ſilver is found reduced or revivified; that is to ſay, it has reſumed its metallic ſtate. It again becomes the ſame white, brilliant, and pure metal which it was when taken out of the cupel. Silver is alloyed with copper, to form ſolder; whence it happens that ſilver utenſils are ſubject to ruſt, and form verdigris, at the places where they are ſoldered.

Sect. XV. *Of Gold.*

This is the moſt perfect, the moſt ductile, the moſt tenacious, and the moſt unchangeable, of all the known metals. Its ſpecific gravity is very conſiderable; but it has neither ſmell nor taſte. It is of a yellow colour, which varies according to the purity of the metal.

This metal when expoſed to the fire, becomes red-hot before it melts, and when melted ſuffers no alteration; but during the time of fuſion, if a ſtrong heat be applied, it appears of a beautiful green colour. Both Kunckel and Boyle kept it in a glaſshouſe furnace for ſeveral months without change. But Homberg has obſerved that this metal, expoſed to the focus of the lens of Tſchirnaus, ſmoked, was volatilized, and even vitrified in part; and Mr. Macquer has verified this obſervation by the mirror of Mr. De Trudane; he obſerved the gold fume become volatilized, and covered with a dull pellicle, which conſtituted a violet-coloured oxide towards the middle. This metal is not attacked by the ſulphuric acid, but the nitric acid appears to have a real action upon it. The ſolution of gold by this acid was firſt noticed by Brandt; and his experiments were made in the preſence of the king of Sweden, and verified by his academy. Both Scheffer and Bergman have by their trials confirmed the reſults of the Swediſh chemiſts; and Mr. Sage has ſince publiſhed a ſeries of experiments on the ſame ſubject. Mr. Chaptal is alſo convinced from experiments, ſeveral times repeated, that the pureſt nitric acid attacks gold in the cold, and is capable of diſſolving a ſixty-fourth part of a grain of it. When very pure nitric acid is boiled upon gold equally pure, the ſolution may be aſcertained in three ways, viz. by the diminution of the weight of the metal, by the evaporation of the acid, in which caſe a purple ſpot remains at the bottom of the evaporatory veſſel, and by the parting operation, which is by means of a plate of ſilver put into the liquor. In this caſe black flocks are in a ſhort time diſengaged, which conſiſt of the gold itſelf. Theſe phenomena appear to announce a true ſolution; and not a ſimple diviſion or ſuſpenſion, as has been ſuppoſed. The quantity of gold diſſolved appeared to the above chemiſt to vary according to the ſtrength of the acid, the time of the ebullition, and the thickneſs of the metallic body.

But the nitro-muriatic acid, and the oxigenated muriatic acid, are the true ſolvents of gold; and theſe acids attack it with greater energy in proportion as they are more concentrated, and as the ſurface of the gold is larger. The ſolution may likewiſe be accelerated by heat. This ſolution has a yellow colour, is cauſtic, and tinges the ſkin of a purple colour; and if it be properly concentrated, it affords yellow cryſtals, reſembling topazes, which affect the form of truncated octahedrons. Theſe cryſtals are a true muriate of gold, according to the experiments of Bergman, Sage, and ſome other chemiſts. If the ſolution of gold be diſtilled, a red liquor is obtained, which conſiſts of the muriatic acid, coloured by a ſmall quantity of gold which is carried over. This is the fluid which was diſtinguiſhed by the *adepts* under the name of *Red Lion*. Gold may be precipitated from its ſolution of ſeveral colours, according to the nature of the ſubſtances employed to make the precipitation. It is precipitated by lime and magneſia in a yellow powder, in which the gold exiſts nearly in the metallic ſtate; a ſlight degree of heat only being neceſſary to convert it to that ſtate. The alkalis likewiſe precipitate gold in the form of a yellowiſh powder; and the precipitate is ſoluble in the ſulphuric, nitric, and muriatic acids. Theſe ſolutions when concentrated ſuffer the gold to precipitate, but cryſtals have not been obtained from them. If ammoniac be poured on a yellowiſh ſolution of gold, the colour diſappears; but, at the end of a certain time, ſmall flocks are diſengaged, which become more and more yellow, and gradually ſubſide to the bottom of the veſſel. This precipitate, being dried in the ſhade, forms the powder which is known by the name of *Aurum Fulminans* or *Fulminating Gold*.

In order to produce the property of detonating in this precipitate, it is abſolutely neceſſary that ammoniac be employed in its preparation. It has been ſhown, that, by gently heating fulminating gold in copper tubes, one extremity of which is plunged in the pneumato-chemical apparatus by the aſſiſtance of a ſyphon, alkaline gas may be obtained, and the precipitate be deprived of its fulminating property: this fine experiment was made by Mr. Berthollet. Mr. Bergman has alſo obſerved that, by expoſing fulminating gold to a gentle heat, incapable of cauſing it to fulminate, it becomes deprived of that property. When the gold is made to fulminate in tubes, the extremities of which are inſerted under a veſſel filled with mercury, the product is nitrogene gas, and ſome drops of water. Triturating fulminating gold with oily ſubſtances alſo deprives it of its property of fulminating. It is evident from theſe eſtabliſhed facts, that fulminating gold is a mixture of ammoniac and oxide of gold. When this mixture is heated, the oxigene is diſengaged at the ſame time with the hydrogene of the alkali. Theſe two gaſes take fire by ſimple heat, detonate, and produce water; the nitrogene gas then remaining alone. On theſe principles it ought to follow, that oily ſubſtances which combine with the oxigene, acids which ſeize the alkali, or a gentle and long-continued heat, which volatilizes the two principles without in-

flaming them, ought to deprive this preparation of its property of fulminating.

It is evident that the nitrous fulphur which Mr. Baumé fuppofed to be formed, in his explanation of this phenomenon, does not exift; for the folution of the oxide of gold by the fulphuric acid, when precipitated by ammoniac, affords a fulminating precipitate. This metal is precipitated from its folution by feveral metals, fuch as lead, iron, filver, copper, bifmuth, mercury, zinc, and tin. This laft precipitates it inftantly in the form of a powder, diftinguifhed by the name of the *Purple Powder of Caffius*, which is much ufed in porcelain manufactories. Gold may likewife be precipitated from its folution by ether: this liquor feizes the gold in a moment, and fometimes inftantly revivifies it. The gold has been obferved to form a ftratum at the furface of the liquor, when the two fluids no longer contained a particle.

This metal is completely diffolved by the fulphures of alkali. For this purpofe nothing more is neceffary than quickly to fufe a mixture of equal parts of fulphur and pot-afh with one-eighth of the total weight of the gold in leaves. This fubftance may then be poured out, pulverized, and diffolved in hot water. The folution has a yellowifh green colour. It has been fuppofed by Stahl that Mofes diffolved the *golden calf* by a fimilar procefs.

Gold unites with moft of the metals. Arfenic as well as bifmuth, nickel, and antimony, render it brittle and alfo white and *eager*. It likewife unites very well with tin and lead, but thefe metals deprive it of its ductility. With this metal iron forms a very hard alloy, which can be employed to much greater advantage than pure gold, for many purpofes. Copper renders this metal more fufible, and communicates a reddifh colour to it. It is from this alloy that money, gold plate, and toys are formed. Silver makes it very pale; and this alloy conftitutes the green gold of goldfmiths.

Sect. XVI. *Of Platina.*

This fubftance has hitherto been found only in the metallic ftate. Its form is that of fmall grains, or flattened plates, of a livid white colour, intermediate between that of filver and iron; and it is probably from this colour that it derived its name of *Platina* or *Little Silver*. If the grains of platina be carefully examined, it is found that fome of them are rounded, and others angular. It has been found among the auriferous fands of South America, near the mountains of the diftricts of Novita and Cytara; and is almoft conftantly accompanied by a ferruginous fand obedient to the magnet. The platina of commerce ufually contains a fmall quantity of mercury, arifing from the amalgamation which the ore has undergone in extracting the gold. When it is required to have platina in a very pure ftate, it muft be expofed to heat, to drive off the mercury; and the magnetical parts, and the iron, muft be forted out with the magnet. Platina itfelf is alfo flightly attracted by the magnet; it has, however, been affirmed that the lighter pieces of platina are only attracted by the magnet, and that they ceafe to be acted on when they exceed a certain fize. The largeft piece of platina that has yet been met with did not exceed the fize of a pigeon's egg. This fubftance is alfo faid to be malleable in its natural ftate. It undergoes no alteration by expofure to the air; and fire alone does not even appear to poffefs the power of changing it. Macquer and Baumé kept it feveral days in a glafs-houfe furnace, without its grains having fuffered any other change than that they were flightly agglutinated. It has however been afcertained that heat, kept up for a long time, tarnifhes its furface, and increafes its weight. Platina, when expofed to the focus of a burning mirror, fumes and melts. This metal may be hammered like gold and filver; and may alfo be fufed upon charcoal, by the affiftance of oxigenous gas. It refifts the action of acids, fuch as the fulphuric, the nitric, and the muriatic; and is foluble only in the oxigenated-muriatic and the nitro-muriatic acids. One pound of the latter, digefted on an ounce of platina, firft affumes a yellow, then an orange, and laftly a very obfcure brown colour. This folution tinges animal fubftances brown; and fpontaneoufly depofits fmall irregular fawn-coloured cryftals; but, if it be concentrated, larger cryftals are obtained, fometimes of an octahedral form, as Bergman has obferved. The muriate of platina is fcarcely cauftic, though fharp; it fufes in the fire, gives out its acid, and leaves an obfcure grey oxide. The fulphuric acid, when poured on this folution, forms a precipitate of a dark colour; but the precipitate occafioned by the muriatic acid, is yellowifh. The alkalis precipitate platina from its folution; but, if it be gradually precipitated by pot-afh, the precipitate is diffolved by the alkali in proportion as it is formed. If a folution of the muriate of ammoniac be poured into a folution of platina, it forms an orange-coloured precipitate, which is a true faline fubftance, totally foluble in water. This precipitate has been fufed by Mr. De Lifle in the fire of a common furnace. The refult of the fufion is platina, ftill altered by fome portion of faline matter; for it does not acquire ductility but by expofure to a much ftronger degree of heat.

It is proper to obferve that the property which the muriate of ammoniac poffeffes, of precipitating platina, affords a very fimple method of afcertaining the mixture of this metal with gold. Proceffes for the fufion of platina have been defcribed by Mr. de Lifle and Mr. Achard: that of the latter is the more fimple method; it confifts in taking two drachms of platina, two drachms of the white oxide of arfenic, two drachms of the acidulous tartrite of pot-afh, and putting them into a crucible well luted. This is to be expofed for an hour to a violent fire, which fufes the platina; but it is brittle, and whiter than ordinary platina. It is then to be expofed to a confiderable heat under a muffle; by which means all the arfenic which was combined with the platina is diffipated, and this metal left in a ftate of purity. Veffels of platina may be formed, by filling clay moulds with the alloy of platina and arfenic; and expofing the mould in the muffle, to diffipate the femi-metal. Mr. De Morveau his fubftituted the arfeniate of pot-afh with advantage, inftead of arfenic; and he had before fufed platina with a vitreous flux, compofed of pounded glafs, borax, and charcoal. Mr. Pelletier has alfo fufed platina, by mixing it with phofphoric glafs and charcoal. The phofphorus in this cafe unites with the platina; and the phofphure of platina is expofed to a degree of heat fufficient to volatilize the phofphorus. It has been advifed by Mr. Baumé to fufe platina with a flight addition of lead, bifmuth, antimony, or arfenic; and to keep the alloy in the fire a long time, to diffipate the metals which have facilitated the fufion. Platina may likewife be fufed with a metal foluble in acid: the mixture being pulverized, the alloyed metal may be diffolved; and the powder of platina may then be fufed with the flux which has been employed by Mr. De Morveau. Inftead of ufing a foluble metal, a calcinable metal may alfo be employed for the fame purpofe, and the mixture be treated as before. This fubftance when pure is of very confiderable fpecific gravity, probably fuperior to that of gold.

Scarce any of the neutral falts have any action on platina. The nitrate of pot-afh, however, alters, it according to the experiments of Dr. Lewis and Mr. Margraff. The former chemift, by heating a mixture of one part of platina and two parts of this nitrate, during three times twenty-four hours, obferved that the metal affumed a rufty colour, and by diluting the mixture in water the alkali was diffolved; and the platina, deprived of all the foluble matter, was diminifhed one-third. The powder taken up by the alkali is the oxide of iron, mixed with the oxide of platina. Thefe experiments, as likewife the property which platina poffeffes of being acted on by the magnet, prove that it contains iron; and Mr. de Buffon has con-

cluded that this metal is a natural alloy of gold and iron; but it has been objected that the artificial alloy of these two metals, made in every possible proportion, never resembles platina; that this metal departs more from the properties of gold in proportion as it is deprived of iron: so that it is considered as a metal possessing particular properties. Platina is capable of being alloyed with most of the known metals. It has been affirmed by Scheffer that arsenic renders this metal fusible, and Mr. Achard and Mr. De Morveau have availed themselves of this property to fuse it, and form it into vessels. It easily unites with bismuth, and forms a substance which is eager, brittle, difficultly cupelled; and which has little ductility. Antimony likewise facilitates the fusion of platina, but the alloy is brittle; and part of the antimony may be disengaged by fire; but a sufficient quantity still remains in combination to deprive the platina of its weight and ductility. Zinc renders this metal more fusible, but the alloy is very hard; and a great part of the zinc may be volatilized by fire; but the platina always retains a small quantity. This metal also unites easily with tin; and the alloy thus formed is very fusible, flows clear, is *eager*, and very brittle: but when the tin is in a large proportion, the alloy is ductile; its grain is coarse, and it becomes yellow by exposure to the air. Lead unites very well with platina; but a stronger heat is required to fuse this than the foregoing alloy. It is not ductile; is no longer capable of being absorbed by the cupel, the absorption only taking place when the lead is in excess; but the platina remains always united to a considerable portion of the metal. Macquer and Baumé, however, cupelled one ounce of platina and twenty ounces of lead, by exposing this alloy, for fifty hours, in the hottest part of the porcelain furnace at Seves; and Mr. De Morveau had the same result in Mr. Macquer's wind-furnace; the operation lasted between eleven and twelve hours. Mr. Baumé has also remarked that the platina obtained by this process possesses the power of being forged and soldered completely, without the assistance of any other metal, which renders it a most valuable acquisition in the arts. Dr. Lewis could not unite forged iron with platina; but having melted crude iron with this metal, there resulted an alloy so hard that the file could not touch it: it was ductile in the cold, but broke short when hot. When copper and platina are alloyed together they form a very hard metal, which is ductile, while the copper predominates in the proportion of three or four to one: it takes a fine polish, and is not liable to tarnish. When the metal is alloyed with silver it deprives it of its ductility, increases its hardness, and tarnishes its colour. These two metals may however be separated by fusion and repose. Dr. Lewis has observed that the silver which is fused with platina, is thrown up against the sides of the crucible with a kind of explosion: this phenomenon seems to be owing to the silver, as Mr. Darcet has found it to break porcelain balls in which it was inclosed, and out of which it was projected by the action of the fire. Gold is not capable of being alloyed with this metal but by the most violent heat: the colour of the gold is prodigiously altered, and the alloy possesses considerable ductility. From the known properties of this metal it may be presumed, that it will prove of the greatest use in the arts. Its almost absolute infusibility, and its unchangeableness, render it of considerable value in the formation of chemical vessels, such as crucibles, and the like; and its property of soldering or welding without mixture, renders it preferable to gold or silver. The density and opacity which it possesses also render it of great value in the construction of optical instruments.

SECT. XVII. *Of Tungsten and Wolfram.*

There are two mineral substances which it is proper to take notice of in this place, and which may be distinguished by the generic title of *Tungsten*; the one is white, and known by the name of *Tungsten*, or the *Heavy Stone* of the Swedes; the other is of a blackish brown, and known to mineralogists by the name of *Wolfram*. Each may be examined separately.

Of Tungsten.—This is a substance of an opake white colour, very heavy, and of a moderate degree of hardness, the crystals of which are octahedrons. When this substance is exposed without addition to the flame of the blow-pipe, it decrepitates without melting; and with soda it is divided with a slight effervescence; it is partly soluble in the native phosphate, or microcosmic salt; and affords a fine blue colour, without the least appearance of red in the refracted light, as happens with cobalt. In borax it is soluble without effervescence. It has been affirmed by Bergman, that by pouring the muriatic acid upon pulverized tungsten, the powder immediately assumes a fine bright yellow colour; and to this character Scheele has added that of its becoming blueish when boiled in the sulphuric acid. Tungsten has a sparry appearance, and was long confounded with the white tin ore. It is found in different places on the continent, and in some mines in this country. It contains little iron, is very fixed and refractory in the fire, and acts on glass like the hardest steel. Though Cronstedt has arranged this substance among the iron ores, it has been supposed by Mr. Scheele to be a salt resulting from the combination of calcareous earth with a peculiar acid; which acid, combined with lime-water, regenerates tungsten; and Bergman considers the acid earth of tungsten as a metallic acid.

Acid of Tungsten.—Several processes are at present known for extracting this acid; we may mention the two following, which were proposed by Scheele: 1. Any desired quantity of this mineral is to be pulverized, and fused with four times its weight of carbonate of pot-ash, and poured out upon a plate of metal. The mass is then to be dissolved in twelve parts of boiling water. A white powder separates during the solution, and falls to the bottom of the vessel. This precipitate is a true carbonate of lime, mixed with a small quantity of quartz, and a portion of undecomposed tungsten. The carbonate of lime may be taken up from the precipitate by nitric acid; and the remaining tungsten being mixed with the former proportion of carbonate of pot-ash, is to be fused, dissolved; and by a repetition of these operations will at length be totally decomposed. The water in which the fused masses were washed, holds in solution a salt formed by the tungstic acid and the alkali made use of. If this solution be saturated with nitric acid, it seizes the alkali; the solution becomes thick; and a white powder falls down, which is the tungstic acid. 2. This consists in digesting three parts of weak nitric acid upon one of pulverized tungsten. In this case the powder becomes yellow; the fluid is then decanted, and two parts of ammoniac are poured upon the yellow powder. The powder then becomes white; and in this way the repeated actions of the acid and the alkali are applied until the tungsten be dissolved. Out of four scruples, treated by Scheele in this manner, there were three grains of insoluble matter, which was a true quartz. By adding the prussiate of pot-ash to the nitric acid made use of, he obtained two grains of Prussian blue; pot-ash precipitated three of chalk; and the ammoniac uniting to the nitric acid, precipitated an acid powder, which is the true tungstic acid. In this experiment the nitric acid seizes the lime, and exposes the tungstic acid, which is seized by the alkali. The muriatic acid may be substituted to advantage instead of the nitric acid, which even gives it a more yellow colour. This acid powder is considered by Scheele and Bergman as the true tungstic acid in a state of purity. Other chemists have affirmed that this acid is mixed with the acid made use of in obtaining it and also with the alkali; and that the yellow powder which is uncovered by the digestion of the nitric acid, is the true acid oxide of tungsten without any mixture.

The properties of the white powder, which is obtained by decompofing the alkaline folution of tungften by an acid, are the following: 1. An acid tafte, reddening the tincture of turnfole, and precipitating the fulphure of alkali of a green colour. 2. When expofed to a flame urged by the blow-pipe, it paffes to a brown and black colour, without affording either fumes or figns of fufion. 3. It is foluble in twenty parts of boiling water. 4. It becomes yellow by boiling in the nitric and muriatic acids, and blueifh in the fulphuric acid.

The properties of the yellow matter obtained by fire or by acids are thefe: 1. It is infipid, reddening the tincture of turnfole. 2. When treated with the blow-pipe, it preferves its yellow colour in the external flame; but fwells up, and becomes black, without fufing, in the interior blue flame. 3. It is infoluble, but capable of becoming fo divided as to pafs through the filters. 4. The three mineral acids have no action upon it.

It is evident from this comparifon of the two fubftances, that the acid is purer in the yellow powder than in the white; and the faline combinations of thefe two bodies confirm the opinion.

If the yellow acid be combined with pot-afh, either in the dry or humid way, it forms a falt with excefs of alkali; and if a few drops of nitric acid be poured on this falt, a white precipitate is inftantly formed, which is re-diffolved by agitation. When all the alkali is faturated, the folution is bitter; but if more acid be poured in, the precipitate which falls down is no longer foluble. This precipitate, when edulcorated, is exactly of the fame nature as the white powder which has been defcribed.

It appears from the experiments of Mr. Delhuyar, and Mr. De Morveau, that this white powder contains the acid of tungften, a portion of the pot-afh with which it was before combined, and a fmall quantity of the precipitating acid. This fufficiently fhows that the yellow matter is the pure oxide, and the true tungftic acid. It is evident alfo that this acid exifts ready formed in the metal; and that its oxigene is afforded neither by the decompofition of another acid, nor the fixation of the oxigenous gas of the atmofphere: it appears to exift in the mineral, and to conftitute a kind of falt of many principles. The pure tungftic acid diffolves ammoniac; but the refult is always with excefs of alkali. This folution affords by evaporation fmall cryftals, of a penetrating, bitter tafte, foluble in water, and then reddening blue paper. The alkali is eafily feparated; and thefe cryftals return by calcination to the ftate of yellow powder, entirely fimilar to that which entered into its compofition. If the calcination be made in clofed veffels, the refidue is of a deep blue colour; for the yellow colour does not appear unlefs the calcination be made in the open air. The experiments of Mr. De Morveau have fhown the affinities of this acid with different fubftances, to be in the following order, which is pretty much the fame as that of the arfenical acid—lime, barytes, magnefia, pot-afh, foda, ammoniac, alumine, and metallic fubftances.

Of Wolfram.—This fubftance is of a blackifh brown colour, fometimes affecting the form of an hexahedral compreffed prifm, terminated in a dihedral fummit; and thefe furfaces are frequently ftriated longitudinally. Its fracture is lamellated, foliated, and the leaves are flat, though rather confufed. Externally it refembles *fchorl*; but is not fufible, and is incomparably heavier. Some mineralogifts have taken it for an arfenical ore of tin; others for manganefe, mixed with tin and iron. Meffrs. Delhuyars, who made a ftrict analyfis of it, found it to contain manganefe 22 parts, oxide $13\frac{1}{2}$, quartzofe powder 2, yellow powder or tungftic acid 65.

The wolfram which was analyfed by thefe chemifts, came from the tin mines of Zinnwalde, on the frontiers of Saxony and Bohemia. Its fpecific gravity was 6.835.

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This fubftance does not melt by the blow-pipe without addition, its angles being fcarcely rounded; but with the native phofphate, or microcofmic falt, it melts with effervefcence, and affords a glafs of an hyacinth colour. It effervefces with borax, and forms a greenifh yellow glafs in the blue flame, which becomes red in the external flame. Pulverized wolfram, upon which the muriatic acid is boiled, affumes a yellow colour like tungften. The ingenious chemifts Delhuyars fufed in a crucible two drachms of pulverized wolfram, and four drachms of pot-afh; and the fufed mixture being poured out on a plate of copper, a black matter remained in the crucible, which, when well edulcorated, weighed thirty-feven grains, and was found to be a mixture of iron and manganefe. The mafs which had been thus poured out was diffolved in water, filtered, and faturated with nitric acid, when it afforded a white precipitate, abfolutely fimilar to that obtained from tungften by a fimilar procefs. The procefs of Scheele, by the humid way, fucceeds equally well, and even appeared to Meffrs. Delhuyars to be more advantageous. Thefe chemifts prefer the difengagement, by mere heat, of the ammoniac which holds the tungftic acid in folution. One hundred grains of wolfram, treated with the muriatic acid and ammoniac, afforded them fixty-five grains of a yellow powder, which is the pure acid. This yellow acid powder unites with moft of the metals; and we have the following facts refpecting it from the above chemifts: 1. One hundred grains of gold leaf, and fifty grains of the yellow matter, urged by a violent heat for three quarters of an hour, in a crucible lined with charcoal, afforded a yellow button, which crumbled in pieces between the fingers, and internally exhibited grains of gold, with others of a grey colour. This button weighed one hundred and thirty-nine grains, and was cupelled with lead, though with difficulty. 2. Similar proportions of platina and the yellow matter, treated in the fame way (for an hour and a quarter), afforded a friable button, in which grains of platina were diftinguifhable, of a whiter colour than ordinary. It weighed one hundred and forty grains. 3. With filver, the yellow matter formed a button of a white greyifh colour, rather fpongy, which extended itfelf eafily by a few ftrokes of the hammer; but, on continuing them, it fplit in pieces. This button weighed one hundred and forty-two grains, and the mixture was perfect. 4. With copper, it afforded a button of a coppery red colour, inclining to grey, which was fpongy, and confiderably ductile. It weighed one hundred and thirty-three grains. 5. With crude or caft-iron, of a white quality, it afforded a perfect button, whofe fracture was compact, and of a greyifh white colour. It was hard, brittle, and weighed one hundred and thirty-feven grains. 6. With lead, it afforded a button of an obfcure grey colour, with very little brilliancy, fpongy, very ductile, and fplitting into leaves when hammered. It weighed one hundred and twenty-feven grains. 7. The button formed with tin was of a lighter grey than the preceding, very fpongy, fomewhat ductile, and weighed one hundred and thirty-eight grains. 8. The button of antimony was of a bright grey, rather fpongy, brittle, and eafily broken; it weighed one hundred and eight grains. 9. That of bifmuth prefented a fracture which, when feen in one direction, was of a grey colour, and metallic luftre; but in another direction it appeared like an earth without any luftre: but in both cafes an infinity of pores were feen over the whole mafs. It weighed fixty-eight grains. 10. The button formed with zinc was of a black greyifh colour, and an earthy afpect, very fpongy, and brittle: it weighed forty-two grains. 11. With common manganefe it afforded a button of a blueifh grey colour, and earthy afpect. Its internal part, examined with a lens, refembled a pure fcoria of iron; it weighed one hundred and feven grains.

The experiments which are here related feem to confirm the

ſuſpicion of Bergman, who, from the ſpecific gravity of this ſubſtance, and its property of colouring the native phoſphate and borate of ſoda, concluded that it was of a metallic nature. The change of colour which accompanies its reduction, its increaſe of weight by calcination, its metallic aſpect, and its uniting with other metals, are alſo ſtrong proofs of its metallic nature. The yellow matter muſt therefore be conſidered as a metallic oxide; and the button obtained by expoſing this oxide to a ſtrong fire, with powder of charcoal, is a real metal.

The ſame chemiſts having put one hundred grains of the yellow matter into a lined crucible well cloſed, and expoſed it to a ſtrong heat for an hour and a half, found upon breaking the crucible, when cold, a button which was reduced to powder between the fingers: its colour was grey. On examining it with the magnifier, an aſſemblage of metallic globules were ſeen, among which ſome were of the bigneſs of a pin's head, and when broken exhibited a metallic fracture reſembling ſteel. It weighed ſixty grains, and of courſe there was a diminution of forty. Its ſpecific gravity was 17.6. Having calcined a part of it, it became yellow with $\frac{24}{100}$ increaſe of weight. The nitric and the nitro-muriatic acid changed it into a yellow powder. The ſulphuric and muriatic acid diminiſhed its weight, and their ſolution let fall Pruſſian blue. The metallic grains always remained after the action of theſe acids. This metal ſhews various properties, which diſtinguiſh it from all others known. 1. Its ſpecific gravity is 17.6. 2. It forms peculiar glaſs with the ſeveral fluxes. 3. It is almoſt abſolutely infuſible, much leſs fuſible than mangaueſe. 4. Its oxide is of a yellow colour. 5. It forms peculiar alloys with the known metals. 6. It is inſoluble in the ſulphuric, muriatic, nitric, and nitro-muriatic acids; but theſe two laſt convert it into an oxide. 7. The oxide combines with alkalis. 8. The oxide is inſoluble in the ſulphuric, nitric, and muriatic acids, and aſſumes a blue colour with this laſt. Wolfram muſt therefore be conſidered as an ore, in which this metal is combined with iron and manganeſe.

Sect. XVIII. *Of Molybdena.*

Different mineral ſubſtances have been confounded with this, ſuch as *Black Lead Ore*, *Mineral Lead*, and *Plumbago*; but the experiments of Mr. Scheele have ſhewn that they are by no means of the ſame nature with *Molybdena*.

This mineral is compoſed of ſcaly particles, either large or ſmall, and ſlightly adherent to each other. It is ſoft and fat to the touch, ſoils the fingers, and makes a trace of an aſh-grey colour. Its aſpect is blueiſh, nearly reſembling that of lead. The mark it makes on paper has an argentine brilliancy; whereas thoſe of plumbago are of a darker and leſs ſhining colour: its powder is blueiſh, which by calcination emits a ſmell of ſulphur, and leaves a whitiſh earth behind. The nitric and the arſenical acids are the only acids which attack it effectually; it is ſoluble in ſoda with efferveſcence before the blow-pipe; it cauſes the nitrate of pot-aſh to detonate, and leaves a reddiſh reſidue; when expoſed to the flame of the blow-pipe in the ſpoon it emits a white fume. Plumbago is leſs fat, leſs granulated, and compoſed of ſmall brilliant particles. It loſes in the fire $\frac{90}{100}$ of its weight, and the reſidue is an oxide of iron. Molybdena is found in union with various ſubſtances in different countries.

The molybdena of Nordberg in Sweden is accompanied with iron that obeys the magnet.

The molybdena of Altemberg in Saxony nearly reſembles that of Nordberg.

Mr. Pelletier has analyſed all the different kinds of molybdena; but the experiments which we are about to relate were made with that of Altemberg in Saxony: This mineral, when expoſed to heat on a teſt, becomes covered, after the ſpace of an hour, with a white oxide; which, when collected by a proceſs ſimilar to that uſed with the ſublimed oxide of antimony, has all the appearances of this laſt ſubſtance. The whole of the molybdena may by this means be converted into oxide. It is indeſtructible in cloſe veſſels, and prodigiouſly refractory, according to the experiments of the above chemiſt, which were made with balls of porcelain expoſed to the moſt intenſe heat. When treated with the black flux it was not reduced, nor even deprived of its ſulphur. If fuſed with iron it affords a button which reſembles cobalt: it unites likewiſe perfectly with copper; but when mixed with lead and tin, it renders them ſo refractory that the reſults are pulverulent and infuſible alloys. The oxide of molybdena obtained by calcination, or by the action of the nitric acid, is not reducible when treated with black flux, alkali, charcoal, or the other ſaline fluxes; but if the oxide of lead or copper be added, the metals which reſult are alloyed with a portion of molybdena, which may be ſeparated. The oxide of molybdena made into a paſte with oil, dried by the fire, put into a lined crucible, and urged by a violent heat for two hours, afforded Mr. Pelletier a ſubſtance ſlightly agglutinated, which could be broken with the fingers. It was black, but evidently of a metallic aſpect. When viewed with the magnifier, ſmall round grains of a greyiſh metallic colour were ſeen, which are the metal of molybdena. It is aſtoniſhingly refractory; for the fire which Mr. Pelletier employed was ſtronger than that which Mr. Darcet uſed in the ſame forge to fuſe platina and manganeſe. This mineral poſſeſſes the following qualities: 1. It is calcinable, and paſſes to the ſtate of a very white oxide. 2. It detonates with nitre, and the reſidue is an oxide of manganeſe mixed with alkali. 3. The nitric acid converts it into a white acid oxide. 4. The alkalis diſengage hydrogenous gas from it in the dry way, and the reſidue is the oxide of manganeſe and alkali. 5. It alloys with the metals in different manners. Its alloys with iron, copper, and ſilver, are very friable. 6. When treated with ſulphur it regenerates the mineral molybdena. According to Mr. Kirwan's experiments the mineral of molybdena contains fifty-five pounds of ſulphur, and forty-five of metal. The iron is accidental.

In order to reduce the mineral molybdena to powder, Scheele directs that it be triturated in a mortar with a ſmall quantity of ſulphate of pot-aſh. The powder is afterwards waſhed in hot water, to carry off the ſalt, and the molybdena remains pure. This ore is a true pyrites, which, when treated with the blow-pipe, emits a white acid fume. But as this method affords only a ſmall quantity of oxide, another method is employed to obtain it. Thirty parts of nitric acid are diſtilled on one of powder of molybdena; care being taken to uſe a large retort, and to pour the acid on at ſeveral times, having previouſly diluted it with one-fourth of water. The receiver being luted on, the diſtillation is performed on the ſand-bath. When the fluid begins to boil, a conſiderable quantity of nitrous gas comes over. The diſtillation being continued to dryneſs, there remains a powder, upon which an additional portion of nitric acid is poured; and this management is repeated until all the nitric acid has been uſed. At the end of the proceſs there remains a reſidue as white as chalk, which is to be waſhed with water to carry off a ſmall quantity of ſulphuric acid, which is formed by the decompoſition of the nitric acid upon the ſulphur.

Acid of Molybdena.—After the above edulcoration there remains ſix drachms thirty-ſix grains of an acid powder, when the operation has been made with thirty ounces of nitric acid, and one ounce of molybdena, which conſtitutes the molybdic acid. The arſenical acid diſtilled from the mineral molybdena, likewiſe affords the molybdic acid. It is pretty evident that the formation of this, like that of the arſenical acid, is owing only to the decompoſition of the acids made uſe of, and the fixation of their oxigene on the metal employed. This acid is

white, and leaves a perceptibly acid and metallic taſte on the tongue. It undergoes no alteration in the air; nor does it riſe in ſublimation, but by the aſſiſtance of the air. It colours the native phoſphate of a beautiful green; and if it be diſtilled with three parts of ſulphur, the mineral molybdena is regenerated. This acid is ſoluble in five hundred and ſeventy times its weight of water at a mean temperature. The ſolution is very acid; decompoſes the ſolution of ſoap; precipitates the ſulphures of alkali, and becomes blue and conſiſtent by cold. The concentrated ſulphuric acid diſſolves a large quantity of it. The ſolution aſſumes a fine blue colour, and becomes thick by cooling. This colour diſappears by heat, but returns again as the fluid cools. The muriatic acid diſſolves a conſiderable quantity by the aſſiſtance of ebullition; and if the ſolution be diſtilled, it leaves a reſidue of an obſcure blue colour. By an increaſe of heat, white ſublimate riſes mixed with a little blue; and the fuming muriatic acid paſſes over into the receiver. This ſublimate attracts humidity, and is nothing but the molybdic acid volatilized by the muriatic. This ſolution of the molybdic acid precipitates ſilver, mercury, and lead from their ſolutions in the nitric acid; and it precipitates lead from its ſolution of the muriate of lead, but not the other metals. It alſo takes barytes from the nitric and muriatic acids; and in the dry way it decompoſes the nitrate of pot-aſh, and the muriate of ſoda; when the acids paſs over in the fuming ſtate. It likewiſe diſengages the carbonic acid from its combinations, and unites with the alkalis; and it even partly decompoſes the ſulphate of pot-aſh by the aſſiſtance of a ſtrong heat. It poſſeſſes the power of diſſolving ſeveral metals, and aſſumes a blue colour in proportion as it yields its oxigene to them.

The combinations of this acid with the alkalis are not well aſcertained; Scheele has, however, obſerved, that the fixed alkali renders this acid earth more ſoluble in water; that the alkali prevented the acid from riſing; and that the molybdate of pot-aſh is precipitated by cooling in ſmall granulated cryſtals. The oxigene adheres but ſlightly to the molybdic baſe: for this acid boiled with the ſemi-metals does not fail to aſſume a blue colour. Hydrogenous gas paſſed through it is even ſufficient to produce the blue colour. It has been obſerved by Mr. Pelletier, that molybdena has a great reſemblance in its chemical reſults to antimony; ſince, like that ſemi-metal, it is capable of affording by calcination an argentine oxide, and of undergoing vitrification.

PART IV.

Sect. I. *Of Vegetable Subſtances.*

IN our examination of the various products of the vegetable kingdom, we ſhall proceed as much as poſſible in the natural order in which theſe ſubſtances are preſented to our obſervation.

Of Gum or Mucilage.—Mucilage ſeems to conſtitute the firſt change or alteration of the alimentary juices in vegetables. Seeds are almoſt totally reſolvable into this ſubſtance, and young plants appear to be entirely formed of it. The mucilage of vegetables has a great analogy with the mucous fluid of animals; for, like that fluid, it is moſt abundant in the earlier periods of life, and all the other principles appear to be derived from it; and in vegetables, as well as animals, its quantity becomes leſs in proportion as the increaſe of magnitude, or growth of the individual, becomes leſs, or ceaſes. The general characters of mucilage are, 1. Inſipidity. 2. Solubility in water. 3. Inſolubility in alcohol. 4. Coagulation by the action of weak acids. 5. The emiſſion of a conſiderable quantity of carbonic acid, when expoſed to the action of fire; at the ſame time that it becomes converted into coal, without exhibiting any flame. This ſubſtance is likewiſe capable of paſſing to the acid fermentation when diluted with water. The formation of mucilage appears to be almoſt independent of light; as thoſe plants which grow in ſubterraneous places abound with it. But light is required to enable mucilage to paſs to other ſtates; for, without the aſſiſtance of this principle, the ſame plants would obtain ſcarcely any conſiſtence. What is called *Gum* is nothing but dried mucilage: it either flows naturally from the trunk of the tree which affords it, or is obtained by making an inciſion in the bark. Mucilage or gum affords by diſtillation, water, an acid, a ſmall quantity of oil, a ſmall quantity of ammoniac or volatile alkali, and much coal; which analyſis proves that it is compoſed only of water, oil, acid, carbone, and earth; and ſhews that the various principles of the alimentary juices, ſuch as water, the carbonic acid, and nitrogene gas, are ſcarcely changed in this ſubſtance.

Sect. II. *Of Oils.*

The name of *Oil* is given to fat unctuous ſubſtances, more or leſs fluid, inſoluble in water, and combuſtible. Theſe products appear to belong almoſt excluſively to animals and vegetables. Oils are diſtinguiſhed on account of their degrees of fixity, into fat, and eſſential oils; but we ſhall deſcribe them under the names of *Fixed* and *Volatile Oils.* The difference between theſe two kinds of oils does not merely conſiſt in their various degrees of volatility, but alſo in their habitudes with the ſeveral re-agents. The fixed oils are inſoluble in alcohol, but the volatile oils are eaſily diſſolved, and the fixed oils are in general mild; while the volatile are acrid, and even cauſtic. It appears neverthelеſs that the oily principle is the ſame in both; but it is combined with mucilage in the fixed oils, and with the *ſpiritus rector,* or *aroma,* in the volatile oils. By burning the mucilage of fixed oils by diſtillation, they become more and more attenuated; the ſame may likewiſe be done by means of water, which diſſolves this principle. By diſtilling volatile oil with a ſmall quantity of water, by the gentle heat of a water-bath, the aroma is ſeparated; and this may be again reſtored by re-diſtilling it with the odorant plant which originally afforded it. The volatile oil is generally found in the moſt odorant part of any plant.

The ſimilitude between volatile oils and ether, which appears to be merely a combination of oxigene and alcohol, proves that the volatile oils may be nothing but a combination of the fermenteſcible baſis of ſugar with oxigene. From this circumſtance we are enabled to form an idea how oil is produced in the diſtillation of mucilage and of ſugar; and we ſhall no longer be ſurpriſed to find that the volatile oils are acrid and corroſive, that they redden blue paper, attack and deſtroy cork, and approach to the properties of acids.

Of Fixed Oils.—Fixed oils are in general fluid; but the greater number of them are capable of paſſing to the ſtate of ſolidity, even by a moderate degree of cold; and there are ſome which conſtantly poſſeſs that form in the temperature of our climates. The fixed oils poſſeſs a very evident degree of unctuoſity, do not mix either with water or alcohol, are volatilized at a degree of heat ſuperior to that of boiling water, and when volatilized they take fire by the contact of an ignited body. Theſe oils are uſually made to flow by expreſſion out of the cellules of the ſubſtances which contain them; but each kind requires ſome difference of management.

If a fat oil be diſtilled in a proper apparatus of veſſels, the

product is, phlegm; an acid; a fluid or light oil, which becomes thicker towards the end; much hydrogenous gas, mixed with carbonic acid; and a coaly residue, which affords no alkali. Mr. Chaptal has observed that the volatile oils afford more hydrogenous gas, and the fixed more carbonic acid: this last product depends on the mucilage. By distilling the same oil repeatedly, it is more and more attenuated, becomes very limpid and very volatile, with the only difference that it has acquired the peculiar odour communicated by the fire. The volatilization of the oil may be accelerated by distilling it from an argillaceous earth; by this means it is in a short time deprived of its colouring part: and the heavy oils which afford bitumens, when distilled once or twice from clay alone, are rendered perfectly colourless. The ancient chemists prepared their *oleum philosophorum* by distilling oil from a brick previously impregnated with it.

It is found that oil easily combines with oxigene; and this combination is either slow or rapid. In the first case, rancidity is the consequence; in the second, inflammation. If fixed oil be exposed for a certain time to the open air, it absorbs the oxigenous gas, and acquires a peculiar odour of fire, an acrid and burnt taste, at the same time that it becomes thick and coloured. But if oil be put in contact with oxigene in a bottle, it becomes more speedily rancid, and the oxigene is absorbed; and Scheele observed the absorption of a portion of the air before the theory was well ascertained. Oil is not subject to alteration in closed vessels.

It seems therefore that oxigene, combined with the mucilage, constitutes rancidity; and that, when combined with the oil itself, it forms a drying oil. The rancidity of oils is therefore an effect analogous to the calcination or oxidation of metals. It essentially depends on the combination of pure air with the extractive principle, which is naturally united with the oily principle. We may carry this inference to demonstration, by attending to the processes employed to counteract or prevent the rancidity of oils; for all these evidently tend to extract the mucilaginous principle, which is soluble in water, and by this means to preserve the fruit from fermentation.

When water is projected upon oil in a state of inflammation, it is well known that extinction does not happen, because the water is decomposed in this experiment; for if the product of the combustion of oil be collected, much water is obtained, because the combination of its hydrogene with oxigene produces that fluid. It has been shown by Mr. Lavoisier, that one pound of olive oil contains 12 ounces, 5 drachms, and 5 grains of coal or carbone, and 3 ounces, 2 drachms, 67 grains of hydrogene. The art of rendering oils drying, also depends on the combination of oxigene with the oil itself; and for this purpose, nothing more is required than to boil it with oxides. If an oil be heated upon the red oxide of mercury, a considerable ebullition ensues, the mercury is reduced, and the oil becomes very drying. The oxides of lead or copper are commonly used for this purpose. An exchange of principles takes place in this operation; the mucilage combines while the oxigene unites with the oil. Oil may likewise be combined with the metallic oxides by double affinity, after the manner of Mr. Berthollet. For this purpose a solution of soap is poured into a metallic solution. By this means a soap of a green colour is prepared with a sulphate of copper; and, with that of iron, a soap of a deep brown colour, of considerable intensity. In the combinations of fixed oils with the oxides of lead, a substance is disengaged, and swims at the top, which Scheele called the *Sweet Principle*, but which seems to be simply mucilage. Oil also combines with sugar, and affords a kind of soap, which may be easily diffused in water, and kept suspended. It likewise unites readily with alkalis; and the result of this union is the well-known compound, soap. See Soap.

The fixed oils are also capable of uniting with acids, as has been shown by several chemists, and particularly by Achard, Cornette, and Macquer. Mr. Achard, in his process, gradually adds the concentrated sulphuric acid to the fixed oil; the mixture being triturated, a mass is obtained which is soluble in water and in alcohol. The fuming nitric acid immediately turns the fixed oils black, and sets fire to such as are drying. It is in this case decomposed with a rapidity so much the greater, as the oil has a greater affinity with the oxigene. On this account it is that the inflammation of the drying oils is more easily effected than that of the others. Those acids whose constituent parts adhere most strongly together, have but a very feeble action on oils; a circumstance which proves that the effect of acids upon oils is principally owing to the combination of their oxigene. It is by virtue of this strong affinity of oils with oxigene, that they possess the power of reviving metals. The oxigene then quits the metal, and unites with the oils, which become thick and coloured. It likewise follows from hence, that drying oils ought to be preferred for this use; and we find that the practice actually agrees with the theory.

Of Volatile Oils.—The volatile oils are characterized by a strong smell, more or less agreeable; they are soluble in alcohol, and have a penetrating and acrid taste. All the aromatic plants contain volatile oil, excepting those whose smell is very transient, such as jasmin, violets, &c.; but the oil is in different states and quantities in different plants.

These oils differ also in their consistence. Some are very fluid, others thicker; some constantly preserve their fluidity; others become concrete by the slightest impression of cold, and there are still others which possess the concrete form. They vary likewise in their colour. The weight is also different in the different kinds; and their taste is in general hot; but the taste of the plant does not always influence that of the oil.

There are two methods of extracting the volatile oils—expression and distillation. See those Articles.

The volatile oils are capable of uniting with oxigene, with alkalis, and with acids. They absorb oxigene with greater facility than the fixed oils. They become coloured by the absorption, grow thicker, and pass to the state of resin; and when they are thickened to this point, they are no longer capable of fermenting, but secure from all putrefaction such bodies as are penetrated and well impregnated with them. On this is founded the theory of embalming. The action of acids upon these oils causes them to pass to the state of resin; and there is no other difference between volatile oil and resin, than that which arises from this addition of oxigene. All the oils, when they assume the character of resin by this combination of oxigene, let fall needle-formed crystals of camphor. And when the oil is changed by the combination of oxigene, it gradually loses its smell and volatility. In order to restore this oil to its original state, it must be distilled. A thick matter remains in the distilling vessel, which consists of resin perfectly formed, and is thus separated from the oil, which has not yet undergone the same alteration. The habitudes of acids are not however the same with all volatile oils. 1. The concentrated sulphuric acid thickens them; but, if it be diluted, it forms *savonules*. 2. The nitric acid, when concentrated, inflames them; but, when diluted, it causes them gradually to pass to the state of resin. Borrichius appears to have been the first who inflamed oil of turpentine with the sulphuric acid, without the nitric acid; and Homberg repeated this delicate experiment with the other volatile oils. The inflammation of oils is so much the more easily effected, as the oil is more drying or greedy of oxigene, and the acid more easily decomposed. 3. The muriatic acid reduces oils to the saponaceous state, but the oxigenated muriatic acid thickens them. Starkey appears to have been one of the first who attempted to combine a volatile oil with a fixed alkali; but his process was long and complicated,

which depended upon his employing the carbonate of pot-aſh, or mild vegetable alkali; but if ten parts of cauſtic alkali, or *lapis cauſticus*, be triturated hot with eight parts of oil of turpentine, a ſoap is inſtantaneouſly formed, which becomes very hard. This is the proceſs recommended by Mr. Geoffroy.

Of Camphor.—This ſubſtance is procured from a ſpecies of laurel growing in China, &c. and, when properly purified, is a white concrete cryſtalline matter of a ſtrong ſmell and taſte, ſoluble in alcohol, burning with a white flame, and leaving no reſidue; reſembling volatile oils in many reſpects, but differing from them in certain properties; ſuch as that of burning without leaving a reſidue; of diſſolving quietly in acids, without decompoſition or alteration; and of being volatilized by a gentle heat, without change of its nature. It may be obtained by diſtillation from the roots of zedoary, thyme, roſemary, ſage, &c.; but it is to be obſerved, that all theſe plants afford a much greater quantity of camphor when the ſap has been ſuffered to paſs to the concrete ſtate, by a deſiccation of ſeveral months. Mr. Achard has remarked, that a ſmell of camphor was diſengaged when he treated the volatile oil of fennel with acids. The combination of the diluted nitric acid with the volatile oil of aniſe, alſo afforded him a large quantity of cryſtals, which poſſeſſed moſt of the properties of camphor; and he obtained a ſimilar precipitate by pouring the vegetable alkali upon vinegar ſaturated with the volatile oil of angelica. From theſe facts it ſeems, that the baſe of camphor forms one of the conſtituent principles of ſome volatile oils; but that it is in the liquid ſtate, and does not become concrete but by combining with oxigene.

According to the experiments of Mr. Romieu, camphor is capable of cryſtallization, whether in ſublimation, or when it is ſlowly precipitated from alcohol, or when alcohol is ſuperſaturated with it; it precipitates in ſlender filaments, cryſtallizes in hexagonal blades attached to a common axis, and ſublimes in hexagonal pyramids or in polygonal cryſtals. It is not ſoluble in water; but it communicates its ſmell to that fluid, and burns on its ſurface. The above chemiſt has obſerved that ſmall pieces of camphor, of one-third or one-fourth of a line in diameter, being placed on the ſurface of pure water in a glaſs, have a rotatory motion: this appears to be an electrical phenomenon; for the motion ceaſes if the water be touched with a conducting ſubſtance; but continues if it be touched with an inſulating body, ſuch as glaſs, ſulphur, or reſin. Acids diſſolve camphor without producing any alteration in it, or becoming themſelves decompoſed; and the nitric acid diſſolves it quietly. This ſubſtance, when precipitated from its ſolution in acids by the addition of alkalis, is heavier, harder, and much leſs combuſtible. By diſtilling the nitric acid ſeveral times from this ſubſtance, it acquires all the properties of an acid which cryſtallizes in parallelopipedons.

Acid of Camphor.—To obtain the camphoric acid, nothing more is required than to diſtil the nitric acid at ſeveral times from the camphor, and in a large quantity. Mr. Koſegarten diſtilled the nitric acid eight times from camphor, and obtained a ſalt cryſtallized in the form mentioned above, which reddened ſyrup of violets and the tincture of turnſole. Its taſte is bitter; and it differs from the oxalic acid in not precipitating lime from the muriatic acid. With pot-aſh it forms a ſalt which cryſtallizes in regular hexagons; and with ſoda it affords irregular cryſtals. But with ammoniac it forms cryſtalline maſſes, which exhibit cryſtals in needles and in priſms; and with magneſia it produces a white pulverulent ſalt, which can again be diſſolved in water. It diſſolves copper, iron, biſmuth, zinc, arſenic, and cobalt. The ſolution of iron affords a yellowiſh white powder, which is inſoluble. This acid forms, with mangaueſe, cryſtals whoſe planes are parallel, and which in ſome reſpects reſemble baſaltes. The camphoric acid, or rather the radical of this acid, exiſts in ſeveral vegetables; ſince camphor can be extracted from them. Mr. Dehne has obtained it from the *pulſatilla*; and Cartheuſer has noticed ſeveral other plants which contain it. It is readily diſſolved by alcohol, and it may be precipitated by water alone: this ſolution is known in pharmacy by the name of *Camphorated Spirit of Wine*. The fixed and volatile oils likewiſe diſſolve this ſubſtance by the aſſiſtance of heat; the ſolutions let fall cryſtals ſimilar to thoſe which are formed in the ſolutions of ſal-ammoniac, compoſed of very fine filaments adhering to a middle part.

Sect. III. *Of Reſins.*

Resin is a term which has been employed to denote inflammable ſubſtances ſoluble in alcohol, uſually affording much ſoot by their combuſtion; they are likewiſe ſoluble in oils, but not all in water. The reſins appear to be nothing more than oils rendered concrete by their combination with oxigene. This concluſion is proved by the expoſure of theſe ſubſtances to the open air, and the decompoſition of acids applied to them. Reſins in general are leſs ſweet than the balſams. They afford more volatile oil, but no acid, by diſtillation. There are ſome among the known reſins which are very pure, and perfectly ſoluble in alcohol, ſuch, for inſtance, as the balſam of *Mecca* and of *Copahu*, *turpentines*, *elemi*, &c. Others are leſs pure, and contain a ſmall portion of extract, which renders them not totally ſoluble in alcohol; ſuch are *maſtic*, *guaiacum*, *labdanum*, &c. The *balſam of Mecca* is a fluid juice which becomes thick and brown by age. It flows from inciſions made in the *amyris opobalſamum*. Its ſmell is ſtrong, ſimilar to that of lemons; and its taſte bitter and aromatic. This balſam, diſtilled by the heat of boiling water, affords much volatile oil.

The *balſam of Copaiba* flows from a tree called *Copaiba*, in South America. It affords the ſame products as the *balſam of Mecca*.

The *turpentine of Chios* flows from the turpentine tree, which affords the *piſtachios*. It is fluid, and of a yellowiſh white colour inclining to blue. This turpentine, diſtilled on the water-bath, without addition, affords a very white, very limpid, and very fragrant volatile oil: a more ponderous oil may be extracted at the heat of boiling water; and the reſidue, which is called *Boiled Turpentine*, affords by diſtillation, in the reverberatory furnace, a weak acid, a ſmall quantity of brown conſiſtent oil, and a great deal of coal.

Venice turpentine is extracted from the *larix*: its colour is a bright yellow, its conſiſtence limpid, its ſmell ſtrong and aromatic, and its taſte bitter. This turpentine affords the ſame principles as that of *Chios*.

Straſburgh Turpentine is a reſinous juice of the conſiſtence of a fixed oil, of a yellowiſh white colour, a bitter taſte, and a more agreeable ſmell than the preceding reſins. It flows from the yew-leaved fir-tree. *Oil of turpentine* is more particularly uſed in the arts. It is the great ſolvent for all reſins; and, as it evaporates, it leaves them applied to the ſurfaces of bodies on which the mixture has been ſpread.

The *balſam of Canada* differs from the turpentine of the fir in its ſmell only, which is more pleaſant. It is obtained from a ſpecies of fir which grows in *Canada*.

Pitch is a reſinous ſubſtance, of a yellow colour, more or leſs inclining to brown. It is afforded by a fir named *Picea*. If melted, and expreſſed through bags of cloth, it is rendered purer; and after being packed in barrels, forms *White Pitch*, or *Burgundy Pitch*. See Pitch.

The chief uſe of reſins is in preparing lacquers, varniſhes, &c. See Varnish.

Sect. IV. *Of Balſams.*

The term *Balſam* ſhould probably be confined to ſuch reſinous ſubſtances only as have a ſweet flavour, capable of being communicated to water; and which more eſpecially contain

fragrant acid and concrete ſalts, which may be ſeparated by decoction or ſublimation. It appears that theſe ſubſtances contain a principle not found in reſins, which, combining with oxigene, forms an acid; while the oil, ſaturated with the ſame air, forms the reſin. This acid ſalt is ſoluble in water and alcohol. As chemical analyſis has therefore pointed out a ſufficiently ſtriking difference between balſams and reſins, we have thought it proper to treat them ſeparately.

The ſubſtances called Balſams are therefore reſins united with a concrete acid ſalt. There are three principal kinds of Balſams generally known, viz. *Benzoin, Balſam of Tolu,* and *Storax Calamita.*

Benzoin is a coagulated ſubſtance of a pleaſant fragrant ſmell, which becomes ſtronger by friction and heat. Benzoin, laid upon hot coals, fuſes, ſpeedily takes fire, and emits a ſtrong aromatic ſmell. But if it be merely heated, without ſetting it on fire, it ſwells up, and emits a more pleaſant though leſs powerful odour.

Acid of Benzoin.—When benzoin is pounded, and boiled in water, it affords an acid ſalt, which cryſtallizes in long needles by cooling. This ſalt may alſo be extracted by ſublimation. It riſes by a degree of heat even leſs than that which is required to raiſe the oil of benzoin; and this is the ſubſtance called *Flowers of Benzoin*, or the *Sublimed Acid of Benzoin.*

Theſe proceſſes are however not œconomical. For preparing theſe articles in the large way, Mr. Chaptal has invented another method, which is by diſtilling the benzoin, and cauſing all the products to paſs confounded together into a capacious receiver. He then boils the product in water, and by this means obtains a much greater quantity of the ſalt of benzoin: becauſe, in this ſtate, the water attacks and diſſolves the whole contents; whereas the moſt accurate trituration will not produce the ſame effect.

The following are the obſervations and experiments of Mr. Scheele upon this ſubſtance: From 96 parts of benzoin he obtained, by ſublimation, between 9 and 10 parts of this ſublimated ſalt, which was very far from what Spielman aſſerted that he obtained—namely, a fourth part of the benzoin ſubmitted to diſtillation: it appears that the laſt chemiſt had taken acid of benzoin mixed with empyreumatic oil for pure acid. Scheele having reduced benzoin to powder, and mixed it with chalk, boiled upon it a quantity of water, and then filtrated the liquor, which afforded no ſalt by cooling: ſulphuric acid, poured into this liquor, ſeparated the acid of benzoin in powder, and ſhowed that acid to have been united with a baſe of chalk, with which it formed a neutral ſalt ſoluble in water: the quantity of concrete acid, however, precipitated by this proceſs, was not more conſiderable than that which is obtained by ſimple lixiviation. He therefore thought that a greater quantity might be obtained by employing a matter capable of acting on the reſin, and facilitating the ſeparation of the ſalt. Pot-aſh did not ſerve his purpoſe; the reſin again collected on the ſurface of the liquor in a thick tenacious oil, on which account he could not expect the acid to be entirely ſeparated. With quicklime he was more ſucceſsful: According to him, it is to be applied in the following manner: Take four ounces of quicklime; ſlake it with 12 ounces of water; add eight pounds more when the ebullition ceaſes; mix ſix ounces of this water with a pound of benzoin in powder: theſe ſubſtances need to be well ſtirred, in order that they may mix properly: pour in by degrees the remaining part of the lime-water: when the lime-water is thus gradually poured in, it hinders the benzoin from collecting into a maſs: this liquor muſt next be heated for half an hour by a moderate fire, and conſtantly ſtirred: it is then taken off the fire, and ſuffered to ſettle for ſeveral hours together: the clarified liquor is now decanted off; eight pounds of tartar are poured upon the reſidue; it is boiled for half an hour, and then mixed with the clarified liquor before poured off from it: the operation is finiſhed by putting the reſidue upon a filter, and pouring hot water upon it. Theſe lixivia are next reduced all to two pounds by evaporation; a little reſin is ſeparated: when the evaporated liquor is cooled, a quantity of muriatic acid is dropped upon it, till it ceaſe to produce a precipitate, and the liquor take a diſcernible acid taſte: the ſalt of benzoin is then precipitated in powder. It is to be edulcorated on the filter: when it is wanted in cryſtals, it is diſſolved in five or ſix times its weight of boiling water; it is then filtrated through a cloth, and the ſolution ſlowly cooled; the ſalt is depoſited in oblong compreſſed priſms. In this proceſs the lime abſorbs the acid of benzoin, and forms with it calcareous benzoate, which is very ſoluble; and the reſin is ſeparated from that ſalt, which has but very little affinity with it. The muriatic acid, which attracts lime with more force than the acid of benzoin, ſeizes that earth, and ſeparates the vegetable acid. The liquor, when reduced to two pounds by evaporation, is no longer ſufficient to maintain the acid in ſolution, and it is therefore almoſt all depoſited. Calcareous benzoate has not the ſmell of benzoin; but as ſoon as the benzoin is ſeparated by the muriatic acid, it takes that lively ſmell which is peculiar to this balſamic ſubſtance By this proceſs Scheele obtained 12 or 14 drachms of acid of benzoin from the pound of benzoin; whereas ſublimation affords only 9 or 10. The above chemiſt obſerves further, that the purification of this ſalt by hot water and by cryſtallization, cauſes a great quantity of it to be loſt; that this ſalt, when properly cryſtallized, is very difficult to be reduced to powder; and that by the purification only about two grains of reſin are ſeparated from a pound of benzoin. The filtration of this acid when diſſolved in water, can only be effected through a linen cloth; for the ſalt being ſeparated quickly, as the liquor cools, it ſtops up the pores of paper.

Since theſe experiments were made known, Mr. Lichtenſtein has publiſhed ſome obſervations on the acid of benzoin; in which he aſſerts, that ſublimation affords more of this acid than the proceſs by lime water: but Mr. Fourcroy agrees with Scheele and Morveau, in thinking that this can only be underſtood of the purified acid. This acid in a ſtate of purity has a taſte ſomewhat ſour, pungent, hot, and acrid: but its ſmell is only a little aromatic; it communicates an high red colour to the tincture of turnſole, and effervesces with the alkaline carbonates.

Air does not ſeem to have any power of acting on this acid; for, after being preſerved 20 years in a glaſs veſſel, a quantity of it was ſtill very pure, and had loſt nothing of its weight: it loſes its ſmell indeed; but that it re-gains by heat. The acid of benzoin is ſcarce ſoluble in cold water: from the experiments of Wenzel and Lichtenſtein it ſeems that 480 grains of cold water diſſolve no more than one grain of this acid; but the ſame quantity of boiling water diſſolves 20 grains of it; 19 of which are ſeparated by cooling. Bergman has however aſſerted that boiling water diſſolves $\frac{1}{24}$ of its own weight, and that water of a moderate temperature diſſolves nearly $\frac{1}{208}$ part. Alkohol diſſolves benzoin totally without leaving any reſidue but ſuch foreign impurities as the balſam may happen to contain.

The acid of benzoin combines with all earthy and alkaline baſes, forming with them benzoates of alumine, barytes, magneſia, lime, pot-aſh, ſoda, and ammoniac; but neither the particular characteriſtic properties of theſe various combinations, nor the different affinities of the acid with each of theſe baſes, are known. It has been aſſerted by Mr. Lichtenſtein, that it prefers the fixed alkalis, and even ammoniac, to alumine, magneſia, or lime: but Bergman obſerves that lime ſeparates the alkaline baſes, and barytes ſeparates lime; and that this acid diſengages the carbonic acid from all theſe baſes. The concentrated ſulphuric acid diſſolves it eaſily without either noiſe or heat, ac-

cording to the fame chemift; but paffes in confequence of effecting this folution into the ftate of fulphureous acid. The acid of benzoin may be feparated from it unaltered by water. The nitric acid likewife diffolves it, and gives it up in the fame manner to water without alteration. M. de Morveau has caufed thefe two bodies to re-act on each other with additional force by the application of heat. The nitrous gas was not difengaged till the end of the operation; and the acid of benzoin was feparated without lofs, and without alteration.

Balfam of Tolu.—This fubftance has a mild and pleafant fmell, and affords much volatile oil when diftilled by the heat of boiling water. An acid falt may alfo be extracted from this balfam, which greatly refembles that of benzoin, and may be obtained by the fame proceffes; but this fublimed falt is commonly brown, becaufe it is foiled by a portion of the balfam, which rifes with a lefs heat than benzoin does. This balfam is foluble in alcohol, and may be precipitated by the addition of water.

Storax, or Styrax Calamita, is a fubftance of a very ftrong but very pleafant fmell. Its habitudes during analyfis are the fame as the preceding, and it exhibits the fame phenomena.

Of Gum Refins.—Thefe fubftances are a natural mixture of extract and refin. The gum refins are partly foluble in water, and partly in alcohol. They render the water turbid in which they are boiled. The different fubftances of this clafs will be noticed under their proper heads.

Caoutchouc, or Elaftic Gum.—This gum is very elaftic, and capable of great extenfion. If it be expofed to the fire, it becomes foft, fwells up, and burns with a white flame.

Mr. Berniard, who has made a variety of experiments on this fubftance, concludes that it is a peculiar fat oil, coloured by a matter foluble in alcohol, and contaminated with the foot of the fmoke to which each layer of the refin muft be expofed, in order to dry it. According to this chemift, water produces no alteration upon it: alcohol, affifted by a boiling heat, difcolours it. Cauftic fixed alkali is incapable of acting upon it. The concentrated fulphuric acid reduces it to a carbonaceous ftate, and is itfelf, at the fame time, tinged with a black colour, and takes the fmell and the volatility of the fulphureous acid. The common or weak nitric acid acts on this refin in the fame way as on cork, and gives it a yellow colour; the nitric acid, ftrongly concentrated, decompofes it very rapidly; the muriatic acid produces no fort of alteration upon it; rectified fulphuric ether did not diffolve it. The author obferves, that this fact muft appear fingular to all thofe who know the accuracy and veracity of Macquer. Nitric ether did diffolve it. This folution is yellow, and affords, by evaporation, a tranfparent fubftance, friable, and foluble in alcohol—in a word, a genuine refin, formed, according to this author, by the action of the nitric acid on the elaftic caoutchouc. The volatile oils of lavender, afpic, and turpentine, diffolved it with the help of a gentle heat; but they form clammy fluids, which ftick to the hands, and cannot therefore be applied to any ufeful purpofe. A folution of elaftic refin by oil of afpic, when mixed with alcohol, depofited white flakes, which were infoluble in hot water, but floated on the furface of that fluid, and became, by cooling, white and folid like wax; in a word, they formed a genuine, fixed, concrefcible oil. Oil of camphor diffolved elaftic refin by fimple maceration. When the folution was evaporated, the camphor was volatilized; and there remained in the capfule an amber-coloured matter, of a firm confiftency, but fcarce gluey, and eafily foluble in alcohol. Fixed oils, when boiled upon elaftic refin, diffolve it: wax likewife diffolves it. This fubftance does not melt by a boiling heat; but when expofed to the action of fire in a filver fpoon, it is reduced into a thick black oil: it then exhales white vapours; after which it remains fat and clammy, though expofed to the air for feveral months; nor does it ever again recover its drynefs and elafticity, which are fo neceffary to fit it for the purpofes to which it is applied. M. Berniard concluded his experiments on this fubftance, by analyfing it by a naked fire. From an ounce of gum elaftic he obtained a very little phlegm; an oil, which, though at firft clear and light, became afterwards thick and coloured; and ammoniac, the quantity of which he does not fpecify: there remained a coal, fimilar to thofe of other refinous fubftances, which weighed 12 grains. This chemift afcribes the origin of the ammoniac to the foot which colours gum elaftic. It may be neceffary to remark with refpect to this analyfis, that it does not determine, in a very accurate manner, the nature of elaftic refin: for acids act not on this fubftance in the fame way as on fat oils; they act on thefe bodies with much more rapidity than on gum elaftic: neither do cauftic alkalis reduce it to a faponaceous ftate; nor does it melt, unlefs a much ftronger heat be applied to it than what is fufficient to reduce the moft folid fixed oils to a ftate of fluidity: and, befides, no fixed oil ever becomes dry and elaftic like elaftic refin.

Mr. Chaptal has obferved, that if linfeed oil be rendered very drying by digefting it upon the oxides of lead, and it be afterwards applied with a fmall brufh upon any furface, and dried by the fun or in the fmoke, it affords a pellicle of a confiderable degree of firmnefs, evidently tranfparent, burning like elaftic gum, and wonderfully elaftic and extenfible. If this very drying oil be left in a fhallow veffel, the furface becomes thick, and forms a membrane, which has the greateft analogy with the elaftic gum. A pound of this oil fpread upon a ftone, and expofed to the air for fix or feven months, acquired almoft all the properties of elaftic gum. Further experiments are however probably ftill wanting to fully determine the nature of this fubftance.

Sect. V. *Of Sugar.*

This fubftance exifts in confiderable quantities in a number of plants, and when extracted and prepared is very foluble in water, fwells up in the fire, becomes black, and emits a particular fmell.

Oxalic Acid.—The method of extracting a peculiar acid from fugar, by combining the oxigene of the nitric acid with one of its conftituent principles, has been long fince fhown by Bergman. It is by mixing nine parts of the nitric acid with one of fugar in a retort. A gentle heat is applied, to affift the action of the acid; which is rapidly decompofed upon the fugar, with the difengagement of a confiderable quantity of nitrous gas. When the decompofition is completed, the diftillation is continued on a fand-bath, till the refidue is concentrated. It is then fuffered to cool; and beautiful cryftals are formed, which may be taken out, and leave the figure of a tetrahedral prifm terminating in a dihedral fummit. By a farther concentration of the liquor in which the acid has cryftallized, more of thefe cryftals may be obtained. Thefe feveral products of cryftals are then to be diffolved in pure waters, and again cryftallized, to feparate them from any admixture of nitric acid that may adhere to them. This acid was formerly thought to be a modification of the nitric acid; and Bergman was under the neceffity of entering into a confiderable detail of reafoning, to remove every doubt on the fubject. But the knowledge we at prefent poffefs refpecting the conftituent principles of the nitric acid, and the great number of the phenomena of this kind which it exhibits when made to act on various fubftances, render any further difcuffion unneceffary. Cold water diffolves half its weight of this acid, and boiling water takes up its own weight of it. When combined with pot-afh, it forms a falt with prifmatic hexahedral flattened rhomboidal cryftals, terminating in dihedral fummits. However, in order

that cryſtallization may take place, it is neceſſary that one of the component parts ſhould be in exceſs. This ſalt is very ſoluble in water. The ſame acid forms with ſoda a ſalt which is very difficult to be brought to cryſtallize, and which converts ſyrup of violets to a green colour. If this acid be poured upon ammoniac, it affords by a ſlight evaporation very beautiful tetrahedral priſmatic cryſtals, terminating in dihedral ſummits; one of whoſe faces is larger than the other, ſo that it occupies three angles of the extremity. This ſalt is of great uſe in the analyſis of mineral waters. It inſtantly ſhews the preſence of any ſalt with baſis of lime, becauſe the oxalate of lime is inſoluble in water. The acid of ſugar, or oxalic acid, attacks and diſſolves moſt of the metals: but its action upon the oxides is ſtronger than upon the metals themſelves; and it takes the oxides from their true ſolvents. In this way it is that it precipitates iron from a ſolution of the ſulphate of iron, in a ſubſtance of the moſt beautiful yellow colour, which may be uſed in painting. It precipitates copper in the form of a white powder, which becomes of a beautiful light green by drying, and zinc is precipitated of a white colour. It likewiſe precipitates mercury and ſilver, but not till after ſeveral hours ſtanding. The combinations of this acid with metallic oxides, according to Bergman, are the following:

1. With oxide of arſenic, it forms priſmatic cryſtals, very fuſible, very volatile, and decompoſable by heat.

2. With oxide of cobalt, a pulverized ſalt, of a bright roſe colour, and ſcarce ſoluble.

3. With oxide of biſmuth, a white ſalt in powder, very little ſoluble in water.

4. With oxide of antimony, a ſalt in cryſtalline grains.

5. With oxide of nickel, a ſalt of a white or greeniſh yellow colour, and ſcarce ſoluble.

6. With oxide of mangaueſe, a ſalt in a white powder, which becomes black in the fire.

7. With zinc, the ſolution of which is attended with effervescence, a pulverulent white ſalt.

8. It diſſolves oxide of mercury, and reduces it to a white powder, which is rendered black by the contact of light. This acid decompoſes mercurial ſulphate and mercurial nitrate.

9. Tin, by its action, is firſt rendered black, and afterwards covered with a white powder. The ſalt which it forms with this metal is of an harſh taſte. It cryſtallizes into priſms by evaporation judiciouſly conducted; when evaporated by an intenſe heat, it leaves a tranſparent maſs, reſembling horn.

10. It tarniſhes lead, but diſſolves its oxide better. The ſaturated liquor depoſits ſmall cryſtals, which may alſo be obtained by pouring oxalic acid into a ſolution of nitrate or muriate of lead, or into acetite of the ſame metal.

11. It acts on iron filings; and as there is water decompoſed in this ſolution, there is, of conſequence, hydrogenous gas diſengaged. Oxalate of iron is ſtyptic: it affords greeniſh yellow priſmatic cryſtals, decompoſable by heat.

Yellowiſh oxide of iron, in combination with this acid, affords a yellow ſalt, ſimilar to that which is obtained by pouring liquid oxalic acid into a ſolution of ſulphate of iron.

12. It acts on copper, and entirely diſſolves the oxides of this metal. The ſalt thus formed is of a clear blue colour, and ſcarce ſoluble. This ſalt may be likewiſe obtained by precipitating ſulphuric, nitric, muriatic, and acetous ſolutions of copper with oxalic acid.

13. Oxide of ſilver precipitated by pot-aſh, diſſolves in a ſmall proportion in this acid. The beſt way of obtaining this ſalt is by precipitating the nitric ſolution of ſilver with oxalic acid: a white ſediment is produced, ſcarce ſoluble in water, and liable to become brown by the contact of light.

14. This acid ſcarce acts on oxide of gold.

15. It diſſolves the precipitate of platina produced with ſoda. This ſolution is ſomewhat yellow, and affords cryſtals of the ſame colour.

All theſe combinations were effected with artificial oxalic acid, prepared from ſugar and nitric acid.

The oxalic acid may be extracted, by the action of nitric acid, from a number of vegetable ſubſtances, ſuch as gums, honey, ſtarch, gluten, or alcohol; and from the experiments of Mr. Berthollet, it ſeems that ſeveral animal ſubſtances, ſuch as ſilk, wool, and lymph, yield the ſame acid.

The experiments of Mr. De Morveau on this acid ſeem to prove that the whole of the ſugar does not enter into the formation of the acid, but only one of its principles; and he affirms that it is an attenuated oil which exiſts in a variety of bodies.

Acid of Sorrel.—From the experiments of Scheele, Weſtrumb, Hermſtadt, and ſome other chemiſts, it appears to be aſcertained, that the acid of the ſalt of ſorrel does not at all differ from that of ſugar; they have been accordingly confounded under the ſame denomination; and that ſalt which is known in commerce by the name of *Salt of Sorrel*, is an acidulous oxalate of pot-aſh. The ſalt of ſorrel is made in Switzerland, and many other places. The juice of ſorrel is expreſſed, diluted with water, filtered, and evaporated to the conſiſtence of cream. It is then covered with oil, to prevent its fermentation, and left in a cellar for ſix months. It appears from the account of Mr. Savary, that fifty pounds of this plant afford five-and-twenty of juice, from which no more than two ounces and a half of the ſalt could be obtained. Six parts of boiling water diſſolve one of the ſalt. It cryſtallizes in the form of parallelopipedons, according to De Liſle. It has been obſerved by Margraff that the nitric acid, digeſted upon ſalt of ſorrel, afforded nitre. Calcareous earth has the property of diſengaging the alkali; and in this operation the carbonic acid of the chalk unites with the alkali of the ſalt, and forms a carbonate of pot-aſh. Salt of ſorrel unites with other baſes without yielding its own, ſo that the reſults are triple ſalts. Mr. Savary has remarked that the pure oxalic acid may be obtained by diſtillation of this ſalt, or otherwiſe by depriving it of its alkali by means of ſulphuric acid, and diſtillation, as in Wiegleb's method; and by the proceſs of Scheele, which conſiſts in ſaturating the exceſs of acid with ammoniac, and pouring the nitrate of barytes into the ſolution. The nitric acid then ſeizes the two alkalis, while the oxalic acid unites with the barytes, and falls down. The barytes is afterwards taken from its combination by the ſulphuric acid, and leaves the oxalic acid diſengaged. This laſt chemiſt has likewiſe propoſed another method of obtaining the pure oxalic acid. It conſiſts in diſſolving the ſalt in water, and pouring in a ſolution of ſalt of ſaturn. A precipitate is formed; and the ſupernatant liquor contains the alkali of the ſalt of ſorrel, united with a portion of the vinegar. The precipitate is then waſhed, and ſulphuric acid poured on, which unites with the lead: and, by filtering and evaporating, the oxalic acid is obtained in cryſtals, ſimilar to thoſe of the acid of ſugar. The identity of the acid of ſalt of ſorrel with that which is extracted from ſugar has alſo been ſhown by the ſame chemiſt. He diſſolved the acid of ſugar to ſaturation in cold water, and into this he very gradually poured a well-ſaturated ſolution of pot-aſh. During the effervescence, he obſerved that ſmall tranſparent cryſtals were formed, which were found to be a true ſalt of ſorrel. Mr. Hoffman has likewiſe proved that the juice and the cryſtals of the *berberis vulgaris* contain the oxalic acid combined with pot-aſh. And Mr. Scheele has found that the earth of rhubarb is a combination of the oxalic acid with lime.

Sect. VI. *Of Vegetable Acids.*

These acids have long been conſidered as weaker than the others, an opinion which was adhered to until it was obſerved that

the oxalic acid feized lime from the fulphuric acid. The chief circumftances which ferve to eftablifh a diftinction between the vegetable and other acids are—1. Their volatility; for there are none which do not rife with a moderate heat. 2. Their property of leaving a coaly refidue after combuftion, and of emitting an empyreumatic fmell in burning. 3. The nature of their acidifiable bafe, which is in general oily. It has been a queftion whether all the vegetable acids be identical in their nature, and whether they may not be confidered as modifications of the fame acid.

If the principle laid down by Monro, who confiders no acids as identical but fuch as form exactly the fame falts with the fame bafe, be true (Phil. Tranf. vol. lvii. p. 479), there can be no doubt but that all the known acids ought to be confidered as very different from each other. Mr. Chaptal however objects to this method of proceeding, as highly erroneous; becaufe in this cafe the various degrees of faturation of the fame principle with oxigene would eftablifh various kinds of acids. The flow or the rapid combuftion of phofphorus caufes fufficient modifications in the acid to afford different phofphoric falts, as has been fhown by the experiments of Sage and Lavoifier. But we cannot on this account admit of two fpecies of phofphoric acid. By purfuing the method of Monro, which is that followed by moft chemifts, we may multiply the vegetable acids to infinity; but if we admit the experiments of different chemifts, as Hermftadt, Crell, Scheele, Weftrumb, Berthollet, Lavoifier, and fome others, we fhall conclude that the vegetable acids are merely modifications of one or two primitive acids. Mr. Scheele obtained vinegar by treating fugar and gum with manganefe and the nitric acid. He obferved that tartar had the fame effect as fugar in the folution of manganefe by the nitric acids; and that vinegar was found after the decompofition of ether. Mr. Crell, by boiling the refidue of nitric alcohol (dulcified fpirit of nitre) with much nitric acid, taking care to adapt veffels to condenfe the vapour, and faturating what came over with alkali, obtained nitrate and the acetate of pot-afh. The latter being feparated by alcohol; gives out its vinegar by the ufual treatment. The fame chemift, by boiling the pure oxalic acid with twelve or fourteen parts of nitric acid, obferved that the former difappears: and the receiver is found to contain nitrous acid, acetous acid, carbonic acid, and nitrogenous gas; and in the retort there remains a little calcareous earth. By faturating the refidue of nitric alcohol with calk, an infoluble falt is obtained; which, treated with the fulphuric acid, affords a true tartareous acid. On boiling one part of oxalic acid with one part and a half of manganefe, and a fufficient quantity of nitric acid, the manganefe is almoft totally diffolved, and vinegar with nitrous acid paffes into the receiver. By boiling tartareous acid and manganefe with the fulphuric acid, the manganefe is diffolved, and vinegar with fulphuric acid is obtained. After digefting for feveral months the tartareous acid and alcohol, the whole becomes changed into vinegar; and the air of the veffels is found to confift of carbonic acid and nitrogene gas.

On thefe facts Crell concludes that the tartareous, oxalic, and acetous acids are merely modifications of the fame acid. We have the following experiments by Mr. Hermftadt on the converfion of the oxalic and tartareous acids into acetous acid: By caufing the oxigenated muriatic acid to pafs through very pure alcohol, ether is produced; and the oxigenated acid refumes its character of ordinary muriatic acid. The ether by diftillation affords—1. Ether. 2. Muriatic alcohol. 3. Vinegar mixed with regenerated muriatic acid. Nitric acid diftilled, for feveral fucceffive times, from the oxalic and tartareous acids, converts them totally into acetous acid. If two parts of oxalic acid, three of fulphuric acid, and four of manganefe, be mixed with one part and a half of water, and diftilled together, they afford acetous acid, which requires to be recohobated and rediftilled, to become very pure. When the fulphuric acid is boiled upon the oxalic or the tartareous acid, thefe two laft are not deftroyed, as was fuppofed by Bergman, but they are converted into acetous acid. Mr. Hermftadt has alfo proved that the fulphureous acid in the receiver, when ether is made, is mixed with much acetous acid. It appears therefore that the tartareous, oxalic, and acetous acids differ from each other only in the proportion of oxigene. In the above experiments the mineral acids are always decompofed; and, by faturating the radical with the oxigene, they conftantly form the acetous acid. If the faturation be not exact, the refult is either oxalic or tartareous acid; which is ftill more fatisfactorily proved by the following fine experiment of the above chemift: If three parts of fuming nitric acid be put into the pneumatic apparatus, and a large jar be adapted, filled with water; and then one part of good alcohol be poured in by a little at a time, the mixture will be heated every time a drop of the alcohol is let fall, and a great quantity of bubbles will rife into the receiver. When the operation is ended, if care be taken to collect the gas, it will be found to confift of nitrous gas, a fmall quantity of carbonic acid, and about a twelfth part of the acetous air of Dr. Prieftley. The refidue affords oxalic acid and acetous acid. The oxalic acid difappears if the operation be continued; ether is formed; and the acetous acid remains, and becomes more in quantity. The fame chemift has likewife fucceeded in converting the acids of tamarinds, citrons, grapes, the juice of plums, apples, and many other fruits, into the oxalic, tartareous, and acetous acids.

From the whole of thefe experiments it may be concluded, that the oxigene, combined with a principle of alcohol, forms the oxalic acid; and that a more accurate faturation of this principle with oxigene forms the tartareous and acetous acids. Mr. Lavoifier has proved that the known vegetable acids do not differ from each other but in the proportion of hydrogene and carbone, and in their degree of oxigenation; and Mr. Chaptal has fhown that water impregnated with the gas difengaged from the juice of grapes in fermentation, paffes to the ftate of acetous acid.

The vegetable acids may therefore be confidered in two very different points of view. Moft of them exift in the plant itfelf; but the properties and acid characters are difguifed by their combination with other principles, fuch as oils, earths, alkalis, &c. On the other hand, feveral acids are extracted from vegetables, which did not exift in nature. In this cafe the plant contained only the radical, and the re-agent with which it is treated affords the oxigene.

It has been found that the mere diftillation of moft vegetables is fufficient to develop an acid, which was difguifed by oily, alkaline, or earthy matters.

Of the Pyro-mucous Acid.—This is a peculiar acid which is afforded in diftillation by all plants which contain a faccharine juice. In preparing this acid, the quantity of fugar intended to be operated upon is put into a very capacious retort, on account of the matter fwelling up very much; and a receiver, fufficiently ample to condenfe the vapour, is to be adapted. A large quantity of carbonic acid and hydrogene gas is difengaged by the firft impreffion of the fire; and a brown fluid remains in the receiver, moft of which confifts of a weak acid, which colours blue paper, and is rendered dark by a portion of oil. The retort contains a fpongy coal. Mr. Schrickel recommends the rectification of the product of the firft diftillation from clay, in order to purify the acid: but Mr. De Morveau has rediftilled it without intermedium; and the acid he obtained had only a flight yellow tinge. This acid rifes at the fame temperature as water: it is therefore not poffible to concentrate it by diftillation. But this purpofe may be effected by freezing; and it was in this manner that Mr. Schrickel prepared the acid he

made ufe of to afcertain its combinations. This concentrated acid has a very penetrating tafte. It ftrongly reddens blue colours. If it be expofed to heat in open veffels, it is diffipated, and leaves only a brown fpot; but if it be heated in clofed veffels, it leaves a more confiderable refidue, of the nature of the coal of fugar.

This acid fpeedily attacks the earthy and alkaline carbonates, and forms falts differing from the oxalates. According to the experiments of Mr. Schrickel, it diffolves gold, but filver is not attacked by it; mercury, however, combines with it by means of a long digeftion, as has been obferved by Mr. De Morveau. This acid corrodes lead, and forms a very ftyptic falt in long cryftals: and with copper it forms a green folution. It alfo partly diffolves tin, and affords green cryftals with iron.

Of the Pyro-ligneous Acid.—This name has been given to the acid obtained by diftillation from wood. It has been long known that the hardeft woods afford an acid principle, mixed with an oil, which partly difguifes its properties; but no one had directly attended to a determination of the habitudes of this acid, until Mr. Goettling publifhed his refearches on the acid of wood, and the ether it affords. In order to obtain this acid, Mr. de Morveau diftilled fmall pieces of very dry beech in an iron retort, by a reverberatory furnace. He changed the receiver when the oil began to rife, and rectified the product by a fecond diftillation. Fifty-five ounces of very dry chips afforded feventeen ounces of rectified acid, of an amber colour, not at all empyreumatic; whofe fpecific gravity, compared with that of diftilled water, was as 49 : 48. This acid ftrongly reddens blue vegetable colours, and one ounce of it required twenty-three ounces and a half of lime water for its complete faturation. It fupports the action of heat very well when it is engaged in an alkaline bafe; but by a ftrong heat it is burned, like all the vegetable acids. It does not precipitate martial folutions of a black colour, but it unites with alkalis, earths, and metals; and does not give up lime or barytes to combine with cauftic alkalis. The action of the pyro-ligneous acid upon metallic fubftances, and upon alumine, may be compared with that of the acetous acid, and appears to follow the fame order. This acid diffolves near twice its weight of the oxide of lead.

Of the Citric Acid.—The juice of lemons exifts in a difengaged ftate in the fruit, and exhibits its acid properties without any preparation. This acid is neverthelefs always mixed with a mucilaginous principle, capable of alteration by fermentation. Mr. Georgius, a Swedifh chemift, has given a method of purifying this acid without changing its properties. He fills a bottle with lemon juice, clofes it with a cork, and preferves it in a cellar. In this way the acid was preferved for four years, without corrupting. The mucilaginous parts had fallen down in flocks; and a folid cruft was formed beneath the cork, the acid itfelf having become as limpid as water. To dephlegmate the acid, he expofes it to froft; and obferves that the temperature fhould not be too cold, becaufe in that cafe the whole would become folid; and though the acid would thaw the firft, it would always be productive of fome inconvenience. In order to concentrate it to better advantage, the ice muft be feparated as it forms. The firft ice is taftelefs, and the laft rather four; and by this means the liquor is reduced to half. The acid thus concentrated is eight times as ftrong as the common acid, two drachms only being required to faturate one drachm of potafh. The citric acid, when thus purified and concentrated, may be kept for feveral years in a bottle; and ferve for all ufes, even that of making lemonade. The generality of chemifts who have examined the combinations of the citric acid, have employed it in its original ftate, embarraffed with its mucilaginous principle. Such is the refult of the experiments of Mr. Wenzel, who obtained only gummy products. But Mr. De Morveau having faturated the purified acid with cryftals of pot-afh, found a non-deliquefcent falt at the end of a certain fpace of time. Bergman has reprefented the affinities of this acid in the following order: lime, barytes, magnefia, pot-afh, foda, ammoniac; but Mr. De Breffey, a French chemift, has obferved, that barytes holds the firft place, lime the fecond, and magnefia the third; and that the alkalis follow after thefe. From the refearches of both, it appears that this acid prefers the three alkaline earths to the alkalis themfelves.

Of the Gallic Acid.—The name of *gallic acid* is given to that acid which is extracted from the nut-gall which grows on oaks in confequence of the puncture of an infect: but this acid is found in a greater or fmaller quantity, in all four or aftringent vegetable fubftances. According to the experiments of different chemifts, but particularly the academicians of Dijon, the properties of this acid are the following: 1. That the products of diftilled nut-galls become black with the folution of fulphate of iron. 2. That an ounce of this fubftance communicates to cold water a tincture, from which $3\frac{1}{2}$ drachms of extract are obtained by evaporation. 3. That this infufion reddens turnfol and blue paper. 4. That the fame principle is foluble in oils, alcohol, and ether. 5. That acids diffolve without altering it, and without depriving it of the property of producing a black precipitate of iron. 6. That its folution in water precipitates alkaline fulphures. 7. That it entirely decompofes all folutions of metals, and communicates a colour to the oxides by combining with them. 8. That it directly diffolves iron, and precipitates filver and gold, after feparating them from their folvents. Mr. Scheele has fince not only obferved, that all four, aftringent plants exhibit marks of acidity, but has difcovered and defcribed a procefs by which this acid may be obtained pure and cryftallized. It is this: Upon a pound of nut-galls in powder pour fix pounds of diftilled water; leave this mixture to macerate for the fpace of fifteen days, in the temperature of from 68 to 77 degrees; then filtrate the liquor, and put it in a ftone pot, or a large capfule of glafs; fuffer it to evaporate flowly in the air; a mouldinefs, and a thick and feemingly glutinous pellicle is then formed upon it: mucilaginous flakes are firft precipitated in great abundance; the folution has no longer a very aftringent tafte, but is more fenfibly acid than before. After it has been two or three months expofed to the air, there is obferved on the fides of the veffels, and adhering to them, a brown plate, covered with granulated cryftals, fparkling, and of a yellowifh grey colour: the fame cryftals exift likewife in great abundance on the under fide of the thick pellicle which covers the liquor: the liquor muft now be decanted off; and hot alcohol be poured on the flaky fediment, the pellicle, and the cryftalline cruft: this folvent takes up all the cryftallized falt, but affects not the mucilage. This fpirituous folution is then evaporated, and the gallic acid is obtained from it pure, in fmall granulated cryftals, of a grey colour, inclining a little to yellow, and brilliant. The gallic acid thus purified has a tafte fomewhat four and aftringent. It produces in folutions of fulphate, and of other falts of iron, a very fine and brilliant black precipitate: it gives a high red colour to the tincture of turnfol; when heated in contact with air, it fwells and kindles, diffufing an agreeable fmell, and leaves a coal, the incineration of which is very difficult: when diftilled by a moderate fire, a part of it is diffolved in the water of its cryftals, and afcends in that ftate: another part is fublimed, without being decompofed, in fmall filky cryftals; a ftrong fire feparates from it fome drops of oil, carbonic acid gas, and carbonated hydrogenous gas. Nut-gall, when diftilled entire, affords a fmall portion of concrete falt, refembling the fublimated gallic acid. The gallic acid requires 24 parts of cold water to diffolve it; but of boiling water only three parts. Repeated folution and cryftallization do not whiten it in a fenfible manner. Alcohol diffolves it much more efficacioufly: four parts of this

liquid, when cold, are ſufficient to diſſolve one of gallic acid; when boiling, it diſſolves a quantity of the acid equal to itſelf in weight. This acid diſengages the carbonic acid from earthy and alkaline baſes, when its action is aſſiſted by heat. With barytes, magneſia, and lime, it forms ſalts ſoluble in water, and eſpecially when there is an exceſs of the baſe. Pot-aſh, ſoda, and ammoniac, combine very readily with it, forming *gallates*, the properties of which are not well known. The nitric converts the gallic into oxalic acid. The gallic acid precipitates gold in a brown powder, and cauſes a part of the metal to appear on the ſurface of its ſolution in a brilliant metallic pellicle. In the ſolution of ſilver it produces a brown precipitate; and ſoon after the precipitation, a plate of reduced ſilver appears on the ſurface of the liquor. From mercury it produces an orange yellow precipitate; from copper a brown precipitate; from iron a beautiful glittering black precipitate; from biſmuth a citron yellow precipitate. Solutions of platina, zinc, tin, cobalt, and mangaueſe, ſuffer no alteration from the action of this acid.

Theſe are the properties which Mr. Scheele gives to the gallic acid when prepared by his proceſs, and they ſhow it to be a peculiar acid, diſtinct from all others, but its intimate nature is not yet ſufficiently known. Mr. De Morveau has obtained from it a reſin which he ſuppoſes to be the acidifiable baſe, by the union of which with oxigene the acid is conſtituted.

Of the Malic Acid.—This acid was announced by Scheele in 1785. In order to obtain it, the juice of apples is ſaturated with alkali, and the acetous ſolution of lead is poured in until it occaſions no more precipitate. The precipitate is then edulcorated, and ſulphuric acid poured on it until the liquor has acquired a freſh acid taſte, without any mixture of ſweetneſs. The whole is then filtered, to ſeparate the ſulphate of lead. This acid is very pure, always in the fluid ſtate, and cannot be rendered concrete. It unites with the three alkalis, and forms deliqueſcent neutral ſalts. When ſaturated with lime, it affords ſmall irregular cryſtals, which are ſoluble only in boiling water. Its habitude with barytes is the ſame as with lime. When united with alumine it forms a neutral ſalt of ſparing ſolubility in water, and with magneſia a deliqueſcent ſalt. It differs from the citric acid in ſeveral reſpects. 1. The citric acid ſaturated with lime, and precipitated by the ſulphuric acid, cryſtallizes; whereas this is not cryſtallizable. 2. The malic acid, treated with the nitric acid, affords the oxalic acid; the citric acid does not afford it. 3. The citrate of lime is almoſt inſoluble in boiling water; the malate of lime is more ſoluble. 4. The malic acid precipitates the ſolutions of the nitrates of lead, of mercury, and of ſilver; but the citric acid produces no change. 5. If the ſolutions of the nitrate of ammoniac, and malate of lime, be boiled together for an inſtant, the latter ſalt is decompoſed, and nitrate of lime falls down; which proves that the affinity of the malic acid with lime is weaker than that of the nitric.

Mr. Scheele has proved the exiſtence of the malic acid in ſugar. If weak nitric acid be poured on ſugar, and diſtilled till the mixture begins to turn brown, all the oxalic acid may be precipitated by the addition of lime-water; and another acid will remain, which the lime-water does not precipitate. To obtain this acid in a ſtate of purity, the liquor is ſaturated by means of chalk, then filtered, and alcohol added, which occaſions a coagulation. This coagulation, well waſhed in alcohol, is rediſſolved in diſtilled water. The malate of lime is decompoſed by the acetate of lead; and, laſt of all, the malic acid is diſengaged by the ſulphuric acid. The alcohol by evaporation leaves a ſubſtance rather bitter than ſweet, which is deliqueſcent, and reſembles the ſaponaceous matter of lemon juice. If a ſmall quantity of nitric acid be diſtilled from this, the malic and oxalic acids are obtained. By treating various other vegetable ſubſtances with the nitric acid, the malic and the oxalic acids were alſo obtained. This celebrated chemiſt alſo obtained the malic and oxalic acids from ſeveral animal ſubſtances, ſuch as fiſh-glue, &c. by treating them with very concentrated nitric acid.

When it was diſcovered that by the decompoſition of certain vegetables by the nitric acid, an acid was obtained as the laſt reſult, it was thought to have exiſted ready formed in the vegetable; but a more intimate examination has ſhown that the acid made uſe of in this operation was merely decompoſed, while it deſtroyed the organization of the vegetable, diſunited the combinations which retained the principles, and that the oxigenous baſe of this acid, by uniting with an element of the vegetable, formed a peculiar acid. It is to a ſimilar cauſe that we ought to attribute the formation of the acetous, the carbonic, and other vegetable acids; and even the rancidity of oils, and the alteration to which ſome other principles of the vegetable kingdom are ſubject. In theſe caſes the air affords the oxigene which becomes fixed in the plant, and gives it an acid nature.

Sect. VII. *Of ſome fixed Principles of Vegetables.*

The analyſis of vegetables ſhows that they contain, beſides ſulphur, which has been already noticed, certain metals, ſuch as iron, gold, and mangaueſe. The iron forms near one-twelfth of the weight of the aſhes of hard wood, ſuch as oak; and it may be extracted by the magnet. It does not appear, however, to exiſt in a perfectly diſengaged ſtate in the vegetable; though it has been aſſerted to have been found in metallic grains in fruits. The iron is uſually held in ſolution in the acids of vegetation, from which it may be precipitated by alkalis. The exiſtence of this metal has been attributed to various circumſtances. But it is unqueſtionably the ſame with the iron as with the other ſalts; which are produced by vegetation; for vegetables watered with diſtilled water afford this ſubſtance as well as others. The preſence of gold in plants has been aſcertained by Beccher and Kunckel; and Mr. Sage has long ſince found gold in the aſhes of vine twigs, and announced it to the public. Other chemiſts, who have attended to this object, have alſo found gold; but in much leſs quantity than he had repreſented. The moſt accurate analyſes have ſhown no more than two grains; whereas Mr. Sage had ſpoken of ſeveral ounces in the quintal. The proceſs for extracting gold from the aſhes conſiſts in fuſing them with black flux and minium. The lead which is produced is then cupelled, to aſcertain the ſmall quantity of gold with which it became alloyed in this operation. Mr. Scheele has alſo obtained mangaueſe in the analyſis of vegetable aſhes. His proceſs conſiſts in fuſing part of the aſhes with three parts of fixed alkali, and one-eighth of nitrate of pot-aſh. The fuſed matter is boiled in a certain quantity of water. The ſolution being then filtered, is ſaturated with ſulphuric acid, and at the end of a certain time mangaueſe falls down. Lime almoſt conſtantly forms ſeven-tenths of the fixed reſidue of vegetable incineration. This earth is uſually combined with the carbonic acid. Scheele has proved that it effloreſces in this form on the bark of guaiacum, the aſh, &c. It is likewiſe very often united with the acid of vegetation. It appears to be formed by an alteration of the mucilage, more advanced than that which forms the *fecula*, which has ſome analogy with this earth. Next to lime, alumine is the moſt abundant earth in vegetables, and after it magneſia. Mr. Darcet has obtained, from one pound of the aſhes of beech, one ounce of the ſulphate of magneſia, by treating them with the ſulphuric acid. This earth is very abundant in the aſhes of tamariſc. Siliceous earth likewiſe exiſts, but leſs abundantly; but the leaſt common of all is that of barytes.

Sect. VIII. *Of Pit-coal.*

This coal, which is probably formed by the decompoſition of vegetable and animal ſubſtances, poſſeſſes the following chemical properties: By diſtillation it affords ammoniac, which is diſſolved in the water, while the oil floats above. But when coal is deprived by combuſtion of all the oil and other volatile principles, the earthy reſidue contains the ſulphates of alumine, iron, magneſia, lime, &c. Theſe ſalts are all formed when the combuſtion is ſlow; but when it is rapid the ſulphur is diſſipated, and there remain only the aluminous, magneſian, calcareous, and other earths. The alumine moſt commonly predominates. It is evident that *petroleum, naphtha, mineral pitch*, and *aſphaltes*, are only ſlight modifications of the bituminous oil ſo abundant in pit-coal. This oil, which the ſimple heat of the decompoſition of the pyrites that is contained in this ſubſtance is ſufficient to diſengage from the coal, receives other modifications by the impreſſion of the external atmoſphere.

Petroleum is a change in this way. This oil is found in the vicinity of coal mines, and near volcanos. The ſmell of this ſubſtance is diſagreeable; and its colour is reddiſh; but it can be rendered clear by diſtilling it from ſome kinds of clay.

Reſpecting the chemical properties of this ſubſtance, it is only known that from brown petroleum there is obtained an acid phlegm, and an oil which is rather tranſparent, but which requires a colour as the diſtillation proceeds. There remains in the retort a thick matter, which by greater activity of fire may be rendered dry and brittle, and be entirely reduced to a carbonaceous ſtate. Alkalis ſcarcely act upon petroleum: the ſulphuric acid colours and thickens it; the nitric acid kindles it in the ſame manner as eſſential oils: it eaſily diſſolves ſulphur; it is coloured by metallic oxides; and it combines with amber, and with the help of heat ſoftens and diſſolves a part of it.

Naphtha is merely a variety of petroleum. The earth impregnated with naphtha is calcareous, and efferveſces with acids; it takes fire by the contact of any ignited body whatever.

Mineral pitch is likewiſe a modification of petroleum. It is found in different places, but particularly in Auvergne in France, at a place called *Puits de Lapege*, in an extent of ſeveral leagues. The calcareous ſtone in that neighbourhood is impregnated with a bitumen, which is ſoftened by the heat of ſummer, when it flows from the rocks, and forms a very beautiful ſtalactites.

Aſphaltes, or *bitumen Judaicum*, is black, brilliant, ponderous, and very brittle. It emits a ſmell by friction; and is found floating on the water of the lake Aſphaltites. This ſubſtance liquefies on the fire, ſwells up and affords flame, with an acrid diſagreeable ſmoke; and by diſtillation it yields an oil reſembling petroleum.

Sect. IX. *Of Amber.*

The conſtituent principles exhibited in the analyſis of this ſubſtance, are the ſalt of amber, or ſuccinic acid, and a bituminous oil.

Succinic Acid.—In order to extract the ſuccinic acid, the amber is broken into ſmall pieces, which are put into a retort, and diſtilled with a ſuitable apparatus upon a ſand-bath. When the fire is carefully managed, the products are—1. An inſipid phlegm. 2. Phlegm holding a ſmall portion of acid in ſolution. 3. A concrete acid ſalt, which attaches itſelf to the neck of the retort. 4. A brown and thick oil, which has an acid ſmell. The concrete ſalt always retains a portion of oil in its firſt diſtillation. To clear it of this, Scheffer has propoſed to diſtil it with ſand, and Bergman with white clay; but Pott adviſes ſolution in water, and filtration through white cotton; after which the fluid is to be evaporated, and is found to be deprived of the oil, which remains on the cotton. Spielman propoſed to diſtil it with the muriatic acid; it then ſublimes white and pure. Bourdelin however clears it of its oil by detonation with nitre. This ſalt is prepared in the large way at *Koningſberg*, by diſtilling the ſhavings and chips of amber. The ſuccinic acid has a penetrating taſte, and reddens the tincture of turnſole. Twenty-four parts of cold water, and two of boiling water, diſſolve one of this acid. If a ſaturated ſolution of this ſalt be evaporated, it cryſtallizes in triangular priſms, whoſe points are truncated; and Mr. De-Morveau has obſerved, that its affinities are barytes, lime, alkalis, magneſia, &c.

The oil of amber has a ſtrong ſmell: it may be deprived of its colour by diſtillation from white clay. Rouelle diſtilled it with water. When mixed with ammoniac it forms a liquid ſoap. Alcohol attacks this ſubſtance, and acquires a yellow colour. Hoffman prepared a tincture by mixing the ſpirit of wine with an alkali.

Sect. X. *Ardent Spirits.*

See Fermentation and Distillation.

Alcohol, which is the product of theſe operations, is a very inflammable and very volatile ſubſtance. From the experiments of Mr. Lavoiſier, it appears to be formed by the intimate union of much hydrogene and carbone. This chemiſt obtained eighteen ounces of water by burning one pound of alcohol. If well-dephlegmated alcohol be digeſted upon calcined pot-aſh, and afterwards diſtilled, a very ſweet alcohol is obtained, and a ſaponaceous extract, which affords alcohol, ammoniac, and an empyreumatic oil. In this experiment, the formation of volatile alkali appears to ariſe from the combination of the hydrogene of the alcohol with the nitrogene of the pot-aſh. Alcohol combines with water in any proportion, and is perfectly ſoluble in it; and ſo ſtrong is the affinity of combination between theſe two fluids, that water is capable of ſeparating from alcohol many of the other bodies which may be united with it; it alſo decompoſes moſt ſaline ſolutions, and precipitates the ſalts. On account of its poſſeſſing this property, Boulduc has propoſed the uſe of alcohol to precipitate the ſalts contained in mineral waters, and obtain them without alteration. It does not act on pure earths; nor do we know whether it be liable to be altered by barytes or magneſia. Lime appears to be capable of producing ſome change upon it; for when it is diſtilled on that earthy ſubſtance, the fluid acquires a peculiar ſmell.

Alcohol does not diſſolve ſulphur, either in maſſes or in a powder; but theſe two bodies unite, if brought into contact when they are both in a vaporous ſtate, as has been diſcovered by the Count de Lauraguais. His proceſs conſiſts in putting ſulphur in powder into a glaſs cucurbit, introducing into the ſame veſſel, above the flowers of ſulphur, a bottle filled with alcohol, and heating the cucurbit on a ſand-bath, with a capital and a receiver adapted to it. Both the ſulphur and alcohol are volatilized at the ſame time: they combine, and paſs into the receiver, in a fluid which is ſomewhat turbid, and diffuſes a fœtid ſmell. It contains about a grain of ſulphur to the drachm of alcohol. Mr. Fourcroy has obſerved, that the ſame combination may be produced by diſtilling ſulphureous waters with alcohol. It does not act at all on either metallic matters, or their oxides; but it partly diſſolves amber. It is the ſolvent of reſins, and of moſt aromatic ſubſtances, and conſequently forms the baſis of the art of the varniſher and of the perfumer. If ſpirit of wine be combined with oxigene, it forms a liquor nearly inſoluble in water, which is called *Ether.*

Ether has been formed with moſt of the known acids. The moſt ancient of all is the *ſulphuric* or *vitriolic ether*. To make this, a certain quantity of alcohol is put into a retort, and an equal weight of concentrated ſulphuric acid is gradually added.

The mixture is ſhaken and agitated, to prevent the retort from breaking by the partial effect of the heat which ariſes. The retort is then placed on a heated ſand-bath, a receiver is adapted, and the mixture is heated to ebullition. Alcohol firſt paſſes over; ſoon after which, ſtreams of fluid appear in the neck of the retort, and within the receiver, which denote the riſing of the ether; which has an agreeable ſmell. Vapours of ſulphureous acid ſucceed the ether; and the receiver muſt be taken away the moment they appear. If the diſtillation be continued, *ſulphureous ether* is obtained, and the oil which is called *Etherial Oil*, or the *Sweet Oil of Wine*; and that which remains in the retort is a mixture of undecompoſed acid, ſulphur, and a matter reſembling bitumens.

It is evident that in this operation the ſulphuric acid is decompoſed: and that the oxigene, by combining with the hydrogene and the carbone of the alcohol, has formed three ſtates, which we alſo find in the diſtillation of ſome bitumens.—1. A very volatile oil or ether. 2. Etherial oil. 3. Bitumen. If the ſulphuric acid be digeſted upon ether, it converts the whole gradually into etherial oil. When the ether is mixed with ſulphureous vapours, it muſt be rectified by a gentle heat; a few drops of alkali being firſt poured in, to combine with the acid. Sulphuric ether may alſo be made very œconomically, by uſing a leaden ſtill with a head of copper well tinned; in this manner Mr. Chaptal prepares it in the large way without any inconvenience. Dr. Black recommends a matraſs, or bolt-head, with a tin pipe adapted to the head, ſo as to convey the ſtreams at a right angle to be condenſed in the receiver. It has been propoſed by Mr. Cadet, to pour on the reſidue of the retort one-third part of good alcohol, and to diſtil it in the uſual way. Sulphuric ether eaſily burns, and exhibits a blue flame; but it is very ſparingly ſoluble in water. The mixture of two ounces of ſpirit of wine, two ounces of ether, and twelve drops of etherial oil, forms the celebrated anodyne liquor of Hoffman.

Nitric Ether.—Various proceſſes have been given by different chemiſts, for making nitric ether, which may be more or leſs eaſily imitated. That which has been recommended by Mr. Woulfe, is the following: He uſes very large veſſels, which afford room for the reception of the air that is diſengaged. Taking a balloon of clear glaſs, ſufficiently capacious to hold eight or ten pints, and terminating in a neck ſeven or eight feet long, he places it on a tripod, high enough to receive under it a chafing-diſh. The neck of the matraſs is to be adjuſted to a tubulated capital, with a glaſs tube ſeven or eight feet long adapted to its beak. The lower extremity of the tube is received into a balloon with two necks, the lower part of which is drawn out into a tube, and inſerted into a bottle. The other neck of this balloon joins the bottles compoſing Woulfe's apparatus, which we have already ſufficiently deſcribed. When all theſe veſſels are ſufficiently luted together, a pound of rectified alcohol, and as much fuming nitrous acid, is to be poured into the matraſs, through the hole perforated in the capital: that hole muſt then be ſtopped with a cryſtal ſtopper, wrapped in a piece of leather. The mixture becomes immediately exceedingly hot: vapours are diſengaged, and paſs rapidly along the neck of the balloon; and this veſſel being expoſed to a heat ſufficient to boil the liquor which it contains, a quantity of nitric ether paſſes into the balloon employed as a receiver. A more convenient method is however employed by Mr. Chaptal: for this purpoſe he takes equal parts of alcohol, and the nitric acid of commerce, of the ſtrength of between thirty and thirty-five degrees. He puts the whole into a tubulated retort, which is fitted to a furnace, and adapts two receivers one ſucceeding the other. The firſt receiver is immerſed in a veſſel of water. The ſecond is ſurrounded by a wet cloth; and a ſiphon communicates from its tubulure to a veſſel of water in which it is plunged. When the heat has penetrated the mixture, much vapour is diſengaged, which is condenſed in *ſtriæ*, on the internal ſurfaces of the receivers, the external ſurface of which is kept conſtantly cold. The ether which he obtains is very pure and very abundant. It is neceſſary however to be careful in mixing the two liquors. The nitric acid ſhould be very gradually added to the alcohol by ſmall portions at a time; and it is even of importance that the nitric acid be added to the alcohol and not the alcohol to the acid.

If the precaution of diſtilling be properly attended to, this ether becomes nearly ſimilar to the ſulphuric.

Dulcified Muriatic Acid.—The diſtillation of the muriatic acid with alcohol produces only a mixture of theſe two liquors, which is called the *Dulcified Muriatic Acid.* Before the theory of ethers, and the ſimple proceſs of combining a ſurplus of oxigene with the muriatic acid, were known, methods were invented to procure the muriatic acid; but ſubſtances were always made uſe of in which the muriatic acid was oxigenated. In this manner it was that the baron de Borne propoſed the concentrated muriate of zinc, mixed and diſtilled with alcohol; and that the marquis de Courtanvaux diſtilled the mixture of a pint of alcohol with two pounds and a half of the fuming muriate of tin. The theory of the formation of ether has ſince led to ſimpler proceſſes. For this purpoſe, Mr. Pelletier introduces a mixture of eight ounces of mangaueſe, and a pound and a half of the muriate of ſoda, into a large tubulated retort; twelve ounces of ſulphuric acid, and eight ounces of alcohol, are afterwards added. Diſtillation is then proceeded upon; and ten ounces of a very etherial liquor are obtained, from which four ounces of good ether are afforded by diſtillation and rectification. But very concentrated muriatic acid, diſtilled from manganeſe in the apparatus of Woulfe, affords more ether. It is even ſufficient, for this purpoſe, to paſs the oxigenated muriatic acid through good alcohol, to convert it into ether. This muriatic ether has the greateſt analogy with the ſulphuric. It differs from it in two characters only—1. It emits, in burning, a ſmell as penetrating as that of the ſulphuric acid. 2. Its taſte is ſtyptic, reſembling that of alum.

From the whole of theſe experiments on ether it is evident that it is merely a combination of alcohol with the oxigene of the acids made uſe of. Mr. Chaptal has even obtained an etherial liquor by repeated diſtillations of good alcohol from the red oxide of mercury. The idea of Macquer, who conſidered ether as ſpirit of wine dephlegmated, or deprived of water, has therefore no foundation: for the diſtillation of the ſpirit of wine from the moſt concentrated or drieſt alkali, never affords any thing but ſpirit of wine more or leſs dephlegmated or purified.

Sect. XI. *Of Tartar.*

This ſubſtance is depoſited on the ſides of caſks during fermentation; and forms a lining more or leſs thick, which is afterwards ſcraped off; and diſtinguiſhed by the name of *Crude Tartar.* All wines do not afford the ſame quantity of tartar. Neumann has remarked that the Hungarian wines left only a thin ſtratum; that the wines of France afforded more; and that the Rheniſh wines afforded the pureſt and the greateſt quantity. This ſubſtance is diſtinguiſhed, from its colour, into red or white: the firſt is afforded by red wine. When pure, tartar exhibits an imperfectly cryſtallized appearance, its taſte is acid and vinous. One ounce of water, at the temperature of 55 degrees of Fahrenheit, diſſolves only ten grains: boiling water diſſolves more, but it falls down in cryſtals by cooling. This ſubſtance is purified from an abundant extractive principle by different proceſſes. The following proceſs is employed at Montpellier: The tartar is diſſolved in water, and ſuffered to cryſtallize by cooling. The cryſtals are then boiled in another

veſſel, with the addition of five or ſix pounds of the white argillaceous earth of *Murviel* to each quintal of the ſalt. After this boiling with the earth, a very white ſalt is obtained by evaporation, which is known by the name of *Cream of Tartar,* or acidulous tartrite of pot-aſh. Another proceſs is followed at Venice which conſiſts—1. In drying the tartar in iron boilers. 2. In pounding it, and diſſolving it in hot water, which by cooling affords purer cryſtals. 3. In re-diſſolving theſe cryſtals in water, and clarifying the ſolution by white of eggs, and aſhes. The proceſs of Montpellier ſeems to be preferable to that of Venice, as the addition of the aſhes in the latter introduces a foreign ſalt, which alters the purity of the product. The acidulous tartrite of pot-aſh cryſtallizes in tetrahedral priſms cut off ſlantwiſe.

Of the Tartareous Acid.—The acidulous tartrite of pot-aſh may be decompoſed by means of fire, in the way of diſtillation; in which caſe the acid and the alkali are obtained ſeparately. This decompoſition may alſo be effected by the ſulphuric acid. But the celebrated Scheele has deſcribed a proceſs of greater accuracy for obtaining the acid from this ſalt. Two pounds of the cryſtals are diſſolved in water, into which chalk is thrown by degrees, till the liquid be ſaturated. A precipitate is formed, which is a true tartrite of lime, and which is taſteleſs, and cracks between the teeth. This tartrite is put into a cucurbit; and nine ounces of ſulphuric acid, with five ounces of water, are poured on it. After twelve hours digeſtion, with occaſional ſtirring, the tartareous acid is ſet at liberty in the ſolution, and may be cleared of the ſulphate of lime by means of cold water. This tartareous acid affords cryſtals by evaporation; which, when expoſed to the fire, become black, and leave a ſpongy coal behind. When treated in a retort, they afford an acid phlegm, and ſome oil. The taſte of this acid is very ſharp; and it combines with alkalis, with lime, with barytes, alumine, and magneſia. The combination of pot-aſh with this acid forms *Cream of Tartar,* when the acid is in exceſs; which is capable of entering into combinations, and forming triple ſalts. Such is the ſalt of *Seignette,* or tartrite of ſoda, which cryſtallizes in tetrahedral rhomboidal priſms. The acidulous tartrite of pot-aſh is very ſparingly ſoluble in water. Even boiling water diſſolves only one twenty-eighth part. It has been propoſed to add borax to facilitate the ſolution; as likewiſe ſugar, which is leſs efficacious than borax, but it makes a very agreeable and purgative lemonade with this ſalt.

Pyro-Tartareous Acid. This acid is obtained from the acidulous tartrite of pot-aſh by means of diſtillation in a naked fire. In this diſtillation a great quantity of carbonic acid gas is diſengaged, and the acid obtained is much contaminated with oil, which muſt be ſeparated from it. Some chemiſts adviſe this to be done by a ſecond diſtillation; but the academicians of Dijon think it dangerous on account of the exploſions that take place during the proceſs. This acid has an empyreumatic taſte and ſmell. It does not redden violets, but it produces that effect on turnſole and blue paper: it diſengages the carbonic acid from its baſes with a lively efferveſcence. With the earths and alkalis it forms ſalts very different from thoſe which the tartareous acid forms with the ſame baſes. Theſe ſaline compounds have not yet been examined; only, we know the pyro-tartrites of pot-aſh and ſoda to be ſoluble in cold water, and cryſtallizable: the acid decompoſes nitrate of ſilver, producing from it a grey precipitate; it by degrees renders nitrate of mercury turbid; it does not decompoſe calcareous muriate; and the ſulphuric acid decompoſes its neutral ſalts by diſtillation.

Acetous Acid.—This acid is obtained from various liquors by a particular kind of fermentation, which probably depends upon the mucilaginous principle of the ſubſtance which is fermented. See FERMENTATION *and* VINEGAR.

Vinegar is purified by diſtillation. The firſt portions which paſs over are weak; but ſoon afterwards the acetous acid riſes, and is ſtronger the later it comes over in the diſtillation. This fluid is called *Diſtilled Vinegar*; and is thus cleared of its colouring principle, and the lees, which are always more or leſs abundant. This acid may likewiſe be concentrated by expoſing it to the froſt. The ſuperabundant water freezes, and leaves the acid more condenſed. The preſence of ſpirit of wine, mucilage, and air, are neceſſary to form vinegar. Scheele has made it by decompoſing the nitric acid upon ſugar and mucilage. Mr. Chaptal has made the following curious obſervation reſpecting the formation of vinegar: Diſtilled water, impregnated with vinous gas, affords vinegar: at the end of ſome months, a depoſition is made of a ſubſtance in flocks, which is analogous to the fibrous matter of vegetables. When the water contains ſulphate of lime, an execrable hepatic odour is developed, a depoſition of ſulphur is afforded, and all this is owing only to the decompoſition of the ſulphuric acid. The ſame chemiſt remarks farther, that, as in the above experiments he had placed the water above the vinous fluid in fermentation, to impregnate it with the carbonic acid, the alcohol which evaporates with the acid carried the mucilage with it; and that the effects, he obſerved, are referable to this ſubſtance.

Acetic Acid.—The acetous acid is capable of combining with a larger portion of oxigene; and when united in this way it forms *Radical Vinegar,* or the acetic acid. In order to form the acetic acid, metallic oxides are diſſolved in the acetous acid; the ſalt which is obtained being then expoſed to diſtillation, affords the oxigenated acid. It has a very lively ſmell, is cauſtic, and its action upon bodies is very different from that of the acetous acid. This acetic acid has the advantage of forming ether with alcohol. For this purpoſe, equal parts of the acid and alcohol are to be diſtilled together; and the product of the diſtillation is to be again added to the reſidue in the retort; and a ſmall quantity of water of Rabel is likewiſe to be added. The whole becomes converted into ether.

The combination of the acetous acid with pot-aſh forms what has been called *Terra Foliata Tartari* or the acetite of pot-aſh. In order to make this ſalt, pure pot-aſh is ſaturated with diſtilled vinegar, the liquor filtered, and evaporated to dryneſs in a glaſs veſſel over a very gentle fire. The acetite of pot-aſh has a penetrating acid taſte; is decompoſed by diſtillation; and affords an acid phlegm, an empyreumatic oil, ammoniac, and a large quantity of very odorant gas, formed of carbonic acid and hydrogene; and the coal contains much fixed alkali in a diſengaged ſtate. This ſalt is very ſoluble in water, and deliqueſces in the air. The ſulphuric acid when poured upon it decompoſes it; and the products which come over are ſulphuric acid and acetic acid. The acetous acid likewiſe combines with ſoda; and this combination is improperly called *Cryſtallizable Terra Foliata.* The acetite of ſoda cryſtallizes in ſtriated priſms, and does not attract the humidity of the air. When theſe ſalts are diſtilled, they leave a reſidue, which forms an excellent and very active pyrophorus. The acetous acid alſo combines with ammoniac, and the acetite which is produced in the liquid form, is called the *Spirit of Mindererus.* This ſalt cannot be evaporated without the loſs of a conſiderable part, on account of its volatility: but, by a long evaporation, it affords needle-formed cryſtals, of a hot and penetrating taſte, and attracting moiſture from the air. Lime, fixed alkalis, mere heat or fire, and the acids, decompoſe this ſalt. The ſulphate of pot-aſh, ſprinkled with the acetic acid, forms the *Salt of Vinegar.*

PART V.

OF ANIMAL SUBSTANCES.

IT is highly neceſſary to examine ſeveral different ſubſtances belonging the animal kingdom, as chemiſtry has diſcovered proceſſes for extracting from theſe bodies a variety of products equally uſeful in the arts and in pharmacy.

Sect. I. *Of Milk.*

When milk is expoſed to the air, it is decompoſed in a longer or ſhorter time according to the degree of heat of the atmoſphere. But if the temperature of the atmoſphere be hot, and the milk in large quantity, it may paſs to the ſpirituous fermentation.

It has been obſerved that milk deprived of its cream cannot produce ardent ſpirit, either with a ferment or without; that milk agitated in a cloſe veſſel affords ardent ſpirit; and that fermented milk loſes its ſpirituous principle by heat, and paſſes to the ſtate of vinegar.

Lactic Acid.—By the heat of ſummer milk becomes ſour, and in three or four days the acid has acquired its full ſtrength. If the whey be then filtered, and evaporated to half, the cheeſy part is depoſited. And if it be again filtered, and a ſmall quantity of the tartareous acid be added, a quantity of ſmall cryſtals of tartar are ſeen to be formed in the courſe of an hour afterwards, which, according to Scheele, cannot ariſe from the ſmall quantity of muriate of pot-aſh in milk, but from an eſſential ſalt which milk always contains. In order to ſeparate the various principles contained in ſour whey, the following proceſs may be uſed, which was pointed out by the celebrated Scheele: Evaporate the ſour milk to one eighth. All the acid ſeparates, and remains on the filter. Pour lime water on the reſidue; an earth is precipitated, and the lime combines with the acid. The lime may be diſplaced by the oxalic acid, which forms with it an inſoluble oxalite, which falls down, and the acid of milk remains diſengaged. The fluid is then to be evaporated to the conſiſtence of honey, and upon this very pure alcohol is to be poured. The ſugar of milk, and all the other principles, are inſoluble, except the acid. The maſs being then filtered, the acid of milk may be ſeparated from its ſolvent by diſtillation. This is the *Lactic Acid*, and it poſſeſſes the following properties: 1. When ſaturated with pot-aſh, it affords a deliqueſcent ſalt, ſoluble in alcohol. 2. With ſoda, a ſalt not cryſtallizable, and ſoluble in alcohol. 3. With ammoniac, a deliqueſcent ſalt, which ſuffers moſt of its alkali to eſcape before the heat has deſtroyed the acid. 4. Barytes, lime, and alumine, form with it ſalts which are deliqueſcent. 5. Magneſia affords ſmall cryſtals, which are reſolved into liquor. 6. Biſmuth, cobalt, antimony, tin, mercury, ſilver, and gold, are not attacked by it either hot or cold. But it diſſolves iron and zinc, and produces hydrogenous gas. The ſolution of iron is brown, and does not afford cryſtals: that of zinc cryſtallizes. 8. With copper it aſſumes a blue colour, which changes to green, and afterwards to an obſcure brown, without cryſtallizing. 9. When kept in digeſtion upon lead for ſeveral days, it diſſolves it; but the ſolution does not afford cryſtals. A light ſediment of a white colour is formed, which Scheele conſiders as a ſulphate of lead.

It is now pretty well known that whey which is not ſour contains a ſaline ſubſtance, to which the name of *Sugar of Milk* has been given. The proceſs by which this ſaline ſubſtance is produced has been deſcribed by Valgamoz and Lichtenſtein, and is this: The milk is deprived of its cream in the uſual manner, and of its curd by rennet. It is then concentrated by evaporation till it has acquired the conſiſtence of honey, after which it is put into moulds, and dried in the ſun. This is called *Sugar of Milk in Cakes.* Theſe cakes are diſſolved in water, clarified with white of egg, evaporated to the conſiſtence of ſyrup, and ſet to cryſtallize in a cool place. White cryſtals in the form of rhomboidal parallelopipedons are ſoon produced. Sugar of milk has a ſlightly ſaccharine taſte, inſipid, and as it were earthy. It is ſoluble in three or four parts of hot water. From one pound of this ſalt when burned Mr. Rouelle obtained from twenty-four to thirty grains of aſhes. Three-fourths conſiſted of muriate of pot-aſh, and the reſt was carbonate of pot-aſh. Mr. Chaptal obtained the oxalic acid by treating the ſugars of milk with the nitric acid. Mr. Scheele alſo procured five drachms of acid of ſugar in long cryſtals, by diſtilling nitrous acid from twelve ounces of ſugar of milk, and ſeven drachms and a half of the peculiar *Acid of Sugar of Milk* in a white powder. The properties of this laſt, according to him, are the following: 1. It is combuſtible like oil in a red-hot crucible, without leaving any mark of aſhes behind. 2. Sixty parts of boiling water, or eighty of cold water, are required to diſſolve it. 3. Its taſte is ſouriſh, it reddens tincture of litmus, and effervesces with chalk. 4. By deſtructive diſtillation it melts, grows black, froths very much; a brown ſalt, ſmelling like a mixture of flowers of benzoin and acid of amber, ſublimes; a brown liquid, without any appearance of oil, comes over into the receiver, and is found to contain ſome of the ſame kind of ſalt as was ſublimed. The ſublimed ſalt is acid, eaſily ſoluble in alcohol, but more difficultly in water, and burns in the fire with a flame. 5. With all the ſoluble earths it forms ſalts inſoluble in water. 6. With vegetable alkali it forms a perfectly neutral cryſtallizable ſalt, ſoluble in eight times its weight of boiling water, and ſeparable for the moſt part by cooling. 7. With mineral alkali it forms a ſalt which requires only five parts of boiling water for its ſolution. 8. With ammoniac it forms a ſalt which, after being gently dried, has a ſouriſh taſte. 9. It does not perceptibly act on the metals; but forms, with their oxides, ſalts of very difficult ſolubility, which therefore fall down. The ſame chemiſt has alſo obſerved, that if ſix ſpoonfuls of good alcohol be mixed with three pints of milk, and the mixture be expoſed to heat in cloſe veſſels, with the precaution of giving, from time to time, a ſlight vent to the gas of the fermentation, the milk is found, in the courſe of a month, to be changed into good acetous acid. He alſo remarks, that if a bottle be filled with freſh milk, and inverted beneath the ſurface of the ſame fluid in an open veſſel, and this be ſubjected to a degree of heat a little exceeding that of ſummer, at the end of twenty-four hours the milk is found to be coagulated; the gas which is developed diſplaces the milk, a proof that the vinous fermentation has taken place.

Sect. II. *Of Fat.*

This is a condenſed inflammable ſubſtance contained in the cellular membrane, which differs in its appearance very much according to the animal from which it is taken: its colour is uſually white, but ſometimes yellow; its taſte inſipid; and its conſiſtence more or leſs firm. It has a great analogy with oils. Like them, it is not miſcible with water; but it forms ſoaps with alkalis; and burns in the open air, by the contact of an ignited ſubſtance, at a ſufficient heat. Neumann treated the fat of the gooſe, the hog, the ſheep, and the ox, in a glaſs retort by a graduated fire; and he obtained phlegm, an empyreumatic and browniſh oil, and a brilliant coal. He concludes from this analyſis that there is little difference between fats; and that that of the ox appears only to contain a little more earthy matter. This very imperfect analyſis however throws no light on the nature of fat. We are indebted for experiments

of a much more interesting nature to Segner and Crell, the chief of which we shall detail. 1. Beef-suet distilled on the water-bath, in a glass retort, affords oil and phlegm; it forms soaps with pot-ash: the reddish phlegm has an acid taste; effervesces with alkali, without reddening the syrup of violets, which assumes a brown colour by this mixture. 2. The marrow of beef affords the same products, excepting that a substance first passes over of the consistence of butter. The phlegm has no smell when cold. Fixed alkali occasions a weak effervescence.

Sebacic Acid.—The latter of the above chemists has instructed us in the manner of obtaining a peculiar acid from this substance, which is at present distinguished by the name of the *Sebacic Acid.* At first he attempted to concentrate this acid by distilling off the phlegm; but this did not succeed, for the receiver was as acid as that in the retort. He then saturated all the acid with pot-ash, and obtained a brownish salt by evaporation, which he fused in a crucible, to burn the oil with which it was contaminated. This salt, by solution and evaporation, afforded a foliated salt. He poured four ounces of sulphuric acid upon ten ounces of the salt, and distilled by a very gentle fire. The sebacic acid passed over in the form of a greyish vapour; and half an ounce, very fuming and acrid, was found in the receiver. It has been observed by Crell, that, in order to succeed in this operation, the salt must be kept a long time in fusion, without which the acid would be mixed with oil, which weakens its virtue. He also obtained the pure acid by the distillation of fat in a copper alembic; but the fire necessary for this purpose alters the vessel, causes the tin to run off, and the acid itself becomes impregnated with copper. It is a fact which has long been known, that the alkalis form a kind of soap with animal fat. Mr. Crell, by treating this substance with a solution of alum, separated the oil, and obtained the sebate of pot-ash by evaporation: the sulphuric acid afterwards distilled from this salt decompose it; and by this means the sebacic acid is separated. Suet was melted by Mr. de Morveau in an iron pot, to which he added pulverized quicklime, taking care to stir it continually at the commencement; at the end of the operation, a considerable heat was applied, and care was taken to raise the vessels, in order to avoid exposure to the vapours. When the whole was cold, it was found that the suet had no longer the same solidity. This was boiled in a large quantity of water; and the lixivium, after filtration, afforded a brown acrid salt, which is the sebate of lime. This salt is soluble in water, but would require too much time to purify it by repeated crystallizations. This purpose is more easily answered by exposing it to a degree of heat capable of burning the oil; after which, a single solution is sufficient to purify it. It leaves its oil upon the filter in the state of coal; and nothing more is then necessary than to evaporate it. The solution usually contains a small quantity of quicklime, which may be precipitated by the carbonic acid. This salt, treated in the same manner as the sebate of pot-ash, affords the sebacic acid. This acid exists ready formed in suet, and Mr. Crell procured from two pounds, somewhat more than seven ounces. It also exists ready formed in the fat, since earths and alkalis disengage it.

It seems to have the greatest affinity with the muriatic acid, as it forms with pot-ash a salt which melts in the fire without being decomposed: it acts powerfully on gold when mixed with the nitric acid; it precipitates silver from the nitrate of silver; it forms a sublimate with mercury, and the solution of this sublimate is not rendered turbid by the muriate of soda. But though this acid approaches the muriatic in several respects, it differs from it in others; and Mr. de Morveau has observed, that as it decomposes corrosive muriate of mercury, that property alone is sufficient to distinguish it from the muriatic acid. With soda, it forms crystals in needles, and a crystallized salt with lime. It also decomposes common salt. Mr. Crell obtained the acid of fat by distillation from the butter of cacao. It may likewise be procured from spermaceti.

This acid has been found to possess the following properties: It reddens blue vegetable colours; assumes a yellow colour by fire, and leaves a residue, which announces a partial decomposition. Mr. Crell, from this circumstance, considers it as occupying the middle space between the vegetable acids which are destroyed by fire, and the mineral which receive no alteration by it; and the existence of it in the butter of cacao, and in fats, is favourable to the opinion of Mr. Crell.

It is found to attack the carbonates of lime and alkali with effervescence, and it forms with them salts which Bergman finds to be very similar to the acetites with the same basis. This acid, as Mr. de Morveau has observed, seems to have some action upon glass. Mr. Crell having digested it several times upon gold, always obtained a precipitate of white earth, which was not lime, but which he presumes to have been carried up in the distillation, and to have arisen from the retort itself. It does not perceptibly act on gold; but attacks the oxide, and forms a crystallizable salt, as it does likewise with the precipitates of platina. It unites with mercury and with silver; yielding the latter to the muriatic acid, but not the former: it takes both from the sulphuric acid, lead from the nitric and acetous acids, and tin from the nitro-muriatic acid. But it does not attack either bismuth, cobalt, or nickel; nor does it decompose the sulphates of copper, iron, or zinc; nor the nitrates of arsenic, manganese or zinc, but it reduces the oxide of the arsenic by distillation. Mr. Crell has even formed a sebacic ether.

It appears from this analysis, that fat is a kind of oil or butter rendered concrete by means of an acid.

Sect. III. *Of Urine.*

Urine was formerly considered as an alkaline fluid; but it has lately been proved to contain an excess of acid; and from the experiments of M Berthollet it appears, that this acid is of the nature of the phosphoric acid. Mr. Scheele, however, supposes that the acid of urine is not altogether phosphoric acid, but partly the same with the acid of the calculus of the human bladder. This acid being susceptible of concretion and crystallization, forms, according to that celebrated chemist, the red crystals that are deposited in urine, as well as the brick-coloured precipitate observable in the urine of feverish persons.

The analysis of urine by distillation has been accurately made by different chemists. If fresh urine be distilled on the water-bath, a large quantity of phlegm is obtained, which putrefies with the greatest facility, and affords ammoniac by its putrefaction, though it does not itself contain that substance. At the same time a substance is precipitated of an earthy appearance, but which in reality is a true phosphate of urine. It is this same salt which forms the sediment of urine, which is observed by exposing it to cold during the winter, even though the urine be of a person in perfect health. When the urine has, by a sufficient evaporation, acquired the consistence of syrup, it need only be exposed, in a cool place, to obtain crystals, in which, analysis has proved, the existence of the phosphates of soda and of ammoniac. This precipitate of crystals has been distinguished by the name of *fusible salt, native salt,* and *microcosmic salt.* Urine may be deprived of all saline matter by repeated solutions, filtrations, and evaporations; the matter which adheres to these crystals, and of which they may be cleared by these operations, is soluble, partly in alcohol, and partly in water. The saponaceous substance, or that which is soluble in alcohol, is capable of crystallization, dries difficultly, and affords by distillation a small quantity of oil, of carbonate of ammoniac, of muriate of ammoniac, and the residue converts syrup of violets to a green. The extractive principle is easily dried, and exhibits the same phenomena in distillation as animal substances. The

phenomena exhibited by the ſpontaneous decompoſition of urine, are very intereſting. If the urine be left to itſelf it ſoon loſes its ſmell, which is ſucceeded by a ſmell of ammoniac, which is alſo diſſipated in its turn. The colour becomes browniſh, and the ſmell fetid and nauſeous. Mr. Rouelle has obſerved that crude urine preſents very different phenomena; and that it becomes covered with mouldineſs, like the expreſſed juices of vegetables. Putrefied urine has much leſs acid in the diſengaged ſtate than when it is freſh. It has been found that the fixed alkalis and lime diſengage much ammoniac from urine, by decompoſing the phoſphate of ammoniac; and that the acids deſtroy the ſmell of urine by combining with ammoniac, which is the principal vehicle of that ſmell. Urine may therefore be conſidered in its natural ſtate, as water holding in ſolution matters purely extractive, and phoſphoric or muriatic ſalts. Theſe phoſphoric ſalts have lime, ammoniac, or ſoda, for their baſis: it may be proper to take notice of each of them. That which is called fuſible ſalt, is nothing but a mixture of all the ſalts contained in urine, clogged with the extractive principle. All the ancient chemiſts adviſed evaporation, and repeated filtration, to clear them from this animal extract: but ſome modern chemiſts, particularly Rouelle and the Duke de Chaulnes in France, have remarked that a great part of the ſalt is diſengaged and diſſipated by theſe operations even ſo much as three-fourths of it. To avoid a great part of this loſs, the latter chemiſt has recommended ſolution, filtration, and cooling in well-cloſed veſſels. Two ſtrata of ſalt are then obtained; the upper of which appears to have the form of ſquare tables, in which tetrahedral priſms flattened with dihedral ſummits have been obſerved by Mr. Rouelle. This is the phoſphate of ſoda: and beneath this lies another ſalt cryſtallized in regular tetrahedral priſms, which is the phoſphate of ammoniac.

The phoſphate of ammoniac commonly exhibits the form of a very compreſſed tetrahedral rhomboidal priſm: but this form varies much; and the mixtures of the phoſphate or muriate of ſoda cauſe an infinity of modifications in it. The taſte of this ſalt is firſt cool, afterwards urinous, bitter, and pungent. It ſwells up upon the coals, emits a ſtrong ſmell of ammoniac, and melts by the blow pipe into a very fixed and fuſible glaſs. It is ſoluble in water. Five parts of cold water, at fifty-five degrees of Fahrenheit, diſſolved only one of this ſalt; but at the temperature of one hundred and ſixty-ſeven degrees this ſalt is decompoſed, and a portion of its acid is volatilized. It ſerves as a flux to all the earths; but in this caſe its alkali is diſengaged, and the phoſphoric acid unites with the earth, as Mr. Chaptal has found by actual experiment. Bergman has alſo propoſed it as a flux. The fixed alkalis, and even lime-water, diſengage the ammoniac. If this ſalt be heated with charcoal, it affords phoſphorus.

The phoſphate of ſoda was made known in 1740 by Haupt, under the name of *ſal admirabile perlatum*. Hellot before him, and Pott ſeventeen years after him, took it for ſelenite. Margraff gave an accurate deſcription of it in 1745; and Rouelle the younger deſcribed it fully in 1776, under the name of fuſible ſalt with baſe of *natron*. All agree that it differs from the preceding in not affording phoſphorus with charcoal. According to Rouelle, its cryſtals are flattened irregular tetrahedral priſms, with dihedral ſummits. The four ſides of the priſm are two irregular alternate pentagons, and two long rhombi truncated ſlopewiſe. When expoſed to heat it fuſes, and affords a glaſs which becomes opake by cooling. It is ſoluble in diſtilled water, and the ſolution turns ſyrup of violets green; it does not afford phoſphorus with charcoal.

Lime diſengages the ſoda, and it may even be obtained in a cauſtic ſtate, if the precipitation be effected by lime-water. The mineral acids, or even diſtilled vinegar, decompoſe it by ſeizing its alkali. Mr. Prouſt, however, was of opinion, that the baſe to which the ſoda adhered was not the phoſphoric acid, but a very ſingular ſalt, whoſe properties greatly reſembled thoſe of the acid of borax. He found this ſalt in the mother water, after having decompoſed the phoſphate of ſoda by the acetous acid, and obtained the acetite of ſoda by cryſtallization; and he obtained the ſame ſalt by diſſolving and evaporating the reſidue of the diſtillation of phoſphorus. One ounce of phoſphoric glaſs contains five or ſix drachms. This ſalt was characterized by theſe properties: it cryſtallizes in parallelograms; its taſte is alkaline, and it turns ſyrup of violets green; it ſwells up in the fire, reddens, and melts; it effloreſces in the air. This however does not take place when the phoſphoric acid has not been ſufficiently decompoſed by the diſtillation to leave the alkali diſengaged, as has been obſerved by Mr. Chaptal. Boiling water diſſolves ſix drachms of this ſalt in every ounce. This ſubſtance aſſiſts the vitrification of earths, and forms a perfect glaſs with ſilex. It decompoſes nitre and marine ſalt, and ſeparates their acids; but it is inſoluble in alcohol. Mr. Klaproth however, in his analyſis of the fuſible ſalt, has ſhewn that the pearly ſalt, or ſalt of Prouſt, is merely the phoſphate of ſoda. In order to prove this, nothing more is neceſſary than to diſſolve this ſalt in water, and to add a ſolution of nitrate of lime. The nitric acid ſeizes the ſoda, and the phoſphoric acid is precipitated with the lime. The phoſphoric acid may afterwards be ſeparated by means of the ſulphuric acid. If the phoſphoric acid obtained by the ſlow combuſtion of phoſphorus be ſaturated with ſoda ſomewhat in exceſs, the fuſible ſalt is formed; if this exceſs be taken up by vinegar, or if more phoſphoric acid be added, the ſubſtance deſcribed by Prouſt is formed. The phoſphate of ſoda is not decompoſable by charcoal; and it is at preſent clearly ſeen why the fuſible ſalt affords but little phoſphorus; and why Kunckel, Margraff, and others, recommended a mixture of the muriate of lead: for by this means the phoſphate of lead was formed, which permits the decompoſition of the phoſphoric acid, and affords phoſphorus.

Sect. IV. *Of the Human Calculus.*

Although many opinions had been advanced concerning the nature of the *Calculus* of the bladder, it was not until the experiments of Scheele threw light upon the ſubject, that any ſatisfactory idea was entertained of its peculiar properties. It has been found that the human calculus is partly ſoluble in boiling water; and that the lixivium reddens the tincture of turnſole; but that, by cooling, it depoſits moſt of what it had diſſolved. The cryſtals which are ſeparated in this way form a peculiar concrete acid. The above chemiſt has obſerved—1. That the ſulphuric acid does not diſſolve the calculus unleſs aſſiſted by heat, and that it is then converted into the ſtate of ſulphureous acid. 2. That the muriatic acid has no action upon it. 3. That the nitric acid diſſolves it with efferveſcence, and diſengages nitrous gas and carbonic acid. This ſolution is red; it contains a diſengaged acid, and tinges the ſkin of a red colour. This ſolution is not precipitated by the muriate of barytes, nor rendered turbid by the oxalic acid. 4. That the calculus was not attacked by the carbonate of pot-aſh; but that the cauſtic alkali diſſolved it, as well as the volatile alkali. 5. That one thouſand grains of lime-water diſſolved 5.37 by mere digeſtion, and that it was again precipitated by acids. That all urine, even that of infants, held a ſmall quantity of the matter of calculus in ſolution. This may probably be the cauſe that, when this matter finds a nucleus in the bladder, it more eaſily incruſts it. 7. That the brick-coloured depoſition from the urine in fevers, is of the nature of the calculi. The calculus of the bladder has alſo been found, on being expoſed to the effects of heat, to contain a ſmall quantity of ammoniac; and the coaly reſidue of the combuſtion indicated an animal ſubſtance of the nature of jelly. The celebrated Scheele did not find it to contain a particle of calcareous earth; but Bergman precipitated a

true fulphate of lime, by pouring the fulphuric acid into the nitrous folution of the calculus. He however admits that the lime is very fmall in quantity, as it rarely exceeds the two-hundredth part of the entire weight. The fame chemift has detected a white fpongy fubftance, not foluble in water, nor attacked by fpirit of wine, or acids, or alkalis; which at laft affords a coal of difficult incineration, and which the nitric acid does not diffolve, even in the ftate of afhes; but this matter exifts in fo fmall a quantity, that he could not procure enough to examine it. The human calculus is not therefore from thefe experiments analogous to bones in its nature; neither is it a phofphate of lime, as has been pretended. Mr. Chaptal however obferves that, after having decompofed many calculi by the cauftic alkali, he has precipitated lime, and formed phofphates of pot-afh.

The following is the analyfis which Dr. Higgins has given of human calculus: Having taken 840 grains of dry, well powdered calculus from a ftone of a laminated ftructure, and which had a fmall nucleus, which was alfo laminated; he put it into a retort, and by the application of heat an elaftic fluid was firft flowly extricated; which, on examination, appeared to be compofed of equal parts of carbonic acid gas, and azotic gas. The laft portions came over very faft, and were attended with an urinous fmell; and, by continuing the diftillation, it became evident that carbonic acid gas, and ammoniacal gas, came over together without forming any union, which the author is at a lofs to account for, unlefs they were prevented by the fmall quantity of hydrogene gas or inflammable air which came over along with them. From the beginning of the 10th meafure, a black, charry, and greafy matter began to line the conical tube and air-veffel adapted to the retort; and as the procefs went on, the proportion of ammoniacal gas decreafed, whilft that of the inflammable air was augmented, until towards the end, when the laft nine meafures were all inflammable: after which no more would come over, though the retort was urged with a white heat. On breaking the diftilling veffel, a black powder weighing 95 grains was found in it. On digefting this for an hour in ten ounces of diftilled water, and then filtering and evaporating it to two ounces, a yellowifh powder was precipitated, but no cryftals were formed after ftanding a whole night. This powder was then feparated by filtration, and the liquor evaporated to one ounce; during which time more powder was precipitated. It was then filtered a fecond time, and the liquor evaporated to half an ounce; when it began to depofit a white powder, and to emit a fub-acid aftringent vapour, not unlike that of fulphuric acid. This white precipitate, when wafhed and dried, amounted only to one grain, had a fhining appearance, and felt very foft, not unlike *mica* in powder. It was not changed, but rather looked whiter, by expofing it to a fierce heat for ten minutes. It diffolved in diftilled water without being precipitated by cauftic volatile alkali. Mineral alkali, acid of fugar, and nitrated terra ponderofa, rendered the folution turbid; whence the author inferred, that the powder in queftion was felenite. After the feparation of this powder, the remaining folution was evaporated to drynefs with a gentle heat. During the evaporation it continued to emit fub-acid vapours, leaving eleven grains of a powder of a dirty yellow colour, having an aluminous tafte. To this powder he added as much diftilled water as was nearly fufficient to diffolve it; after which it was fet by for three weeks. At the expiration of this term feveral fmall, tranfparent, and cubical cryftals appeared on the fide of the veffel above the furface of the folution; and thefe likewife had an aluminous tafte. The whole was then diffolved in diftilled water, and the folution filtered. The oxalic acid produced no change in the liquor for at leaft five minutes, but an immediate cloudinefs took place on a mixture with ammoniac or volatile alkali; and on filtering the liquor it was again rendered turbid by mineral alkali, though the cauftic alkali already predominated. Nitrated terra ponderofa threw down a copious precipitate, and Pruffian alkali difcovered a fmall quantity of iron. This aluminous folution left a yellow fubftance on the filter; which, when collected and dried, weighed only half a grain: it diffolved without effervefcence in nitrous acid; acid of fugar caufed no precipitation, but cauftic volatile alkali threw down a precipitate which diffolved in diftilled water. This folution was rendered turbid by the oxalic acid, and muriated terra ponderofa, but no effect was produced by cauftic volatile alkali or lime-water. The yellow powder firft depofited by the folution weighed two grains and a half, and by expofure to a ftrong heat acquired a deep orange-colour. On digeftion with diftilled water, the infoluble part was reduced to three-fourths of a grain, and appeared to be iron; while the foluble part was found to be nothing elfe but gypfum. The author, however, is of opinion, that this iron is impregnated with a fmall portion of fulphuric acid, though not in fuch quantity as to render it foluble. The charred matter remaining in the retort was reduced by lixiviation with water to 80 grains. Thefe were calcined with a red heat in an open fire, but could not be reduced to a grey powder in lefs than three quarters of an hour. When thoroughly calcined and cold, it weighed only 21 grains, which communicated to hot diftilled water a limy tafte, and gave it the property of turning fyrup of violets green. The fulphurous acid had no effect upon it, but it was rendered turbid by aërated volatile alkali and the oxalic acid. The remainder when well dried weighed 16 grains, which diffolved in nitric acid at firft with a little effervefcence; and when this ceafed, the folution went on very flowly, until the whole was taken up. The oxalic acid made no change in the liquid, but the whole was precipitated by cauftic volatile alkali. Pruffian alkali threw down a grain, or perhaps more, of blue fubftance; the precipitate digefted with diftilled vinegar loft a grain and an half, which was thrown down by cauftic volatile alkali. The infoluble part being wafhed and digefted in diftilled water for half an hour, was partly diffolved; the folution was not affected by cauftic volatile alkali, but the oxalic acid and nitrated terra ponderofa caufed an immediate cloudinefs. Seven grains and an half of the powder, which was infoluble both in acetous acid and diftilled water, were readily taken up by the fulphurous acid, and precipitated by cauftic volatile alkali: the 16 grains laft treated, therefore, appeared to contain, of clay $7\frac{1}{2}$ grains; of felenite, fix grains; magnefia, one and a half; and of iron, one grain. The proportions of the different ingredients in the whole calculus are, therefore, from thefe trials; of iron, $2\frac{1}{2}$; of fulphate of lime, 11; of clay, $7\frac{1}{2}$; of fulphate of alumine, 8; of pure calcareous earth, 5; of carbonate of magnefia, 1; and of charry combuftible fubftance, 59. It muft alfo be obferved, that in this experiment, a darkifh yellow fublimate adhered to the neck of the retort; the inner part next the retort more compact, but the reft of a lamellar fpongy texture. This fublimate, when carefully collected, was found to weigh 425 grains, and readily diffolved in eight ounces of hot diftilled water.

From the analyfis of both Scheele and Bergman, and which has been repeated by other chemifts, it appears that the human calculus is of a different nature from the earth of bones. Mr. Tennant has, however, found in the bladder, ftones which loft only two-thirds by calcination, and whofe refidue melted into an opaque glafs by cooling. Thefe muft therefore have contained a pretty confiderable quantity of calcareous phofphate.

Lithic Acid.—The trials of thefe chemifts fhew that the properties which this acid poffeffes are, 1. That of being concrete and cryftalline. 2. That of being infoluble in water, but more foluble in hot than in cold water. 3. That of being foluble in nitric acid, from which it abforbs oxigene, and forming, after

this folution, a deliquefcent red mafs, which communicates a colour to many bodies. 4. That of combining with earths and metallic oxides; and forming with them peculiar neutral falts, which are called *lithiates*. 5. The property of preferring, in its attractions, alkalis to earths. 6. That of yielding thefe bafes to the weaker of the other acids, even to the carbonic acid, which renders the calculus infoluble by alkaline carbonates; this laft property is peculiar to this acid. But Mr. de Morveau has very well obferved, that much remains to be done before we can obtain a fufficient knowledge of this acid.

Sect. V. *Of Phofphorus.*

This is one of the moft aftonifhing products of chemiftry; and it is pretended that traces of the knowledge of this fubftance exift in the writings of the earlieft chemifts: but the moft pofitive information we poffefs on this fubject is found in the hiftory given by Leibnitz, who beftows the invention on Brandt, a chemift of Hamburg; but Mr. Boyle feems evidently to have a claim to the difcovery, fince he communicated the procefs for making phofphorus to the Royal Society as a difcovery of his own, and it is entered as fuch in the tranfactions of that fociety.

But however this may be, Kunckel, who had affociated himfelf with Kraft, in order to purchafe the fecret from Brandt, having been deceived by Kraft, who kept the fecret to himfelf, knowing that urine was made ufe of, fet to work, and difcovered a procefs for making the fubftance; and it is this which has led chemifts to call it by the name of Kunckel's Phofphorus. Though the procefs was rendered public, Kunckel, and a German called Godefred Hanckwitz, who feems to have been inftructed by Boyle, were the only perfons who prepared phofphorus for a long time. Margraff, however, in the year 1743, publifhed a new and more eafy method, which was generally followed until Scheele and Gahn fhewed that it might be obtained from bones. The procefs of Margraff confifts in mixing the muriate of lead, which remains after the diftillation of four pounds of minium and two of fal ammoniac, with ten pounds of the extract of urine of the confiftence of honey. Half a pound of charcoal in powder is added; the mixture is dried in an iron pot until it be reduced to a black powder. This powder is to be put into a retort; and the volatile alkali, the fetid oil, and the fal ammoniac, diftilled off. The refidue contains the phofphorus. It is affayed by throwing a fmall quantity on hot coals: if it emit a fmell of garlic, and a phofphoric flame, it is to be put into a good earthen retort, and diftilled. Much more phofphorus is obtained by this than by the old procefs; and this depends on the addition of the muriate of lead by Margraff, which decompofes the phofphate of foda, forming a phofphate of lead, which affords phofphorus; whereas the phofphate of foda is not decompofable by charcoal. This chemift has likewife proved that it is the fufible falt of urine which affords the phofphorus. Mr. Gahn in the year 1769 fhewed that the earth of calcined bones confifted of lime united with the acid of urine; but Scheele was the firft to prove that by decompofing this falt of bones by the nitric and fulphuric acids, evaporating the refidue in which the phofphoric acid exifts in a difengaged ftate, and diftilling the extract with powder of charcoal, phofphorus might be obtained. Additions and improvements have been fucceffively made in this procefs, by different chemifts.

Mr. Chaptal has propofed the following procefs as one which has fucceeded very well: The hardeft bones are felected and burned. By this combuftion the external part becomes white, while the internal part is blackifh. Thefe burned bones muft then be pulverized, and put into a tureen, or in a round hooped wooden veffel. Half their weight of *oil of vitriol* is then to be poured on, and conftantly ftirred. During the agitation a confiderable heat is excited. The mixture muft be left in digeftion for two or three days; after which, water muft be gradually added, and ftirred. He digefts this laft mixture upon the fire, in order to increafe the folvent power of the water. The water of the lixivium is then to be evaporated in veffels of ftone ware, filver, or copper. Mr. Pelletier recommends this laft metal; becaufe, according to him, the phofphoric acid does not attack copper. The evaporation muft be carried to drynefs; more boiling water muft be poured on the refidue; and this wafhing muft be continued until the matter be exhaufted, which may be known by the water being no longer tinged yellow. All thefe waters are to be evaporated, when they afford an extract. In order to feparate the fulphate of lime, the extract muft be diffolved in the leaft poffible quantity of water, then filtered, and the falt remains on the filter. This extract may be mixed with powder of charcoal, and diftilled: but the above chemift prefers converting it into animal glafs; for which purpofe he puts the extract into a large crucible, and urges the fire. It fwells up at firft, but at laft fettles; and at that inftant the glafs is made. This glafs is white, of a milky colour.

Mr. Chaptal once obferved, that the phofphoric glafs he had juft made, emitted very ftrong electric fparks, which flew to the hand at the diftance of two inches. This glafs loft that property in two or three days, though preferved in a capfule of common glafs. It fometimes happens that this glafs is deliquefcent, but it is then acid; and this circumftance arifes from too large a quantity of fulphuric acid, or from this acid not having been faturated by a digeftion of fufficient continuance. The fame chemift has likewife obtained glafs of the colour of turquoife, when he performed the evaporation in copper veffels. This glafs may be deprived of the bubbles it ufually contains, by keeping it for a time in a violent heat; it is then tranfparent, and may be cut like a diamond. According to Crell, its fpecific gravity is to that of water as three to one, while that of diamond is as three and a half to one. This glafs is infoluble in water, &c. Mr. Chaptal pulverizes this glafs, mixes it with equal parts of powder of charcoal, and puts it into a porcelain retort well coated, the beak of which is partly plunged into the water of the receiver, fo that nothing can efcape but air or phofphoric gas. He adapts a large tube to the tubulure of the receiver, and plunges it into a veffel filled with water. The fire being raifed by degrees, the phofphorus comes over the moment the mixture is ignited. The phofphorus fublimes, partly in the form of a fume which congeals; and is precipitated upon the furface of the water, partly in the form of inflammable gas, and partly refembling melted wax, which drops in beautiful tranfparent tears from the neck of the retort. The theory of this operation is eafily explained. The phofphoric acid is difplaced by the fulphuric acid, as is fhown by the large quantity of fulphate of lime which is obtained. All the other operations tend only to concentrate this phofphoric acid, which is ftill combined with other animal fubftances, and the diftillation with charcoal decompofes the phofphoric acid; its oxigene unites with the coal, and affords carbonic acid, while the phofphorus itfelf becomes difengaged. With a view to purify the phofphorus, a piece of chamois leather is moiftened, and the mafs of phofphorus is put into it. This being immerfed in a veffel of boiling water, the phofphorus melts, and is paffed through the fkin like mercury. The fkin cannot be ufed more than once; the phofphorus, which might be paffed a fecond time, would become coloured. This procefs was invented by Mr. Pelletier.

But in order to form phofphorus into fticks, a funnel with a long neck may be ufed, the lower orifice being clofed with a fmall cork, or piece of foft wood. The funnel is then to be filled with water, and phofphorus put into it; and this being plunged into boiling water, the heat is communicated to that

of the funnel; and melts the phoſphorus, which runs into the neck, and takes that form. The funnel is then removed into a veſſel of cold water; and when the phoſphorus is perfectly cooled, the cork is taken out, and the phoſphorus thruſt out of its mould with a ſmall piece of wood.

Phoſphorus is generally kept under water. After a certain time it loſes its tranſparency, becomes covered with a white powder, and the water is acidulated. This ſlow acidification of the phoſphorus ſeems, however, to be reverſed by the ſun's light. Sticks of phoſphorus, which had become covered with a white powder, were expoſed under water to the ſun's light, which converted them to an orange yellow colour in ſuch parts as were acted upon by the direct light.

But in whatever manner phoſphorus may be made, it is always one and the ſame ſubſtance, characterized by the following properties:—It is of a fleſh colour, and evidently tranſparent. It has the conſiſtence of wax; and may be cut in pieces with a knife, or twiſted aſunder with the fingers; in which laſt caſe the precaution muſt be taken of frequently plunging it into water, to prevent its taking fire. If placed in contact with the air, it emits a white fume. It is luminous in the dark; and a ſolid ſtick of phoſphorus may be uſed to write with, like a crayon. The marks are viſible in the dark; and this means has often been uſed to create fear and aſtoniſhment in the minds of thoſe not acquainted with the nature of this ſubſtance.

The combuſtion of phoſphorus takes place at different temperatures, according to its purity; but if it be expoſed to about 86 degrees of heat of Fahrenheit's thermometer, it takes fire with decrepitation, burns with a very bright flame, and emits a very abundant white fume, which is luminous in the dark. The reſidue of the combuſtion is a red cauſtic ſubſtance, which attracts the humidity of the air, and becomes reſolved into a liquor. This is the phoſphoric acid. Mr. Wilſon affirms that the ſolar rays ſet fire to phoſphorus; and proves that this flame has the colour proper to the phoſphorus, and not that of the ray itſelf.

Phoſphorus is ſoluble in oils, more eſpecially the volatile oils, which then become luminous. If this ſolution be kept in a bottle, a phoſphoric flaſh, which emits a ſmall quantity of light, will be ſeen every time the bottle is opened. The oil of cloves is uſed in this operation. The combination of phoſphorus and oil appears to exiſt naturally in the glow-worm, and it has been obſerved that the ſhining matter of the glow-worm is liquid. If the glow-worm be cruſhed between the fingers, the phoſphoreſcence remains on the fingers. A phoſphoric gas may alſo be extracted from phoſphorus, which takes fire by the mere contact of the air. Mr. Gengembre has ſhown the method of extracting it, by digeſting alkalis upon it; and Mr. Chaptal demonſtrated at the ſame time, that it might be extracted by means of acids, which are decompoſed upon phoſphorus.

This ſubſtance is alſo found in different bodies in the three kingdoms. Mr. Gahn found the phoſphoric acid in lead. Siderite is likewiſe a phoſphorus of iron.

One of the moſt intereſting combinations of phoſphorus is that which it forms with vital air. This is always the phoſphoric acid; but the acid appears to be modified by the manner in which it is made. Phoſphorus unites with oxigene—1. By deflagration, or the rapid combuſtion. 2. By the ſlow combuſtion. 3. In the humid way, more eſpecially by the decompoſition of the nitric acid.

Phoſphoric Acid.—If phoſphorus be expoſed to a dry heat of about eighty-ſix degrees, it takes fire, emits a white denſe fume, and leaves a reddiſh reſidue, which powerfully attracts the humidity of the air, and becomes reſolved into a liquor. This combuſtion may be performed under glaſs veſſels; in which caſe white flocks are depoſited on the ſides of the glaſs, which reſolve into a liquor by the contact of moiſt air, and form the phoſphoric acid. Care is taken to introduce an additional quantity of vital air when the combuſtion of the phoſphorus has not been completed. Mr. Lavoiſier has burned phoſphorus, by the aſſiſtance of a burning glaſs, under a glaſs veſſel plunged in mercury. Margraff had obſerved that air was abſorbed in this operation, and Mr. Morveau, in the year 1772, had likewiſe declared the ſame thing from his own experiments. Fontana alſo proved that phoſphorus abſorbs and vitiates air like every other combuſtible ſubſtance. But Lavoiſier and De la Place have determined that forty-five grains of phoſphorus abſorb 65.62 of vital air. The acid obtained by this means is impure, as it always contains phoſphorus in ſolution, not ſaturated with oxigene.

But phoſphorus is moſt completely decompoſed by the ſlow combuſtion. For this purpoſe the neck of the funnel is inſerted into a bottle, and ſticks of phoſphorus are diſpoſed round in the funnel, ſo as not to touch each other; a ſmall piece of glaſs tube being put into the neck, to prevent their falling through. A paper is tied over the funnel. The phoſphorus is ſlowly decompoſed; and, as it becomes converted into a fluid, it flows into the bottle, where it forms a liquid without ſmell or colour. This acid almoſt always retains a ſmall quantity of undecompoſed phoſphorus, from which it may be cleared by digeſting alcohol upon it, which diſſolves the phoſphorus without volatilizing the acid. One ounce of phoſphorus produces in this manner three ounces of phoſphoric acid.

It is alſo found that the nitric acid may be decompoſed by digeſtion upon phoſphorus. The nitrous gas is diſſipated; and the oxigene remains united to the phoſphorus, with which it forms phoſphoric acid. When the nitric acid is very concentrated, the phoſphorus takes fire, and burns at its ſurface.

It is well known that the water in which phoſphorus is kept, contracts acidity in the courſe of time; which ſhows that the water itſelf is decompoſed, and yields its oxigene to the phoſphorus. This ſubſtance precipitates ſome metallic oxides from their ſolutions in the metallic ſtate; and it has been obſerved that acid is formed in this operation; which proves that the oxigene quits the metal to unite with the phoſphorus. The phoſphoric acid is clear, and inodorous, without being corroſive; and it may be concentrated to dryneſs. Crell having concentrated it to dryneſs, found its ſpecific gravity, compared with water, to be as 3.1. This acid is very fixed. If it be concentrated in a matraſs, the water is firſt diſſipated, a ſmell of garlic is ſoon perceived, which ariſes from a portion of phoſphorus, from which this acid is difficultly cleared: and vapours likewiſe riſe. The liquor becomes turbid, aſſumes a milky appearance, and a paſty conſiſtence; and if the matter be put into a crucible, on hot coals, it boils conſiderably. The vapour which iſſues renders the flame green; and the maſs at laſt becomes converted into a white tranſparent glaſs, inſoluble in water. The phoſphoric acid has no action on quartz; but it diſſolves clay with ebullition. It diſſolves barytes; and unites to clay with ſingular facility, with which it forms a ſalt of ſparing ſolubility. The ſolution, when well charged, lets fall, at the end of four-and-twenty hours, cryſtals in ſmall thin flattened needles, ſeveral lines long, and obliquely truncated at each end. The phoſphoric acid precipitates lime from lime-water, and forms a true phoſphate of lime, very ſimilar to the baſis of bones, and decompoſable by the mineral acids like that ſubſtance. This acid when ſaturated with pot-aſh forms a very ſoluble ſalt, which affords tetrahedral cryſtals terminating in tetrahedral pyramids. This phoſphate is acid, ſwells up on hot coals, and is difficult of fuſion. Lime-water decompoſes it. Soda, combined with the phoſphoric acid, affords a ſalt of a taſte re-

sembling that of the muriate of soda. This phosphate does not crystallize, but becomes converted into a gummy and deliquescent mass by evaporation. M. Sage asserts that the phosphate of soda prepared with the acid of the slow combustion, forms a salt susceptible of crystallization. Dr. George Pearson has combined the phosphoric acid obtained by nitric acid with soda, and obtained a neutral salt in rhomboids. This salt, though saturated, turns syrup of violets green, effloresces in the air, and has a saline taste resembling that of common salt. It purges in the dose from six to eight drachms, without producing either nausea or griping, and has not a disagreeable taste. This acid acts only on a small number of metallic substances. It however dissolves zinc, iron, and copper, readily; but none of these solutions afford crystals by evaporation, except the solution of iron, which, indeed, seems susceptible of crystallization. The others form into soft ductile masses, like extracts: when urged with fire, they emit sparks, and appear to form genuine phosphorus. The phosphoric acid likewise precipitates some solutions of metals, such as the solutions of mercury and silver by the nitric acid. The nitric and acetous solutions of lead are, in like manner, liable to be precipitated by the phosphoric acid, and by soluble phosphates. The precipitate produced by the decomposition of the latter, which is phosphate of lead, affords phosphorus, when distilled with coal.

This acid has a very evident action on oils. Mixed with an equal portion of olive oil, it acquires a fawn colour by mere agitation, which subsists even after the separation. This shade increases if the two fluids be digested together; the acid becomes thick; and the oil which floats above becomes black and coaly, and emits a strong disagreeable smell.

Phosphorous Acid.—This acid may be considered as phosphoric acid, holding in solution a little phosphorus. This acid, when rubbed, and, still more, when heated, takes a fœtid and disagreeable smell: part of it is then volatilized, in a very acrid and pungent white vapour, and becomes more volatile than phosphoric acid. But this acid never rises all in vapour, like the sulphureous acid; it always contains more or less phosphoric acid, which causes it to leave a vitreous residue, or a melted phosphoric oxide, when treated with a strong fire. It may be prepared by decomposing phosphoric acid; and in the production of phosphorus there is always a certain quantity of it disengaged. The distinctive properties of the phosphorous acid have not been yet determined.

Sect. VI. *Of the Bombic Acid.*

Mr. Chaussier has made some important experiments on the acid of the silk-worm, and has furnished two methods of extracting it. The first consists in bruising the chrysalides, and straining them through a cloth. The fluid which passes is strongly acid; but the acid is weakened by various foreign substances, of which it may be cleared by digestion in spirit of wine. The fluid which passes the filter after this digestion, is of a fine orange colour. More spirit of wine is to be poured upon it. At every addition of spirit a light whitish precipitate is formed; and the additions of spirit are to be continued until no more precipitate appears, But instead of bruising the chrysalides they may be infused in spirit of wine, which dissolves all the acid; and as this acid is less volatile than the spirit, this last may be evaporated, and the residue filtered. By these precautions the acid may be cleared of its spirit of wine, and of the mucous matter which was dissolved, but remains on the filter. These experiments would seem to prove that this acid exists in all the states of the silk-worm, even in the eggs; but that in the egg and in the worm it does not exist in a disengaged state, but combined with a gummy glutinous substance. The properties and affinities of this acid are not hitherto ascertained with any degree of precision.

Sect. VII. *Of the Formic Acid.*

This acid is so far in a disengaged state, that the transpiration of these animals, and their simple contact without any alteration, prove its existence. Mr. Fisher seems to have been the first who discovered the acid of ants, in a course of experiments for the analysis of animal substances by distillation. He even tried its action on lead and iron; and his observations were communicated to the Royal Society, and inserted in their Transactions, in the year 1670. It was, however, the celebrated Margraff who more particularly examined the properties of this acid in 1749. He combined it with many substances, and concluded that it greatly resembled the acetous acid. In 1777 this subject was resumed by Ardvidsson and Oerhn; and treated in a manner which leaves little to be desired. The ant which affords the greatest quantity of acid, is the large red ant which is found in dry and elevated places. The summer months are most favourable for the extraction of this acid: they are then so penetrated with it, that their simple passing over blue paper is sufficient to turn it red. Two methods may be used to obtain this acid, viz. distillation, and lixiviation. In order to extract the acid by distillation, the ants are first dried by a gentle heat, and put into a retort, to which a receiver is adapted, and the fire is raised by degrees. When all the acid is come over, it is found in the receiver mixed with a small quantity of empyreumatic oil, which floats upon it, and may be separated by a funnel. Ardvidsson and Oerhn obtained, in this manner, from each pound of ants seven ounces and a half of an acid whose specific gravity, at the temperature of 66 degrees of Fahrenheit's thermometer, was to that of water as 1.0075 to 10000.

But in the process by lixiviation, the ants are washed in cold water; and boiling water is afterwards poured over them, which is filtered when cold. More boiling water is poured over the residue, and likewise filtered when cold. By this means one pound of ants affords a pint of acid as strong as vinegar, and of a greater specific gravity. The chemists mentioned above are of opinion that this acid might be substituted instead of vinegar for domestic uses. The acid obtained by these processes is, however, never pure; but it may be purified by repeated distillations, which disengage the ponderous and volatile oil, and render the acid as clear as water. This acid, when rectified by this process, was found by these chemists to have a specific gravity of 1.0011 to 1. The acid of ants may likewise be obtained by placing linen cloths impregnated with alkali in an ant-hill. From these the formiate of pot-ash, of soda, and ammoniac, may be obtained by lixiviation. The formic acid has some resemblance to the acetous acid; but the identity of these two acids has not yet been proved. Mr. Thouvenel found more analogy between it and the phosphoric acid: but this stands in need of further proof. The formic acid retains water with so much force, that it cannot be entirely deprived of it by distillation. When it is exceedingly pure, its specific gravity is to that of water as 1.0453 to 1. It affects the nose and the eyes in a peculiar manner, which is not very disagreeable. Its taste is penetrating and burning when pure, but agreeable when diluted with water, It possesses all the characters of acids; and, when boiled with the sulphuric acid, it turns black as soon as the mixture is heated. White penetrating vapours arise; and, when it boils a gas is emitted, which unites difficultly with distilled water, or with lime-water, but the formic acid is decomposed in this operation, for it is obtained in less quantity. The nitric acid distilled from it, destroys it completely, and a gas arises which renders lime-water turbid, and is difficultly and sparingly soluble in water. The muriatic acid only mixes with it, but the oxigenated muriatic acid decomposes it. The two chemists we have just noticed have determined the affini-

ties of this acid with various bafes to be in the following order: barytes, pot-afh, foda, lime, magnefia, ammoniac, zinc, manganefe, iron, lead, tin, cobalt, copper, nickel, bifmuth, filver, alumine, effential oils, water.

The formic acid mixes perfectly with fpirit of wine, but it unites difficultly with the fixed oils, and with the volatile oils, by the affiftance of heat. It attacks foot; affumes a fawn colour; and lets fall a brown fediment as it cools, which by diftillation affords a liquor of a yellowifh colour, and a difagreeable fmell, accompanied with very elaftic vapours.

Explanation of the Table of Chemical Nomenclature, propofed by Meffrs. De Morveau, Lavoifier, Berthollet, and De Fourcroy, in 1787.

In forming this table the intention of thefe chemifts was not to give a nomenclature for all the chemical fubftances, but to exhibit in feveral claffes of compounds, a confiderable number of well chofen examples, fo as to enable all perfons, by the affiftance of a fimple and eafy ftudy, to apply the new method of naming to all the compofitions known in the fcience, or to fuch as may be difcovered in future. With this defign the table is divided into fix perpendicular columns, at the head of which are placed the titles indicating the ftates of the fubftances whofe names are ranged in the columns. Each column contains fifty-five fpaces placed under one another. This number is determined by the number of the known un-decompounded fubftances, whofe names are ranged through the whole length of the firft column. The horizontal correfponding fpaces of the five other columns, contain the principal combinations of thefe fimple fubftances, and confequently amount to the fame number.

Column I.

This column is marked with the Roman figure I. and entitled *Subftances not decompounded*. Thefe fubftances are only confidered as fimple, becaufe they have not yet been able to be analyfed, and becaufe all the experiments which have been lately made have fhewn that they cannot be feparated into more fimple bodies, and that they cannot be re-produced by artificial compofitions. Thefe fubftances amount, as has been obferved, to fifty-five; before the horizontal fpaces in which they are contained, the numbers in Arabic cyphers are placed, to indicate the particular place of each fubftance and the correfponding compofitions in the other columns. In this manner the horizontal lines are continued from the firft column to the fixth, and all the horizontal fpaces of each column are indicated by the fame figure. The fifty-five fimple fubftances in the firft column are divided into five claffes, according to the comparative nature of each. The firft divifion contains four fubftances, which appear to approach the neareft to the idea that has been formed of elements, and which are the chief principles in combinations; thefe are in the 1 fpace *light*; in the 2 *caloric*, which has been called the matter of heat; in the 3 *oxigene*, or that part of vital air that fixes itfelf in the bodies which burn, thereby augmenting their weight, and changing their nature, and whofe principal property is to form the acids, from which it has derived its appellation; and in the 4 *hydrogene* or the bafe of the elaftic fluid called inflammable gas, a fubftance which exifts in its ftate of folidity in ice, becaufe it is one of the principles of water. Thefe four firft fimple bodies are contained in a crotchet by themfelves.

The fecond clafs of non-decompofed fubftances of the firft column, contains twenty-fix different bodies, all of which poffefs the property of becoming acid by their uniting with oxigene; and which, on account of this common property, are expreffed by the words *Acidifiable Bafes*. Among thefe twenty-fix fubftances, there are only four which can be obtained in a fimple ftate and uncombined; fuch are in the 5 fpace *Azot Nitric Radical*, or the folid bafe of the atmofpherical *Mofet*; in the 6 pure charcoal, *Carbon* or *Carbonic Radical*; in the 7 *Sulphur* or *Sulphuric Radical*; and in the 8 *Phofphorus* or *Phofphoric Radical*. The twenty-two others are known only in their combinations with oxigene, and in their acid ftate; but to give more perfpicuity and extent to the fcience, they have in idea been feparated from the oxigene, and been fuppofed to be in that ftate of purity to which they probably may one day be reduced by art. They are all expreffed by the names of their acids with uniform terminations, which are followed by the generical term *Radical*. For example: in the 9 fpace *Muriatic Radical*, in the 10 fpace *Boracic Radical*, and fo on of the reft.

The third clafs of thefe fubftances which are not decompofed of the firft column, includes the metallic fubftances, which are to the number of 27, from the 31 fpace inclufively to the 47. All of them have names by which they have been known to the prefent time; the three firft are capable of paffing to the acid ftate; and on account of this property feem connected with the acidifiable bafes which precede them.

In the fourth clafs of the fubftances which are not decompofed are placed the earths, in the 48 fpace *Silice*, in the 49 *Alumine*, in the 50 *Barytes*, in the 51 *Lime*, and in the 52 *Magnefia*. The three new earths, viz. thofe obtained from Adamantine Spar, Jargon of Ceylon, and the Mineral from New South Wales, are not noticed, as their difcovery has been made fince the formation of this table.

The fifth clafs of fubftances, which are not decompofed, contains the three alkalis in the 53 fpace *Pot-afh*, in the 54 *Soda*, and in the 55 *Ammoniac*.

The firft column, whofe divifions we have explained, is longitudinally fplit into two parts like all the other columns: in one part containing the new names; and in the other, the ancient names, which, for the fake of greater diftinction, are printed in italic characters.

Column II.

This column has for its title, *Converted into the State of Gas by Caloric*; to this title fhould be joined that of the preceding column, and be read in this manner, *Subftances not decompounded converted into the State of Gas by Caloric*. From which it will appear that the fecond column is intended to prefent the permanent aeriform ftate which many of the fimple fubftances expreffed in the firft column are capable of undergoing; in this column there are only four elaftic fluids whofe names are derived, like all the words in the other columns, from thofe of the fubftances which are not decompofed, and become plain and confpicuous by the addition of the word *Gas* which follows the primitive words. Thus we find in the 3 fpace *Oxigene Gas* or vital air; in the 4 *Hydrogene Gas*; in the 5 *Azotic Gas*; and in the 55 *Ammoniacal Gas*, correfponding to which are placed the ancient appellations.

Column. III.

At the head of this column is written *Combined with Oxi-*

gene. The title of the first column is also here to be understood; and it is evident that *substances not decompounded*, are those which are meant. This column is one of the most crowded, because the greater number of the substances of the first column can be combined with oxigene. On looking at the order and the terms which are there exposed, it is evident that these names are each composed of two words, expressing compositions of two substances. The first of these words is the generical name of the acid, which indicates the saline property given by the oxigene; the second specifies each acid, and is almost always that of the radical indicated in the first column. The fifth space of this column presents the union of *Azot* or *Nitric Radical* with oxigene, and from the union of these two substances, according to their proportions, three well known compositions are produced; either the azot contains the smallest quantity possible of oxigene, and then forms the *Base of the Nitrous Gas*; or it is saturated with oxigene, and constitutes the *Nitric Acid*; or it contains less oxigene than the latter, but more than the nitrous gas, and forms *Nitrous Acid*. Thus it is plain that by only changing the termination of the same word the three different states of the same combination are expressed. It is absolutely the same in respect to the 7 space, *Sulphuric Acid*; the 8 *Phosphoric Acid*; and the 13 *Acetic Acid*; each of which can exist in two states of combination with oxigene, according to the quantity contained in the radical or acidifiable bases of each. When these bases are completely saturated, the *Sulphuric*, *Acetic*, and *Phosphoric* acids are the result. When these bases are not saturated, and when they are in excess of proportion to the oxigene, they are denominated *Sulphureous*, *Acetous*, and *Phosphorous* acids. Thus this method of termination serves to express the state of the acids, like the names already employed of vitriolic and sulphureous, and we thereby institute a rule which is as general as it is simple for all the other acids which are in either the one or the other of these states. After this it will not be difficult to understand the names of the 6 space *Carbonic Acid*, and the 10 *Boracic Acid*, and of all those which present only a single state where the acidifiable base is saturated with oxigene. By the same rule of denomination, it is to be understood that each acid which is placed by itself in a space, and whose name terminates in *ous*, has an excess of acidifiable matter; such are the 14 space *Tartareous Acid*, the 15 *Pyro-Tartareous Acid*, the 21 *Pyro-Ligneous Acid*, and the 22 *Pyro-Mucous Acid*. The 9 space *Muriatic Acid* is in a state very different from all the others; besides its acid combination or saturation with oxigene, it can imbibe an excess of that principle, and thereby acquire most singular properties. To distinguish it in this state it is called in the 9 space *Oxigenated Muriatic Acid*, and this first simple name whose meaning is precisely determined, can be given regularly to such other acids as may be discovered to possess the property of receiving an excess of oxigene.

The inferior spaces of this third column from the 31 inclusively to the 47, contain the nomenclature of another system of bodies. Here the word *Oxide* begins the compound denomination. It is easy to perceive that this term, without expressing the saline property like the word *Acid*, nevertheless signifies, as well as this last, a combination of oxigene; it has also the advantage of being employed for all the substances capable of uniting with oxigene, and which in that combination do not produce acids, because either the quantity of oxigene is not sufficiently abundant, or because their bases by nature are not capable of acidification. Thus, the phosphoric acid vitrified or deprived of a portion of its oxigene by the action of an intense fire, is a kind of *Phosphoric Oxide*; nitrous gas, which has no more the properties of an acid than the phosphoric gas, because it does not contain enough of oxigene, is likewise a true *Nitrous Oxide*; thus hydrogene united to oxigene does not produce an acid, but this union constitutes *Water*, which considered in this point of view may be called an *Oxide of Hydrogene*.

Among the seventeen metallic oxides contained in the spaces from the 31 to the 48, there are three which are easily changed into the acid state; and it is only for want of oxigene that the oxides of the 31 space *Arsenic*, of the 32 *Molybdena*, and of the 33 *Tungstein*, are not absolutely acid. A greater proportion of this acidifying principle produces it in the 31 space *Arsenic Acid*, in the 32 *Molybdic Acid*, and in the 33 *Tungstic Acid*. Epithets taken from the colour, and from the methods of preparation, are also used to distinguish the different oxides of the same metal, as for example in the 38 space *the Oxides of Antimony*; in the 42 *the Oxides of Lead*, and in the 44 *the Oxides of Mercury*, which afford the greatest number of examples of this diversity.

Column IV.

This column, the title of which is *Gazeous Oxigenated*, that is to say, simple substances combined at the same time with oxigene, and with a sufficient quantity of caloric to convert them into the state of permanent gases, under the pressure and in the ordinary temperature of the atmosphere, contains only six known substances in that state; such are in the 5 space *Nitrous Gas* and *Nitrous Acid Gas*, in the 6 *Carbonic Acid Gas*, in the 7 *Sulphureous Acid Gas*, in the 9 *Muriatic Acid Gas*, and *Oxigenated Muriatic Acid Gas*, and in the 11 *Fluoric Acid Gas*. As no other of these oxigenated substances to the present time could be converted into the state of gas by caloric, the greater number of the spaces of this fourth column are empty, of which circumstance advantage has been taken by placing in it several combinations of metallic oxides or oxigenated metals, with different substances. This column therefore is intersected at about half its length, and takes the new title of *Metallic Oxides with Various Bases*. The 31, 36, 37, 38, 39, 40, 41, 42, 43, 44, and 45 spaces indicate the combinations of the metallic oxides with sulphur and with the alkalis; the former bearing the epithet of *Sulphurated Oxides*, of arsenic, and of lead; the second that of *Alkaline Metallic Oxides*. When any of these combinations vary in the proportion of their component principles, and consequently in their properties, they are distinguished after the manner of simple oxides, by secondary epithets taken from their colour; thus in the 38 space *Grey*, *Red*, or *Orange Sulphurated Oxide of Antimony*, &c.

Column V.

This column, which contains simple substances *oxigenated with bases*, or the neutral salts in general, offers a greater number of names than the preceding; because it was necessary to give here a greater number of examples, to shew the advantage of this methodical nomenclature over the ancient denominations.

At the first view of the spaces of this column, it is evident that there is an uniformity in the terminations of all the names contained therein, which uniformity of termination in this nomenclature is always used to express analogical compositions. The bodies which are named in this fifth column are all compositions of three substances, of acidifiable bases, of the acidifying principle or oxigene, and of the terrestrial, alkaline, and metallic bases; but their natures are indicated by two words only, because the first, which is derived from that of the combination of oxigene, or the acid, includes the expression of that union, and the second indicates the base with which the acid is saturated. All the names of these compositions are terminated in *at*, when they contain acids completely saturated with oxigene; and their termination is in *ite*, when the acids are deprived of a certain quantity of their oxigene. On considering the spaces of this column from the fifth to the twenty-fourth, it appears that there have been inserted as many examples, in proportion as the acids to which they correspond, or whose

faline compofitions they contain, are more known and more employed. Thefe fpaces prefent fome principal varieties in the nomenclature.

1. The greater number of thefe fpaces contain denominations of falts, terminated in *at*, as in the 6 fpace *carbonats*, in the 11 *fluats*, in the 12 *fuccinats*, in the 17 *gallats*, in the 18 *citrats*, in the 19 *malats*, in the 20 *benzoats*, in the 23 *camphorats*, in the 24 *lactats*, in the 25 *faccholactats*, in the 26 *formiats*, in the 27 *pruffiats*, in the 28 *febats*, in the 29 *lithiats*, in the 30 *bombiats*, in the 31 *arfeniats*, in the 32 *molybdats*, and in the 33 *tunftats*. Thefe terminations, fimilar to one another, and peculiar to thefe eighteen kinds of neutral falts, fhew that the acids which compofe them are known only in their complete ftate of faturation with oxigene. In like manner all the acids in the third column uniformly have their terminations in *ic*, according to the rules of the nomenclature.

2. In the 14, 15, 21, and 22 fpaces of the fifth column there are only *tartrites*, *pyro-tartrites*, *pyro-lignites*, and *pyro-mucites*, whofe uniform terminations indicate acids with excefs of acidifiable bafes, and that they contain tartareous, pyro-tartareous, pyro-ligneous, and pyro-mucous acids.

3. In this fame column is a third clafs of fpaces which contains neutral falts, the names of which alfo have the two different terminations which we have mentioned, fuch are thofe which are feen in 5 fpace *nitrats* and *nitrites*, in the 7 *fulphats* and *fulphites*, in the 8 *phofphats* and *phofphites*, and in the 13 *acetats* and *acetites*. Thefe two terminations in each of the fpaces fufficiently indicate, that the falts to which they are applied are compofed of acids in two proportions of union with oxigene, always recollecting, however, that the acids terminated in *ic* produce neutral falts terminated in *at*, and that thofe with terminations in *ous* form neutral falts, whofe names are terminated in *ite*.

4. In feveral fpaces of this column are given fome examples of neutral falts different from thofe of the two claffes which we have diftinguifhed; thus in the 9th fpace the appellation of *oxigenated muriate of pot-afh* is given to the combination of oxigenated muriatic acid and pot-afh. In other divifions of the fame column, the faline combinations in which the acids predominate, are alfo expreffed by adding to the methodical nomenclature of thefe falts the epithet *acidulous*, as in the 14 fpace *acidulous tartrite of pot-afh*, and in the 16 *acidulous oxalat of pot-afh*. By the word *fur-faturated* is likewife expreffed the neutral falts in which the bafes predominate, as in the 8 fpace *phofphate fur-faturated with foda*, and in the 10. *borax*, or *borat fur-faturated with foda*.

Column VI.

The laft column of this table, which contains the names of fimple fubftances combined in their natural ftate, and, as their title denotes, without being oxigenated or acidified, is one of the fhorteft, and contains very few compofitions. The inferior fpaces from the 31 to the 48, contain the combinations of metals with one another, for which the names of alloy and amalgam, which have been a long time in ufe, are preferved. Under thefe there are found only three which offer new denominations founded upon the fame principles as the preceding; as in the 6 fpace *carburet of iron*, expreffing the combination of charcoal and iron, vulgarly called plumbago, in the 7 *metallic fulphurets* or the native combinations of fulphur with the metals, *alkaline-fulphurets* or the combinations of fulphur with the alkalis, and *fulphurated hydrogene gas* or the folution of fulphur in hydrogene gas. In fhort, by the generical name of *metallic phofphorets* in fpace 8, are expreffed the native compofitions of phofphorus and metals: likewife for the word *fiderite* is fubftituted the appellation *phofphoret of iron*, which expreffes in the clearer manner the union of phofphorus with iron; and by thefe three comparative words, *carburet*, *fulphuret*, and *phofphoret*, which differ only in termination from words very well known, it is poffible to give an exact idea of analogical compofitions, and to diftinguifh them from all other compound fubftances.

Under the above fix columns are placed a nomenclature of the principal fubftances in the vegetable kingdom. In this part of the table are introduced, from among the ancient names, fuch as from their concifenefs and perfpicuity appeared moft worthy of attention.

		I. SUBSTANCES NOT DECOMPOSED.		II. CONVERTED INTO THE STATE OF GAS BY CALORIC.		III. COMBINED WITH OXIGENE.	
		NEW NAMES.	ANCIENT NAMES.	*NEW NAMES.*	ANCIENT NAMES.	*NEW NAMES.*	ANCIENT NAMES.
1		Light.					
2		Caloric.	*Latent heat,* or *the matter of heat.*				
3		Oxigene.	*Base of vital air.*	Oxigenous gas. *N. B.* It appears that light assists to change it into the state of gas.	*Dephlogisticated air,* or *vital air.*		
4		Hydrogene	*Base of inflammable gas.*	Hydrogenous gas.	*Inflammable gas.*	Water.	*Water.*
5	ACIDIFIABLE BASES.	Azote, *or* the Nitric radical	*Base of phlogisticated air,* or *of the atmospherical mofet.*	Azotic gas.	*Phlogisticated air,* or *atmospherical mephitis.*	Base of nitrous gas. Nitric acid. *And with excess of azote,* Nitrous acid.	*Base of nitrous gas.* *Colourless nitrous acid.* *Fuming nitrous acid.*
6		Carbone, *or* the Carbonic radical.	*Pure charcoal.*			Carbonic acid.	*Fixed air,* or *cretaceous a*
7		Sulphur, *or* the Sulphuric radical.				Sulphuric acid. *And with less oxigene,* Sulphureous acid.	*Vitriolic acid.* *Sulphureous acid.*
8		Phosphorus, *or* the Phosphoric radical.				Phosphoric acid. *And with less oxigene,* Phosphorous acid.	*Phosphoric acid.* *Fuming,* or *volatile ph phoric acid.*
9		Muriatic radical.				Muriatic acid. *And with excess of oxigene,* Oxigenated muriatic acid.	*Marine acid.* *Dephlogisticated marine a*
10		Boracic radical.				Boracic acid.	*Sedative salt.*
11		Fluoric radical.				Fluoric acid.	*Acid of spar.*
12		Succinic radical.				Succinic acid.	*Volatile salt of amber.*
13		Acetic radical.				Acetous acid. *And with more oxigene,* Acetic acid.	*Distilled vinegar.* *Radical vinegar.*
14		Tartaric radical.				Tartareous acid.	
15		Pyro-tartaric radical.				Pyro-tartareous acid.	*Empyreumatic tartareous acid,* or *spirit of tartar.*
16		Oxalic radical.				Oxalic acid.	*Saccharine acid.*
17		Gallic radical.				Gallic acid.	*Astringent principle.*
18		Citric radical.				Citric acid.	*Lemon-juice.*
19		Malic radical				Malic acid.	*Acid of apples.*
20		Benzoic radical.				Benzoic acid.	*Flowers of benzoin.*
21		Pyro-lignic radical.				Pyro-ligneous acid.	*Spirit of box.*
22		Pyro-mucic radical.				Pyro-mucous acid.	*Spirit of honey, of sug &c.*

IV. GAZEOUS OXIGENATED.		V. OXIGENATED WITH BASES.		VI. COMBINED WITHOUT BEING CONVERTED INTO THE ACID STATE.		
NEW NAMES.	ANCIENT NAMES.	*NEW NAMES.*	ANCIENT NAMES.	*NEW NAMES.*	ANCIENT NAMES.	
						1
						2
						3
Nitrous gas.		Nitrate of pot-ash. Nitrate of soda, &c.	*Common nitre.* *Cubic nitre.*			4
Nitrous acid gas.		Nitrate of pot-ash.				5
Carbonic acid gas.	*Fixed air, mephitic air.*	Carbonate { of lime. of pot-ash, &c. of iron.	*Chalk.* *Aërate alkalis.* *Rust of iron.*	Carbure of iron.	*Plumbago.*	6
Sulphureous acid gas.	*Sulphureous acid gas.*	Sulphate { of pot-ash. of soda. of lime. of alumine. of barytes. of iron, &c. Sulphite of pot-ash, &c.	*Vitriolated tartar.* *Glauber's salt.* *Selenite.* *Alum.* *Ponderous spar.* *Vitriol of iron.* *Stahl's sulphureous salt.*	Sulphure { of iron. of antimony. of lead, &c. Sulphurated hydrogenous gas Sulphure of pot-ash. } Sulphure of soda, &c. } Alkaline sulphures containing metals. Alkaline sulphures containing charcoal.	*Factitious pyrites of iron.* *Antimony.* *Hepatic gas.* *Alkaline livers of sulphur.* *Metallic liver of sulphur.* *Liver of sulphur containing charcoal.*	7
		Phosphate { of soda. of lime, &c. Phosphate super-saturated with soda Phosphite of pot-ash, &c.	*Phosphoric salt with base of natrum.* *Earth of bones.* *Haupt's pearly salt.*	Phosphorized hydrogenous gas. Phosphure of iron	*Phosphoric gas.* *Siderite.*	8
Muriatic acid gas. Oxigenated muriatic acid gas.	*Marine acid gas.* *Dephlogisticated marine acid gas.*	Muriate { of pot-ash. of soda. of lime, &c. of ammoniac. Oxigenated muriate of soda, &c.	*Febrifuge salt of Sylvius.* *Sea-salt.* *Calcareous sea-salt.* *Sal ammoniac.*			9
		Borate super-saturated with soda, *or* borax. Borate of soda, &c. *the soda saturated with acid.*	*Common borax.*			10
Fluoric acid gas.	*Sparry acid gas.*	Fluate of lime, &c.	*Fluor spath.*			11
		Succinate of soda, &c.				12
		Acetite { of pot-ash. of soda. of lime. of ammoniac. of lead. of copper. Acetate of soda, &c.	*Terra foliata tartari.* *Mineral foliated earth.* *Calcareous acetous salt.* *Mindererus's spirit.* *Sugar of lead.* *Verdegrise.*			13
		Acidulous tartrite of pot-ash. Tartrite of pot-ash. Tartrite of soda, &c.	*Cream of tartar.* *Vegetable salt.* *Salt of Seignette.*			14
		Pyro-tartrite of lime. Pyro-tartrite of iron, &c.				15
		Acidulous oxalate of pot-ash. Oxalate of lime. of soda, &c.	*Salt of sorrel.*			16
		Gallate { of soda. of magnesia. of iron.				17
		Citrate of pot-ash. Citrate of lead, &c.	*Foliated earth with lemon-juice.*			18
		Malate of lime, &c.				19
		Aluminous benzoate. Benzoate of iron, &c.				20
		Pyro-lignite of lime. Pyro-lignite of zinc.				21
		Pyro-mucite of magnesia. Ammoniacal pyro-mucite, &c.				22

No.		I. SUBSTANCES NOT DECOMPOSED. NEW NAMES.	I. ANCIENT NAMES.	II. CONVERTED INTO THE STATE OF GAS BY CALORIC. NEW NAMES.	II. ANCIENT NAMES.	III. COMBINED WITH OXIGENE. NEW NAMES.	III. ANCIENT NAMES.
23	*Acidifiable Baſes continued.*	Camphoric radical.				Camphoric acid	
24		Lactic radical.				Lactic acid.	*Acid of milk.*
25		Saccho-lactic radical				Saccho-lactic acid.	*Acid of the ſugar of mil*
26		Formic radical.				Formic acid.	*Acid of ants.*
27		Pruſſic radical.				Pruſſic acid.	*Colouring matter of Pru blue.*
28		Sebacic radical.				Sebacic acid.	*Acid of fat.*
29		Lithic radical.				Lithic acid.	*Acid of the ſtone of the bl*
30		Bombic radical.				Bombic acid.	*Acid of ſilk worms.*
31	METALLIC SUBSTANCES.	Arſenic.	*Regulus of arſenic.*			Oxide of arſenic. *And with more oxigene,* Arſenic acid.	*White arſenic, or cal arſenic.* *Arſenical acid.*
32		Molybdena.				Oxide of molybdena. Molybdic acid.	*Calx of molybdena.*
33		Tungſtein.				Oxide of tungſtein. Tungſtic acid.	*Yellow calx of tunſtein tungſtein.*
34		Mangaueſe.	*Regulus of manganeſe.*			White / Black / Vitreous } Oxide of manganeſe.	*Manganeſe.*
35		Nickel.				Oxide of nickel.	*Calx of nickel.*
36		Cobalt.	*Regulus of cobalt.*			Grey oxide of cobalt. Vitreous oxide of cobalt.	*Calx of cobalt.*
37		Biſmuth.				White / Yellow / Vitreous } Oxide of biſmuth.	*Magiſtery of biſmuth.* *Yellow calx of biſmuth.* *Glaſs of biſmuth.*
38		Antimony.	*Regulus of antimony.*			White oxide of antimony { by the nitrous acid.	*Diaphoretic antimony.*
						White oxide of antimony { by the muriatic acid.	*Powder of algaroth.*
						White ſublimated oxide of antimony.	*Flowers or ſnow of an mony.*
						Vitreous oxide of antimony.	*Glaſs of regulus of antim*
39		Zinc.				Oxide of zink. Sublimated oxide of zink.	*Calk of zinc.* *Flowers of zinc. Pomp lix, &c.*
40		Iron.				Black oxide of iron. Red oxide of iron.	*Ethiops of iron.* *Aſtringent ſaffron of M.*
41		Tin				White oxide of tin.	*Calx of tin.*
42		Lead.				White oxide of lead. Yellow oxide of lead. Red oxide of lead. Vitreous oxide of lead.	*Ceruſſe, or white lead.* *Maſſicot.* *Minium.* *Litharge.*
43		Copper.				Red oxide of copper. Green oxide of copper. Blue oxide of copper.	*Brown calx of copper.* *Green calx of copper, verdegriſe.* *Mountain blue.*
44		Mercury.				Blackiſh / Yellow / Red } Mercurial oxide	*Ethiops* per ſe. *Turbith mineral.* *Precipitate* per ſe.
45		Silver.				Oxide of ſilver.	*Calx of ſilver.*
46		Platina.				Oxide of platina.	*Calx of platina.*
47		Gold.				Oxide of gold.	*Calx of gold.*
48	EARTHS.	Silex.	*Vitrifiable earths, quartz, &c.*				
49		Alumine.	*Argillaceous earth, or earth of alum.*				
50		Barytes.	*Barytes, ponderous earth.*				
51		Lime.	*Calcareous earth*				
52		Magneſia.					
53	ALKALIES.	Pot-aſh.	*Vegetable fixed alkali, ſalt of tartar, &c.*				
54		Soda.	*Mineral alkali. Marine alkali. Natrum.*				
55		Ammoniac.	*Fluor, or cauſtic volatile alkali.*	Ammoniacal gas.	*Alkaline gas.*		

IV. GAZEOUS OXIGENATED.		V. OXIGENATED WITH BASES.		VI. COMBINED WITHOUT BEING CONVERTED INTO THE ACID STATE.		
NEW NAMES.	ANCIENT NAMES.	*NEW NAMES.*	ANCIENT NAMES.	*NEW NAMES.*	ANCIENT NAMES.	
		Camphorate of soda, &c.				23
		Lactate of lime, &c.				24
		Saccholate of iron, &c.				25
		Ammoniacal formiate, &c.	*Spirit of magnanimity.*			26
		Prussiate of pot-ash, &c. Prussiate of iron, &c.	*Phlogisticated alkali,* or *Prussian alkali.* *Prussian blue.*			27
		Sebate of lime, &c.				28
		Lithiate of soda, &c.				29
		Bombiate of iron, &c.				30
OXIDES WITH DIFFERENT BASES.*						
Yellow } sulphurated Red } oxide of arsenic. Arsenical oxide of pot-ash.	*Orpiment.* *Realgar.* *Liver of arsenic.*	Arseniate of pot-ash, &c. Arseniate of copper, &c.	*Macquer's arsenical neutral salt.*	Alloy of arsenic and tin.	*Arsenicated tin.*	31
Sulphur of molybden.	*Molybdena.*	Molybdate.		Alloy, &c.		32
		Calcareous tungstate.	*Tungsten of the Swedes.*	Alloy, &c.		33
				Alloy of manganese and iron.		34
				Alloy of nickel, &c.		35
Alkaline cobaltic oxides.	*Precipitate of cobalt redissolved by alkalis.*			Alloy, &c.		36
Sulphurated oxide of bismuth.	*Bismuth precipitated by liver of sulphur.*			Alloy, &c.		37
Gray } sulphurated Red } oxide of anti- Orange } mony. Vitreous } Alkaline oxide of antimony.	*Gray calx of antimony.* *Kermes mineral.* *Golden sulphur of antim.* *Glass and liver of antimony.*			Alloy, &c.		38
Sulphurated oxide of zinc.	*Precipitate of zinc by liver of sulphur.*			Alloy, &c.		39
Sulphurated oxide of iron.				Alloy, &c.		40
Yellow sulph. oxide of tin	*Aurum musivum.*			Alloy, &c.		41
Sulphurated oxide of lead.				Alloy, &c.		42
Ammoniacal oxide of copper.				Alloy, &c.		43
Black } sulphurated oxide Red } of mercury.	*Ethiops mineral.* *Cinnabar.*			Alloy, or amalgam of, &c.		44
Sulphurated oxide of silver				Alloy, &c.		45
				Alloy of platina and gold.		46
				Alloy, &c.		47
						48
						49
						50
						51
						52
						53
						54
						55

* As the substances placed in the interior part of this column cannot be changed into the state of gas, as well as many of those situated above them; we have changed the title of this column, and by many of that which we have substituted we express certain combinations of metals.—Note by the Author.

NAMES GIVEN TO SEVERAL MORE COMPOUND SUBSTANCES WHICH COMBINE WITHOUT DECOMPOSITI(

	1	2	3	4	5	6	7	8	9	10
New Names.	Mucus.	Gluten.	Sugar.	Starch.	Fixed Oil.	Volatile oil.	Aroma.	Reſin.	Extract.	Extracto-reſi matter, *whe extract prea nates.*
Ancient Names.	*Mucilage.*	*Glutenous matter.*	*Saccharine matter.*	*Amylaceous matter.*	*Unctuous,* or *fat oil.*	*Eſſential oil.*	*Spiritus rector.*	*Reſin.*	*Extractive matter.*	

	11	12	13	14	15	16	17
New Names.	Reſino-extractive matter, *when the reſin predominates.*	Fecula.	Alcohol, *or* Spirit of wine.	Alcohol { of pot-aſh. of guaiacum. of ſcammony. of myrrh, &c.	Nitrous alcohol. Gallic alcohol. Muriatic alcohol.	Sulphuric ether. Muriatic ether. Acetic ether, &c.	Alkaline ſoaps. Earthy ſoaps. Acid ſoaps. Metallic ſoaps. Saponul. of turp. &c.
Ancient Names.		*Fecula.*	*Spirit of wine.*	*Alkaline tincture.* *Tincture* { *of guaiacum. of ſcammony. of myrrh, &c.*	*Dulcified ſpirit of nitre. Tincture of galls. Dulcified marine acid.*	*Frobenius's ether. Marine ether. Acetous ether, &c.*	*Alkaline ſoaps. Earthy ſoaps, &c. Combinations of the v. tile oils with differ baſes.*

Explanation of Plate 72.

Fig. 1. Repreſents a crucible or pot, which may be made either of earth, black lead, forged iron, or platina.

Fig. 2. Is the repreſentation of a cucurbit or matraſs, which is a veſſel generally formed of glaſs, earth, or metal.

Fig. 3. Repreſents a retort, which is a veſſel of earthen ware, glaſs, or metal, with a neck bended on one ſide. Some retorts have another neck or opening on the upper part, through which they may be charged, and the opening may be afterwards cloſed with a ſtopper. Theſe are called tubulated retorts.

Fig. 4. Is the repreſentation of a receiver, which is a veſſel uſually made of glaſs, of a ſpherical form, with a ſtraight neck, into which the neck of the retort is commonly inſerted.

Fig. 5. Repreſents an alembic, uſed for the diſtillation of volatile ſubſtances. It conſiſts of a body A, to which is adapted a head B. The head is of a conical figure, and has its external circumference or baſe depreſſed lower than its neck; ſo that the vapours which riſe, and are condenſed againſt its ſides, run down into the circular channel formed by its depreſſed part, from whence they are conveyed by the noſe or beak C, into the receiver D.

Fig. 6. Is the drawing of an alembic, commonly made in metal. The head is contained in a veſſel of cold water, to accelerate the condenſation; a method which is not ſo rational as that of cooling the receiver, becauſe the coldneſs of the head, in the former caſe, cauſes much of the vapour to fall again into the body.

Fig. 7. Repreſents the large ſtill uſed in the diſtillation of ardent ſpirits. Inſtead of uſing a refrigeratory or receiver, the ſpirit is made to paſs through a ſpiral pipe, called the worm, which is immerſed in a tub of cold water. During its paſſage it is condenſed, and comes out at the lower extremity E of the pipe, in a fluid form.

Fig. 8. Exhibits the common ſmall furnace for melting. A is the aſh-hole, where the air enters. C is the fire-place, containing a covered crucible ſtanding on a ſupport of baked earth, which reſts on the grate. D is the paſſage into E the chimney. At D is a ſhallow crucible called a cupel, placed in the current of the flame; and at F is an earthen or ſtone cover, to be occaſionally taken off, for the purpoſe of ſupplying the fire with fuel.

Fig. 9. Is the reverberatory furnace. A is the fire-place, B the dome and chimney, which is moveable. It ſerves to reflect the flames, and cauſes them to ſurround the veſſel C, which is by that means more ſtrongly heated than it could otherwiſe be.

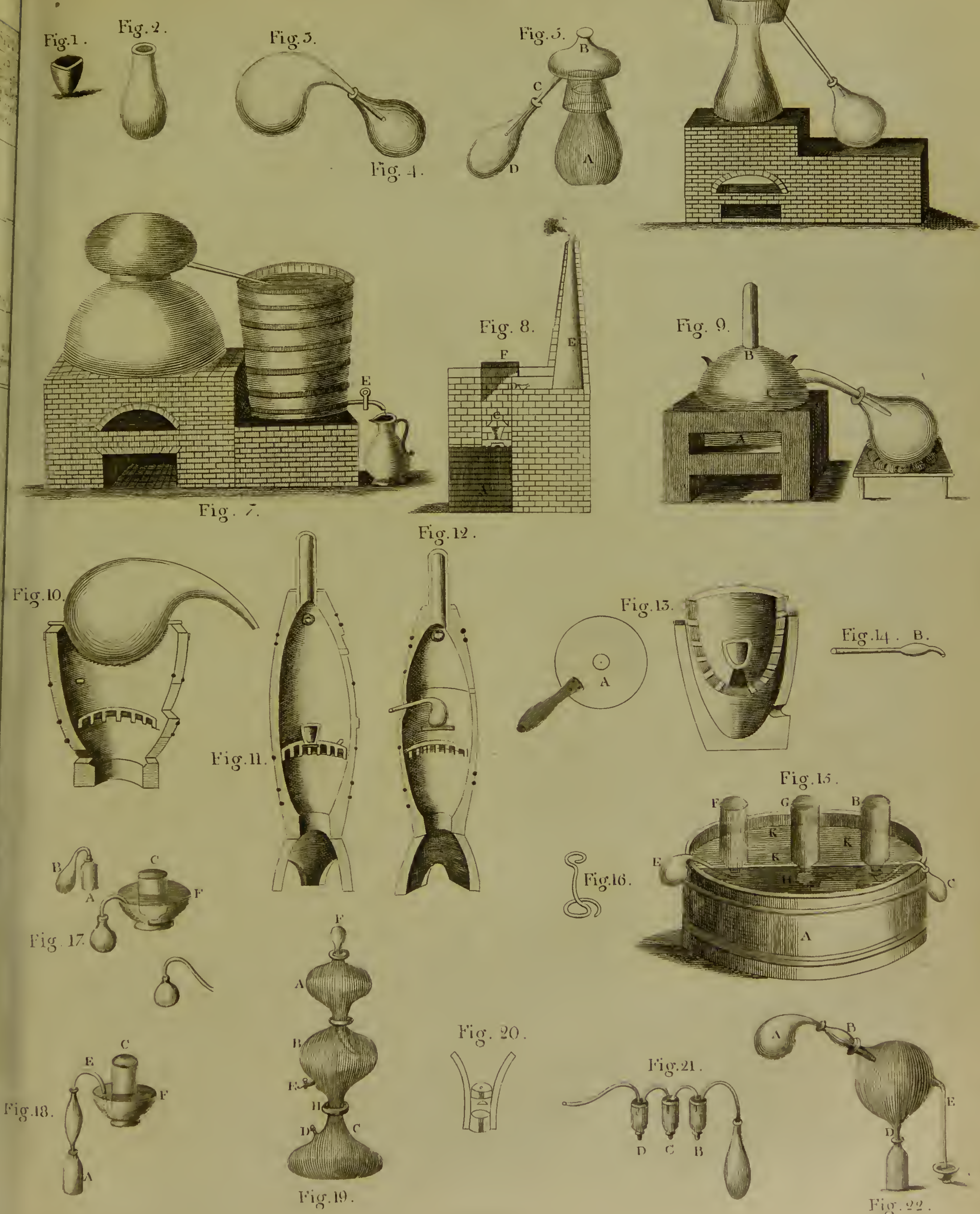
Fig. 10. Repreſents a furnace for open fire formed by one pot. The lower ſquare aperture is the door of the aſh-pit, and the upper one the door of the fire-place, which, in the intentions this furnace is deſigned for, is kept ſhut. The charcoal is put in at the top, and ſupplied with air by one or more of the lower apertures; and the intenſity of the fire may in ſome meaſure be regulated by more or leſs cloſing of the apertures. The round hole in the bottom ſerves to inſert the nozzle of a pair of bellows, which, when the other apertures are ſtopped, converts it into a blaſt-furnace.

Fig. 11. Is a wind-furnace, formed by two pots applied mouth to mouth. An iron chimney compoſed of pieces, by which its length may be regulated ſo as to increaſe the draft at pleaſure, is put on the top. The crucible containing the ſubjected matters, is placed upon a circular piece of brick laid upon the grate, which prevents the cold air from immediately ſtriking the crucible and endangering the breaking it. The charcoal is put through the fire-place door, or larger aperture of the dome, or upper pot, which ſhould always be cloſed immediately after each ſupply of fuel. The two oppoſite holes in the upper part of the dome afford the conveniency of paſſing an iron rod through, for ſafely and commodiouſly lifting it when intenſely heated.

Fig. 12. Is a furnace conſiſting of two pots, ſeparated by an iron hoop, in which an opening or door is cut. It ſerves for a reverberatory furnace for diſtilling with retorts of earthen ware or coated glaſs. The bottom of the diſtilling veſſel reſts on two bars laid acroſs within the lower pot. If the grate of this furnace be occaſionally changed for a larger, which may be placed near the edge of the lower pot, a muffle, or ſmall earthen oven, may be placed in the midſt of the fire, with its mouth oppoſite the hole in the iron hoop. In this may be performed all proceſſes that require the admiſſion of air, and frequent inſpection, ſuch as aſſays, enamelling, &c.

Fig. 13. Is an improved blaſt-furnace. The pot which contains the fuel for this purpoſe, has a number of holes bored at ſmall diſtances, in ſpiral lines, all over it, from the bottom up to ſuch an height as it is deſigned that the fuel ſhould reach. The crucible is placed upon a proper ſupport at the bottom; and the holes are made, not in a perpendicular direction to it, but oblique, that the ſtreams of air forced in through them may but

CHEMISTRY



Barlow sculp.

juſt touch it: by this means the crucible is in no danger of being cracked by the blaſt, and the impelled heat plays in a kind of ſpiral upon its ſurface. The lower pot receives this perforated pot to ſuch a depth that all its holes hang in the cavity; which cavity having no other outlet than the aperture for the bellows, the air blown in through this aperture neceſſarily diſtributes itſelf through the perforations of the inner pot. Both pots may be of the largeſt ſize, the external narrow part of the inner falling into the wide mouth of the outer. It wants no addition to its height; but, on the contrary, will be more commodious in regard to the inſpection and taking out of the crucible, if all the part above where the fuel reaches be ſawed away. The moſt convenient cover for it, is an iron plate with a round hole in the middle, and a handle projecting at one ſide for lifting it. This is repreſented at letter A.

Fig. 14. Repreſents a blow-pipe, which, for philoſophical or other nice purpoſes, is provided with the bowl, or enlargement, B. in which the vapours of the breath are condenſed and detained; and alſo with three or four ſmall nozzles, with different apertures, to be ſlipped on the ſmaller extremity. Theſe are of uſe when larger or ſmaller flames are to be occaſionally uſed.

Fig. 15. In this figure, A repreſents a wooden veſſel, or tub; K, K, K, is a ſhelf fixed in the tub. When this apparatus is uſed, the tub is filled with water to ſuch an height, as to riſe about one inch above the upper ſurface of the ſhelf. B, G, F, are glaſs jars inverted with their mouths downwards, which reſt upon the ſhelf. If theſe, or any other veſſels open only at one end, be plunged under the water, and inverted after they are filled, they will remain full, notwithſtanding their being raiſed out of the water, provided their mouths be kept immerſed; for in this caſe the water is ſuſtained by the preſſure of the atmoſphere in the ſame manner as the mercury in the barometer. It may be eaſily imagined, that if the common air, or any other fluid reſembling common air in lightneſs and elaſticity, be ſuffered to enter theſe veſſels, it will riſe to the upper part, and the ſurface of the water will ſubſide. If a bottle, a cup, or any veſſel in that ſtate which is uſually called empty, though really full of air, be plunged into the water with its mouth downwards, ſcarcely any water will enter, becauſe its entrance is oppoſed by the elaſticity of the included air; but if the veſſel be turned up, it immediately fills, and the air riſes in one or more bubbles to the ſurface. Suppoſe this operation to be performed under one of the jars which are filled with water: the air will aſcend as before; but, inſtead of eſcaping, it will be detained in the upper part of the jar. In this manner, therefore, we ſee that air may be emptied out of one veſſel into another, by an inverted pouring, in which the air is made to aſcend from the lower to the upper veſſel, in which the experiments are performed, by the action of the weightier fluid. When the receiving veſſel has a narrow neck, the air may be poured through a glaſs funnel, H.

C (fig. 15.) is a glaſs body or bottle, whoſe bottom is blown very thin, that it may ſupport the heat of a candle, ſuddenly applied, without cracking. In its neck is fitted, by grinding, a tube D, curved nearly in the form of the letter S. In the figure, the body C is repreſented as containing a fluid, in the act of combining with a ſubſtance that gives out air, which paſſes through the tube into the jar B, under whoſe mouth the other extremity of the tube is placed. At E is a ſmall retort of glaſs or earthen ware, whoſe neck being plunged in the water, beneath the jar F, is ſuppoſed to emit the elaſtic fluid, extricated from the contents of the retort, which is received in the jar.

Fig. 16. Repreſents a convenient wire-ſtand for a gallipot, or any thing that is ſupported at a conſiderable height within a jar.

Fig. 17. Exhibits an apparatus for impregnating water with the carbonic acid gas. The quart bottle C, is filled with water, and inverted in the baſon F, which likewiſe contains a little water. A is a half-pint phial, into which broken pieces of marble or chalk are put; and upon them is poured as much water, rendered very acid by a mixture of oil of vitriol, as may fill the bottle two-thirds. B is a bladder, whoſe neck is tied faſt round a perforated cork of a tapering figure. After the effervеſcence of the chalk and the acid has begun, the cork is to be thruſt into the neck of the phial A, the bladder being previouſly emptied by preſſure. Carbonic acid gas will eſcape from the chalk, and inflate the bladder. When this laſt is full, it muſt be diſengaged from the bottle, and the bended tube E muſt be thruſt into the orifice of its cork. The aperture of the tube being then placed beneath the mouth of the bottle C, it is eaſy to diſcharge the aërial contents of the bladder by preſſure into this laſt. The uſe of the bladder, in this operation, is only to prevent any of the fluid contents of the bottle A from paſſing into the bottle C, which would happen in the violent ſtate of ebullition, if the tube E were to paſs directly from the bottle A to C. The manipulation is ſimpler if the bladder have two holes at its oppoſite ends, the one containing a cork, conſtantly kept in the neck of the bottle A, and the other faſtened round the tube E, which then remains conſtantly beneath the mouth of C; and the air is preſſed up as occaſion may demand. See fig. 18.

Fig. 19. Is a repreſentation of Dr. Nooth's machine for the above purpoſe: it conſiſts of three glaſs veſſels. The lower veſſel C contains the effervеſcent materials: it has a ſmall orifice at D, ſtopped with a ground ſtopper, at which an additional ſupply of either acid, water, or chalk, may be occaſionally introduced. The middle veſſel B is open both above and below. Its inferior neck is fitted by grinding into the neck H of the lower veſſel. In the former is a glaſs valve, formed by two pieces of tube, and a lens, which is moveable, between them, as repreſented in fig. 20. This valve opens upwards, and ſuffers the air to paſs; but the water cannot return through the tubes, partly becauſe the orifice is capillary, and partly becauſe the flat lens covers the hole. The middle veſſel is furniſhed with a cock E, to draw off its contents. The upper veſſel A is fitted, by grinding, into the upper neck of the middle veſſel. Its inferior part conſiſts of a tube, that paſſes almoſt as low as the centre of the middle veſſel. Its upper orifice is cloſed by a ground-ſtopper F. When this apparatus is to be uſed, the effervеſcent materials are put into the lower veſſel; the middle veſſel filled with pure water, and put in its place; and the upper veſſel is nearly ſtopped, and likewiſe put in its place. The conſequence is, that the carbonic acid gas paſſing through the valve at H, aſcends into the upper part of the middle veſſel B, where, by elaſticity, it re-acts on the water, and forces part up the tube into the veſſel A; part of the common air, in this laſt, being compreſſed, and the reſt eſcaping by the ſtopper, which is made of a conical figure, that it may be eaſily raiſed. As more carbonic acid gas is extricated, more water riſes, till at length the water in the middle veſſel falls below the lower orifice of the tube; carbonic acid gas then paſſes through the tube into the upper veſſel, and expels more of the common air by raiſing the ſtopper. In this ſituation the water in both veſſels, being in contact with a body of carbonic acid gas, becomes ſtrongly impregnated with that fluid, after a certain time.

Fig. 21. Exhibits an apparatus of veſſels, in which the different products of bodies may be conveniently examined. A is a matraſs, which communicates with the receiver B, by a tube that reaches very near the bottom of the latter. The upper part of this receiver communicates in the ſame manner with the ſecond receiver C, by a tube reaching nearly to the bottom of C. In like manner C communicates with D, and from D proceeds a recurved tube, which may be inſerted beneath an inverted veſſel of water, or mercury.

Fig. 22. Exhibits Mr. Woulfe's improvement in the receiver in diſtillation. A is the retort. B an intermediate veſſel, called an adopter, which is occaſionally uſed. C the receiver, having

two necks; one at D, inserted into a bottle which receives the products which are usually condensed in the receiver; and the other, at E, transmits the more volatile or aëriform products into a bason G, containing water; beneath the surface of which the extremity of the neck E is plunged. If the neck E be made large, and the water from the bason G should, by a rapid condensation in C, be forced up the neck, the surface of the water in G will fall so much as to leave the lower orifice of E uncovered, before any considerable rise can take place; but if F were narrower, its whole capacity would be filled, and the water would run over into C before the fall in G would be sufficient to uncover the orifice of F, and restore the equilibrium, by admitting common air.

Explanation of Plate 86.

The calorimeter is represented in perspective at fig. 1. and its interior structure is engraved at fig. 2. and 3. the former being horizontal, and the latter a perpendicular section. Its capacity or cavity is divided into three parts, the interior, middle, and external cavities. The interior cavity *ffff*, fig. 4. into which the substances submitted to experiment are put, is composed of a grating or cage of iron wire, supported by several iron bars; its opening or mouth LM, is covered by the lid HG, which is composed of the same materials. The middle cavity *bbbb*, fig. 2. and 3. is intended to contain the ice which surrounds the interior cavity, and which is intended to be melted by the caloric of the substances employed in the experiment. The ice is supported by the grate *m m* at the bottom of the cavity, under which is placed the sieve *n n*. These two are represented separately in fig. 5. and 6.

In proportion as the ice contained in the middle cavity is melted, by the caloric disengaged from the body placed in the interior cavity, the water runs through the grate and sieve, and falls through the conical funnel *c c d*, fig. 3. and the tube *x y*, into the receiver F, fig. 1. This water may be retained or let out at pleasure, by means of the stop-cock *u*. The external cavity *a a a a*, fig. 2. and 3. is filled with ice, to prevent any effect upon the ice in the middle cavity from the heat of the surrounding air; and the water produced from it, is carried off through the pipe ST, which shuts by means of the stop-cock *r*. The whole machine is covered by the lid FF, fig. 7. which is made of tin and painted with oil colour, to prevent rust.

The substances to be operated upon are placed in the thin iron bucket, fig. 8. the cover of which has an opening fitted with a cork, into which a small thermometer is fixed. When we use acids, or other fluids capable of injuring the metal of the instruments, they are contained in the matrass, fig. 10. which has a similar thermometer in a cork fitted to its mouth, and which stands in the interior cavity upon the small cylindrical support RS, fig. 10.

Explanation of the Tables of Chemical Characters, proposed by Messrs. Hassenfratz and Adet.

It is not easy to say precisely in what age chemists first began to make use of characters. Inquiries of this nature only show with what views the ancients formed the characters of the metallic substances. They persuaded themselves that the celestial bodies had a sensible influence on all the animate and inanimate substances of the terrestrial globe, and therefore distinguished the metals into solar or coloured metals, and into lunar or white metals. The metals of these two classes were next subdivided into *perfect metals*, *semi-perfect*, and *imperfect*; the *perfection* was expressed by a circle, fig. 1; the *semi-perfection*, by a semi-circle, fig. 2; and the *imperfection* by a cross or dart, fig. 3. Thus gold, which was the solar metal by excellence, was represented by a plain circle, fig. 4. This figure was common to the metals of the first class, such as copper, fig. 5; iron, fig. 6; and antimony, fig. 7; but at the same time combined with the sign of imperfection. Silver, which was regarded as a semi-perfect lunar metal, was expressed by a semi-circle, fig. 2; tin, fig. 8; and lead, fig. 9, had also the semi-circle for character, as belonging to the same class; but were distinguished from silver by the cross or dart. In fine, mercury, which was esteemed an imperfect metal, at the same time both solar and lunar, had the distinctive marks of these two classes, and was expressed by a circle surmounted by a semi-circle, to which was added a cross, fig. 10. This very whimsical method of characterizing different bodies was at length discontinued. For as new substances were discovered new characters became necessary; and those introduced a considerable degree of confusion, as may be seen by examining the characters employed from the time of Geoffroy to that of Bergman. The last chemist employed, as general characters, a triangle, a circle, a kind of crown, and a cross. The triangular figure modified different ways, represented the four elements of the ancients, and also the inflammable substances, as phosphorus and sulphur; the little crown signified the metallic substances; the circle belonged to the salts, and with some modifications also afforded characters for the alkalis; in fine, the cross was used only to express the different acid substances, fig. 11.

Bergman had also representative signs which he made use of to express the different substances, whose classes are indicated by the characters that have been mentioned. It would seem to be necessary that the character for earth in general, which is a triangle with its base upwards, and intersected by an horizontal line, should serve, with some modifications, to express all the different kinds of earth. But Bergman has employed the triangular figure to represent only silice and alumine. Lime, fig. 12; magnesia, fig. 13; and barytes, fig. 14, notwithstanding they have the properties of earth in a very high degree, are represented by characters that have no manner of analogy with that given to earth in general. The cross, which in his system particularly characterised the acids, is found combined with the signs of an infinity of substances which are very far from having the properties of acids, such as lime, fig. 12; copper, fig. 5; tin, fig. 8; lead, fig. 9; sulphur, fig. 15; antimony, fig. 7; gum, fig. 16; and mercury, fig. 10. He has not made any use of the character with which he represented the metals in general to express them in particular. He gave them for characteristic signs, crosses, circles, and semi-circles; but the circle had been before bestowed upon the class of salts. It should seem from this that he wanted to express some supposed likeness between the metals and the saline substances. It also appears, on perusing his tables, as if there were an analogy between lime and the oxides; for when he wants to represent an oxidified metal, he always joins to it the character of lime!

From this account of the more modern characters it is evident that there are too many incoherencies and absurdities among them to allow them any longer to exist, particularly as they are not adequate to the expression of the modern improvements. In order to obviate these inconveniences the present tables have been constructed.

The substances analysed by chemists may be divided into two great classes, into *simple* and *compound*: by the words *simple bodies* are to be understood, such as are not at present capable of any further analysis; the *compound bodies*, on the contrary, are those whose constituent principles can be separated by art. From this it is evident that there ought to be two great classes of characters; the first intended to express the simple substances, and the others to signify the compound; but as the compound bodies are all formed by the different combinations of simple substances, the characters to express compound bodies should be made by the junction of the different characters of simple bodies.

The discoveries of the moderns indicate that the class of the 54 simple substances which are at present known, may be divided into six genera: 1. into substances which appear to enter into the compositions of the greater number of bodies; 2. into alkaline and terrestrial substances; 3. into combustible substances; 4. into metallic substances; 5. into acidifiable substances, which there is every reason to suppose are formed of several principles, and whose decomposition may be foreseen, such are, for example, the bases of the vegetable acids; 6. into compound substances, with whose component principles we are not yet acquainted. Each of these genera is divided into a number of more or less considerable species.

This division of simple bodies requires that each genus should have a sign proper to itself, and which may with some modifications be employed to express the different species of its genus. This circumstance has been attended to in forming the present chemical characters.

To the first genus of simple bodies a right line is given; to the second a triangle; to the third a semi-circle; to the fourth a circle; to the fifth a square; and to the sixth a square with its point upwards.

The right line, which is the character for the first genus, can have four different and distinct positions; it may be either vertical, horizontal, inclined from the right to the left, or from the left to the right. But by rendering the line zigzag or wavy, and placing it in the same positions as the right line, eight characters, perfectly distinct from one another, may be obtained, fig. 17. But as there are only four known species of the first genus, viz. light, caloric, oxigene, and azote, there remain four characters which future chemists may employ to indicate whatever new substances may be discovered in the first genus of simple bodies.

The semi-circle, which expresses the inflammable substances, has, like the right line, four perfectly different positions. It can open upwards, or downwards, to the right, and to the left, fig. 18; these four positions of the semi-circle afforded characters for the four species of bodies in the second genus; but as the semi-circle can be doubled, and by that means form a character simple enough, which can be placed in positions similar to those of the semi-circle, fig. 19, it follows that four characters remain, which can be used, whenever any thing new may be discovered in the genus of inflammable substances.

The triangle, which has been employed for the characteristic sign of the alkaline and earthy substances, can be placed only in two different positions; it can have its vertex either upwards or downwards; yet it is necessary to produce characters for all the earthy substances by the aid of these two positions of the triangle: this has been effected by giving to the alkalis the triangle with its point upwards, and to the earths the triangle with its point downwards, and by inscribing in the triangle, which expresses each species of alkali or earth, the first letter of the Latin name of that particular substance. Thus, for example, Pot-ash is expressed by a triangle with its point upwards, in the middle of which is inscribed a P; in like manner lime is expressed by a reversed triangle, containing within it a C.

The circular figure, which has been chosen to distinguish the metallic, or the fourth genus, presents for its modifications the same difficulties as the triangle. It is managed by inserting in each of the circles which represent each species of this genus, the initial letter of the Latin name of each metallic substance, taking care at the same time to represent gold by a circle with a point at its center, merely for the sake of preserving the ancient character; the Latin initial letters have been employed because the Latin names are universally known.

The square, adapted to the fifth genus, or that of the acidifiable substances, which are supposed to be formed of several principles, whose decomposition may be foreseen, have been modified in the same way; each square contains within it the initial letter of the substance which it should signify. The same is done for the square with its angle upwards, used to signify the undecompounded mixed bodies.

The characters of compound substances resulting from the combination of simple substances, should also result from the union of the characters of these same simple substances. Thus the first law to be observed in the formation of characters for mixed bodies, is to join together the characters of simple substances, two and two, to represent the compositions of two substances; three and three, to represent the compositions of three substances; and four and four, to represent the bodies resulting from the union of four simple substances, &c. Therefore if the comparative quantities of the component principles in compound bodies were always the same, and if the compound bodies always presented themselves in the same state and with the same properties, no other rule but the above would be necessary; but as it is known that two substances can have not only a degree of reciprocal saturation, but also form combinations in different proportions, in which they produce compositions sensibly different from those formed by their union with reciprocal saturation; as is evident from the union of sulphur with oxigene: it therefore follows that, by the assistance of two characters which, joined together, represent the combination of sulphur and oxigene, the different states in which this combination can exist should be expressed. This is effected by diversifying the respective positions of the characters which represent these substances.

It is also necessary that the characters of compound bodies be joined together, in order that the characters of simple substances placed next to one another should not be mistaken for them.

Two characters joined together can have eight different positions; viz. two horizontal, two vertical, two oblique to the right, and two oblique to the left. Thus these two characters, fig. 20, can be combined as in fig. 21; but the oblique positions do not present sufficient distinction. They have therefore been rejected, and there only remain four positions, viz. two horizontal and two vertical; but in the compositions of these substances it matters little whether one of them be placed on the right side or on the left. Thus the two horizontal positions are reduced to one; and consequently these two characters can have only three positions, viz. one horizontal and two vertical. The position of the two characters upon the same horizontal line is to indicate that the saturation is reciprocal, and that there is an equality in the proportions of the principles which compose the compound substance represented. The vertical positions, on the contrary, are to signify that there does not exist a reciprocal saturation nor equality of proportion among the component principles of a compound body; so that the character which is to be placed inferior to the others, is to signify that the substance which it represents is in excess of proportion in comparison to the others. Suppose, for example, a combination of sulphur and pot-ash, or what is called sulphuret of pot-ash; it may happen that the sulphur and the pot-ash are in a state of reciprocal saturation, and it also may happen that the one or the other of the two component principles of this sulphuret of pot-ash is in greater proportion than the other; and either of these states can easily be expressed according to these rules. Thus the character of pot-ash being as in fig. 23, and that of sulphur as in fig. 24, the combination of sulphur and pot-ash, in which there is a reciprocal saturation, can be expressed by fig. 25; and the combination of sulphur and pot-ash, where the sulphur predominates, can be signified by fig. 26; and, in fine, the combination of sulphur and pot-ash, in which the latter substance is in superabundance, may take its distinguishing character as fig. 27.

This muſt be a general rule for all the compound bodies, be their nature what it may. But a little deviation is neceſſary in the following inſtances:

Heat, according to its degree of intenſeneſs, cauſes great variation in the ſtate of bodies. In proportion to the quantity of caloric with which ſubſtances combine, they are in a ſolid, liquid, or aëriform ſtate. Therefore caloric muſt be conſidered as combined with different bodies in three very diſtinct ſtates; but as every ſubſtance in nature is at all times combined with more or leſs caloric, it has been thought proper not to repeat too frequently the character of caloric, but to exclude it whenever it is intended to ſignify a body in a ſolid ſtate, and only to employ it to repreſent the liquid ſtate, and the ſtate of elaſtic fluidity; taking care, according to the fore-mentioned rule, to put the ſign of caloric at the top of the other characters when it is intended to ſignify fluidity, and at the bottom of the other characters when it is deſigned to expreſs the elaſtic aëriform ſtate. Thus, for example, the character of lead being fig. 28, and that of caloric fig. 29, lead in the ſtate of ſolidity will be repreſented by fig. 28; when in the liquid ſtate by fig. 30; and when in the ſtate of elaſtic fluidity by fig. 31. Thus caloric is an exception to the general rule, and is to have only two poſitions inſtead of three in all its combinations. (See the ſecond plate.)

Oxigene in its union with the acidifiable ſubſtances makes the ſecond exception to this general rule. For oxigene combined in different proportions to the different acidifiable ſubſtances, produces compoſitions whoſe properties are too remarkable to ſuffer them to be miſtaken or confounded with one another. It produces, 1. oxides; 2. acids in which the acidifiable baſe predominates; 3. acids in which there is a reciprocal ſaturation; 4. by combining again with an acid whoſe two principles are reciprocally ſaturated, it produces a compoſition which is diveſted of the characteriſtic properties of acids; but in this ſtate the force of its retention is ſo inconſiderable, that the action of a few rays of light is ſufficient to ſet it at liberty, and make it regain its elaſtic ſtate.

This laſt production of the combinations of oxigene is well known only in the oxigenated muriatic acid, while the oxide of ſulphur, the ſulphureous acid, and the ſulphuric acid, preſent us with the other compoſitions which we have mentioned. Nevertheleſs, oxigene in its combinations with azote appears to offer the four combinations of which we ſpeak. Nitrous gas or *oxide of azote* is the combination of oxigene and azote, in which the acid properties are not at all developed. The nitrous acid, which lets eſcape nitrous gas, is the combination of oxigene and of azotic gas, in which the acidifiable baſe is in ſuperabundance. The nitrous acid, which is of a white colour, and does not diſengage any nitrous gas, when united with water, is a combination of oxigene and azote, in which there is a reciprocal ſaturation, and the ſort of nitrous acid which has been ſaid to be oxigenated nitric acid. Thus, as oxigene combined with an acidifiable ſubſtance can produce in certain caſes four very diſtinct compoſitions, the character of oxigene therefore muſt have four different poſitions. Theſe four poſitions have been given it by placing the character of oxigene at the top of the character of the acidifiable baſe, to indicate the combination which is not acid; by placing it at the middle of the character of the acidifiable baſe, to indicate the combination in which the acidifiable baſe predominates; at the bottom of the character of the acidifiable baſe, to indicate the combination in which there is a reciprocal ſaturation of the two principles; and, in fine, by placing it under the character of the acidifiable baſe, and in detaching it a little, to ſhew that the oxigene is in ſuperabundance in the compoſition, and that a very little force is requiſite to diſengage it. Thus, if it be wanted to expreſs the combinations of oxigene and azote, the character of azote, being fig. 32, that of oxigene, fig. 33, the character of nitrous gas is to be fig. 34, that of nitrous acid fig. 35, that of nitric acid fig. 36, and that of oxigenated nitric acid fig. 37.

It is probable that ſeveral of the vegetable acids which we have not yet been able to decompoſe with ſufficient accuracy to know their conſtituent principles, have the ſame baſe, and owe their acid properties to the oxigene; but as it appears that the differences preſented by theſe acids depend on the different proportions of the acidifiable baſe and oxigene, and that the proportions of the acidifiable baſe and oxigene vary in each of theſe acids, it follows that to indicate theſe different kinds of acids, means different from thoſe which have been already uſed ſhould be invented, as thoſe at preſent in uſe are not ſufficient. But, as theſe acids appear to have for conſtituent principles carbone, hydrogene and oxigene, they can be eaſily expreſſed by uniting the three characters of theſe three ſubſtances in the manner indicated by their comparative proportions, and by placing over the character of oxigene the initial letter of the Latin name of the acid. For example: to expreſs by characters the tartareous and the oxalic acids, let us here imagine that in the firſt there are ten parts of carbone, five of hydrogene, and ten of oxigene; and that in the ſecond there are nine parts of carbone, ſix of hydrogene, and ten of oxigene; it follows that, according to theſe principles, theſe two acids be written in the ſame manner, for in both caſes the carbone is in exceſſive proportion in compariſon to the hydrogene, ſo that the tartareous acid would be repreſented as in fig. 38, and the oxalic acid as in fig. 39. Thus it could not be indicated that the hydrogene, as is ſuppoſed, is in greater proportion in the oxalic acid than in the tartareous acid, and that conſequently they muſt be different acids; but all equivocation may be prevented by writing, after what has been ſaid, the character of the tartareous acid as repreſented fig. 40, and the oxalic acid as fig. 41. This example is ſufficient to ſhew, that although there may be found a greater number of acids, with baſes compoſed in the ſame manner; yet by theſe means can be expreſſed the different ſorts of acids reſulting from the combinations of theſe principles, in proportions too ſmall to permit them to be eaſily repreſented according to the general rules. Theſe chemical characters, by being properly multiplied or joined together as in fig. 42, ſeem ſufficient to repreſent all the combinations at preſent known, and even ſuch as may be expected to be diſcovered in future by chemical analyſis.

CHEMNITZ (Martin), a famous Lutheran divine, the diſciple of Melancthon, was born at Britzen in Brandenburgh, in 1522. He was employed in ſeveral important negotiations by the princes of the ſame communion; and died in 1589. His principal work is the Examen of the Council of Trent, in Latin.

CHEMOSH. See CHAMOS.

CHEMOSIS, a diſeaſe of the eye, proceeding from inflammation; wherein the white of the eye puts on a jelly-like appearance, and ſwells above the tranſparent cornea. It may be cured by almoſt any mildly aſtringent eye-water, eſpecially if a very minute portion of camphor be added.

TABLE V.th NEUTRAL SALTS COMPOSED OF THREE SUBSTANCES.

Caloric is not expressed because they are all supposed to be in the solid state. The Ammoniacal Salts are composed of four Substances.

Calcareous Acetat	Calcareous Benzoat	Muriat of Soda	Pyro mucite of Soda	Sulphat of Mercury
Acetat of Alumine	Borat of Soda	Ammoniacal Muriat	Pyro lignite of Ammoniac	Sulphat of Tin
Acetat of Magnesia	Ammoniacal Borat	Barytic Muriat	Saccho lat of Potash	Sulphat of Copper
Acetat of Potash	Calcareous Borat	Muriat of Iron	Sebat of Soda	Sulphat of Lead
Acetat of Soda	Camphorat of Potash	Oxygenated Muriat of Soda	Sulphite of Potash	Sulphat of Iron
Acetat of Copper	Ammoniacal Camphorat	Nitrat of Potash or Nitre	Sulphat of Potash	Sulphat of Zink
Acetat of Iron	Calcareous Camphorat	Nitrat of Soda	Acidulous Sulphat of Potash	Sulphat of Manganese
Ammoniacal Acetite	Citrat of Soda	Ammoniacal Nitrat	Sulphat of Potash with excess of base	Sulphat of Nickel
Acetite of Potash	Ammoniacal Citrat	Barytic Nitrat	Sulphat of Soda	Sulphat of Bismuth
Calcareous Acetite	Calcareous Citrat	Nitrat of Silver	Acidulous Sulphat of Soda	Sulphat of Antimony
Boombiat of Potash	Fluat of Potash	Nitrite of Potash	Sulphat of Soda with excess of base	Sulphat of Cobalt
Ammoniacal Boombiat	Fluat of Ammoniac	Oxalat of Potash	Sulphat of Ammoniac	Sulphat of Arsenic
Calcareous Boombiat	Fluat of Lime	Acidulous Oxalat of Potash	Acidulous Sulphat of Ammoniac	Sulphat of Molybdan
Carbonat of Potash	Formiat of Soda	Phosphat of Potash	Sulphat of Ammoniac with excess of base	Sulphat of Tunstein
Carbonat of Soda	Ammoniacal Formiat	Phosphat of Soda	Barytic Sulphat	Succinat of Potash
Ammoniacal Carbonat	Calcareous Formiat	Ammoniacal Phosphat	Sulphat of Lime	Arseniat of Potash
Calcareous Carbonat	Lactat of Soda	Phosphat of Lime	Acidulous Sulphat of Alumine	Acidulous Arseniat of Potash
Barytic Carbonat	Ammoniacal Lactat	Phosphat of Iron	Sulphat of Alumine	Arseniat of Potash with excess of base
Magnesian Carbonat	Lactat of Lime	Phosphite of Soda	Sulphat of Alumine with excess of base	Molybdat of Soda
Carbonat of Iron	Gallat of Potash	Prussiat of Iron	Sulphat of Magnesia	Ammoniacal Tunstat
Benzoat of Potash	Malat of Potash	Pyro tartrite of Potash	Sulphat of Silver	Calcareous Tunstat
Ammoniacal Benzoat	Muriat of Potash			Lithiat of Potash

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III.^D TABLE. THE KNOWN COMBINATIONS OF OXYGEN & CALORIC WITH DIFFERENT SUBSTANCES.

Nitrous Gas		Liquid Phosphoric Acid		Liquid Gallic Acid	G	Concrete Molybdic Acid	ML
Nitrous Acid Gas		Liquid Muriatic Acid	M	Liquid Citric Acid	C	Oxyd of Arsenic	As
Nitrous Acid		Muriatic Acid Gas	M	Liquid Malic Acid	ML	Concrete Arsenic Acid	As
Nitric Acid		Oxygenated Muriatic Acid Gas	M	Concrete Benzoic Acid	Bz	Oxyd of Cobalt	K
Oxygenated Nitric Acid		Liquid Oxygenated Muriatic Acid	M	Liquid Pyro ligneous Acid	B	Oxyd of Antimony	Sb
Ice		Concrete Oxygenated Muriatic Acid	M	Liquid Pyro mucous Acid	Pm	Oxyd of Bismuth	B
Water		Concrete Boracic Acid	B	Concrete Camphoric Acid	Cp	Oxyd of Nickel	N
Vapor of Water		Fluoric Acid Gas	F	Liquid Lactic Acid	L	Oxyd of Manganese	M
Carbonic Acid Gas		Concrete Succinic Acid	S	Concrete Saccho-lactic Ac.	SL	Oxyd of Zink	Z
Sulphureous Oxyd Gas		Liquid tartareous Acid	T	Liquid Formic Acid	Fm	Oxyd of Iron	F
Sulphureous Acid Gas		Concrete tartareous Acid	T	Prussic Acid Gas	Ps	Oxyd of Lead	P
Sulphureous Acid		Liquid Pyro-tartareous Ac	T	Liquid Sebacic Acid	Sb	Oxyd of Copper	C
Liquid Sulphuric Acid		Liquid Acetous Acid	A	Liquid Bombic Acid	Bb	Oxyd of Tin	S
Concrete Sulphuric Acid		Acetous Acid Gas	A	Oxyd of Tunstein	T	Oxyd of Mercury	H
Concrete Phosphorus Acid		Liquid Acetic Acid	A	Tunstic Acid	T	Oxyd of Silver	A
Liquid Phosphorus Acid		Concrete Oxalic Acid	O	Oxyd of Molybden	ML	Oxyd of Gold	·
						Oxyd of Platina	P

IV.^TH TABLE. COMBINATIONS OF TWO SUBSTANCES.

Caloric forms a third in some of these Compositions.

Ammoniacal Gas		Sulphuret of Lime	C	Sulphuret of Bismuth	B	Amalgam of Gold	· H
Concrete Ammoniac		Sulphuret of Alumine	A	Sulphuret of Antimony	Sb	of Silver	A H
Carbonated Azotic Gas		Sulphuret of Gold	·	Sulphuret of Cobalt	K	of Copper	C H
Sulphurated Azotic Gas		Sulphuret of Silver	A	Sulphuret of Arsenic	As	of Tin	S H
Carbonated Hydrogen Gas		Sulphuret of Mercury	H	Sulphuret of Molybden	M	Alloy of Tin & Copper	S C
Sulphurated Hydrogen Gas		Sulphuret of Tin	S	Phosphuret of Lead	P	of Tin & Lead	S P
Phosphorated Hydrogen Gas		Sulphuret of Copper	C	Phosphuret of Iron	F	of Iron Manganese	F M
Sulphuret of Potash	P	Sulphuret of Lead	P	Alloy of Platina & Gold	P ·	of Iron & Nickel	F N
Sulphuret of Soda	S	Sulphuret of Iron	F	of Platina & Silver	P A	Carburet of Iron	F F F
Sulphuret of Barytes	B	Sulphuret of Zink	Z	of Gold & Silver	· A		
		Sulphuret of Nickel	N	of Gold & Copper	· C		

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II^d. TABLE. COMBINATIONS OF CALORIC
with different Simple Substances, producing the Solid, Liquid, & Aeriform States.

	Solid	Liquid	Aeriform		Solid	Liquid	Aeriform		Solid	Liquid	Aeriform
Azot				Copper	C	C	C	Pyro-tartarous Radical	T	T	T
Potash	P	P	P	Lead	P	P	P	Oxalic Radical	O	O	O
Soda	S	S	S	Iron	F	F	F	Gallic Radical	G	G	G
Barytes	B	B	B	Zink	Z	Z	Z	Citric Radical	C	C	C
Lime	C	C	C	Manganese	M	M	M	Malic Radical	M.	M.	M.
Magnesia	M	M	M	Nickel	N	N	N	Benzoic Radical	Bz	Bz	Bz
Alumine	A	A	A	Bismuth	B	B	B	Pyro-lignic Radical	E	E	E
Silex	S	S	S	Antimony	Sb	Sb	Sb	Camphoric Radical	Cp	Cp	Cp
Hydrogen				Arsenic	As	As	As	Lactic Radical	L	L	L
Carbon				Molybden	M.	M.	M.	Saccho-lactic Radical	Sl	Sl	Sl
Sulphur				Tunstein	T	T	T	Formic Radical	Fm	Fm	Fm
Phosphorus				Muriatic Radical	M	M	M	Prussic Radical	P	P	P
Gold				Boracic Radical	B	B	B	Sebacic Radical	Sb	Sb	Sb
Platina	P	P	P	Fluoric Radical	F	F	F	Bombic Radical	Bb	Bb	Bb
Silver	A	A	A	Succinic Radical	S	S	S	Lithic Radical	L	L	L
Mercury	H	H	H	Acetous Radical	A	A	A	Ether	E	E	E
Tin	S	S	S	Tartarous Radical	T	T	T	Alkohol	A	A	A

I.st TABLE OF THE CHARACTERS TO BE MADE USE OF IN CHEMISTRY. By Mess.rs Hassenfratz & Adet.

Simple Substances which can exist in the aeriform state in the ordinary temperature of the Atmosphere & which entering into the composition of an infinity of substances demand a great simplicity in their characters		Light.
		Caloric. Matter of Heat.
		Oxygen. Base of Vital Air.
		Azot. Base of Vitiated Air or Mofette
		Characters to express such new and simple Substances as may be discovered.
Alkalies which are as yet considered as simple substances	P	Potash. Caustic fixed Alkali
	S	Soda. Caustic Mineral Alkali
Simple Earths	B	Barytes. Ponderous earth
	C	Lime. Calx
	M	Magnesia.
	A	Alumine. Argillaceous earth.
	S	Silice. Quartz
Combustible Simple Substances, commonly called Inflammable Substances		Hydrogen. Base of inflammable Air
		Carbon, or pure Charcoal.
		Sulphur.
		Phosphorus.
		Characters to express such new combustible substances as will be discovered

METALLIC SUBSTANCES.

Metals reducible by heat alone	P	Platina
	·	Gold. Aurum
	A	Silver. Argentum
A Metal in the liquid State in the ordinary temperature of the Atmosphere	H	Mercury. Hydrargirum
Malleable Metals	S	Tin. Stannum
	C	Copper. Cuprum
	P	Lead. Plumbum
	F	Iron. Ferrum
Metals not malleable	Z	Zink. Zincum
	M	Manganese. Magnesiii
	N	Nickel. Nicolum
	B	Bismuth. Bismuthum
	St	Antimony. Stibium
	K	Cobalt. Kobaltum
Acidifiable Metals	As	Arsenic. Arsenicum
	M	Molybden. Molybdenii
	T	Tunstein. Tunstenum

Bases which we do not as yet know, but whose nature we expect to be able to discover

Radical	M	Muriatic
	B	Boracic
	F	Fluoric
	S	Succinic
	A	Acetic
	T	Tartaric
	P	Pyro-tartaric
	O	Oxalic
	G	Gallic
	C	Citric
	M	Malic
	Bz	Benzoic
	P	Pyro-lignic
	Pm	Pyro-mucic
	Cp	Camphoric
	L	Lactic
	SL	Saccho-lactic
	Fm	Formic
	P	Prussic
	Sb	Sebacic
	Bb	Bombic
	L	Lithic

Compound bodies which are not acidifiable bases and whose component Principles are very little known

E	Ether
A	Alcohol
O	Fixed Oil
Ov	Volatile Oil
B	Bitumen
M	Mucus

General Characters

	Alkalies
	Earths
	Combustible Substances
	Metallic Substances
	Compound Acidifiable Bases
	Non Acidifiable compound Substances

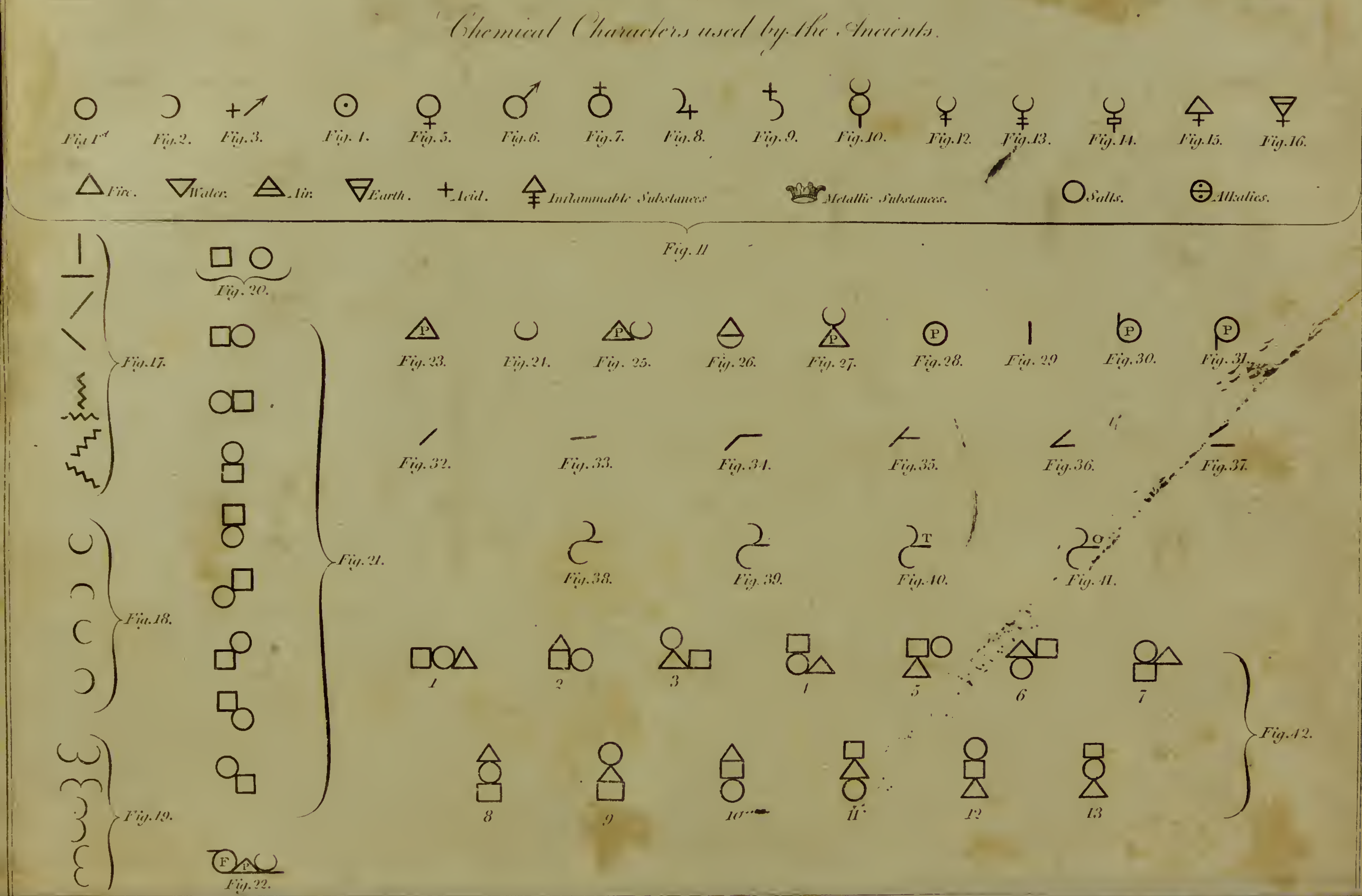
Chemical Characters used by the Ancients.
Fig. 1st
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.
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Fig. 16.
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Water.
Air.
Earth.
Acid.
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Metallic Substances.
Salts.
Alkalies.
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Fig. 21.
Fig. 22.
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Fig. 26.
Fig. 27.
Fig. 28.
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Fig. 30.
Fig. 31.
Fig. 32.
Fig. 33.
Fig. 34.
Fig. 35.
Fig. 36.
Fig. 37.
Fig. 38.
Fig. 39.
Fig. 40.
Fig. 41.
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Fig. 42.

CHENOPODIUM, GOOSE-FOOT, or *Wild Orach*; a genus of the digynia order, belonging to the pentandria clafs of plants; and in the natural method ranking under the 12th order, *Holoraceæ*. The calyx is pentaphyllous and pentagonal; no corolla; one feed lenticular, fuperior. There are 18 fpecies, 13 of which are natives of Britain. The moft remarkable are the following: 1. The *bonus henricus*, or common Englifh mercury, found growing naturally in fhady lanes in many places in Britain. It has large triangular, arrow-pointed, entire leaves; upright, thick, ftriated ftalks, garnifhed with triangular leaves, and terminated by clofe fpikes of apetalous yellowifh-green flowers in June and July, which are fucceeded by ripe feeds in Auguft. 2. The *fcoparia*, belvidere, or annual mock-cyprefs, which is of a beautiful pyramidal form, refembling a young cyprefs-tree. 3. The *botrys*, or oak of Jerufalem. 4. The *ambrofoides*, or oak of Cappadocia. All thefe are very eafily propagated from feeds; and will thrive beft in a rich light earth. Moft of the fpecies have an aromatic fmell. A fpecies which grows near the Mediterranean is ufed by the Egyptians in fallads, on account of its faltifh aromatic tafte. From the fame plant kelp is made in other countries. The firft fpecies, or *Englifh mercury*, was formerly ufed as fpinach; but is now difufed, as being greatly inferior to that herb. As an article of the materia medica, it is ranked among the emollient herbs, but rarely ufed. Goats and fheep are not fond of this herb; cows, horfes, and fwine, refufe it. The *belvidere* is a plant much efteemed in China. It is about the beginning of April that the belvidere fprings up. Its fuckers or fhoots rife to the height of eight or nine inches, in fhape of a child's fift half fhut; after which it extends itfelf, and fends forth a number of branches loaded with leaves like thofe of flax; and as it grows, its branches arrange themfelves naturally in the form of a beautiful pyramid; its leaves are juicy, have a very agreeable tafte, and may be eaten as a fallad with vinegar. When prepared like other leguminous plants, and baked with meat, it has an agreeable and pleafing flavour: and when its leaves become hard and unfit for the table, nourifhment is then found in its root, which ferves as a refource in times of famine and fcarcity. The Chinefe Herbal cites the example of four mountaineers, who having lived on nothing but the leaves, roots, and ftalks, of the belvidere, with which their country abounded, had neverthelefs enjoyed perfect health to a very great age.

CHEPELIO, an ifland in the bay of Panama and province of Darien, in South America, fituated about three leagues from the city of Panama, which it fupplies with provifions. W. long. 81. N. lat. 9.

CHEPSTOW, a market town of Monmouthfhire in England, feated on the river Wye near its mouth, in W. long. 2. 40. N. lat. 51. 40.

CHEQ, or CHERIF, the prince of Mecca, who is, as it were, high prieft of the law, and fovereign pontiff of all the Mahometans of whatever fect or country they may be. See CALIPH. The grand fignior, fophis, moguls, khans of Tartary, &c. fend him yearly prefents, efpecially tapeftry to cover Mahomet's tomb withal, together with a fumptuous tent for himfelf, and vaft fums of money to provide for all the pilgrims during the 17 days of their devotion.

CHERASCO, a ftrong and confiderable town of Italy, in Piedmont, and capital of a territory of the fame name, with a ftrong citadel belonging to the king of Sardinia, where he retired in 1706, during the fiege of Turin. It is feated at the confluence of the rivers Sturia and Tanaro, upon a mountain. E. long. 7. 55. N. lat. 44. 35.

CHERBURG, a feaport of France, in the department of the Channel and late province of Normandy, with a harbour and late Auguftine abbey. It is remarkable for the fea-fight between the Englifh and French fleets in 1692; when the latter were beat, and upwards of twenty of their men of war burnt near Cape la Hogue. The Englifh landed here in Auguft 1758, and took the town, with the fhips in the bafin, demolifhed the fortifications, and ruined the other works which had been long about, to enlarge the harbour, and render it more fafe and convenient for fhipping. The works were refumed, on a very ftupendous fcale, by the late unfortunate Lewis XVI. but their progrefs has been interrupted by the late unexpected feries of events in France. At Cherburg is a fociety, whofe principal object is the natural hiftory of the country, with a proper attention to navigation and commerce. It is 50 miles N. W. of Caen. Lon. 1. 33. E. Lat. 49. 38. N.

CHEREM, among the Jews, is ufed to fignify a fpecies of annihilation. See ANNIHILATION. The Hebrew word *cherem* fignifies properly to *deftroy, exterminate, devote*, or *anathematife*.

CHEREM is likewife fometimes taken for that which is confecrated, vowed, or offered to the Lord, fo that it may no longer be employed in common or profane ufes. No devoted thing that a man fhall devote unto the Lord, of all that he hath of man and beaft, and of the field of his poffeffion, fhall be fold or redeemed; every devoted thing is moft holy to the Lord: none devoted, which fhall be devoted of men, fhall be redeemed, but fhall furely be put to death. There are fome who affert that the perfons thus devoted were put to death; whereof Jephtha's daughter is a memorable example. Judges xi. 29, &c.

CHEREM is alfo ufed for a kind of excommunication in ufe among the Jews. See NIDDUI.

CHERESOUL, or CHAHRZUL, a town of Turkey in Afia, capital of Curdiftan, and the feat of a beglerbeg. E. long. 45. 15. N. lat. 36. 0.

CHERILUS, of Samos, a Greek poet, flourifhed 479 years before Chrift. He fung the victory gained by the Athenians over Xerxes, and was rewarded with a piece of gold for every verfe. His poem had afterwards the honour of being rehearfed yearly with the works of Homer.

CHERLERIA, in botany; a genus of the trigynia order, belonging to the decandria clafs of plants; and in the natural method ranking under the 22d order, *Caryophylleæ*. The calyx is pentaphyllous; there are five nectaria, bifid, and petal-like; the antheræ alternately barren; the capfule is trilocular and three-valved.

CHERLESQUIOR, in Turkifh affairs, denotes a lieutenant-general of the grand fignior's armies.

CHERMES, in zoology, a genus of infects belonging to the order of infecta hemiptera. See Plate 2. The roftrum is fituated on the breaft; the feelers are longer than the thorax; the four wings are deflected; the thorax is gibbous; and the feet are of the jumping kind. There are 17 fpecies; and the trivial names are taken from the plants which they frequent, as the chermes graminis, or grafs-bug; the chermes ulmi, or elm-bug, &c. The chermes ficus, or fig-tree bug, one of the largeft of the genus, is brown above and greenifh beneath. The antennæ, likewife brown, are large, hairy, and one third longer than the thorax. The feet are yellowifh; the wings large, twice the length of the abdomen. They are placed fo as to form together an acute roof. The membrane of which they confift is thin and very tranfparent; but they have brown veins, ftrongly marked, efpecially towards the extremity. The roftrum of this chermes is black, and takes its rife from the lower part of the thorax, between the firft and fecond pair of feet. It is an infect to be met with in great numbers upon the fig-tree. The larva has fix feet. It is like the infect, when provided with wings. Its form is oblong, and its motion flow. The chryfalis differs from it by two flat buds that fpring from

the thorax and inclofe the wings, afterwards feen in the perfect infect. Thefe chryfalids are frequently met with on plants; and the two plates of their thorax give them a broad uncouth appearance, and a heavy look. When the little chryfalids are going to be metamorphofed, they remain motionlefs under fome leaves which they fix themfelves upon. Their fkin then divides upon the head and thorax, and the perfect infect comes forth with his wings, leaving the fpoil of his chryfalis open and rent anteriorly upon the leaf. Thefe kind of floughs are often found beneath the leaves of the fig-tree. The perfect infect is furnifhed with four wings, large in proportion to its body, veined, and placed in the form of a roof; and with them it flies. It has, moreover, the faculty of leaping pretty brifkly, by means of its hinder-legs, which play like a fpring. When it is attempted to catch the chermes, it makes its efcape rather by leaping than flying. Some of thofe infects have a manœuvre worthy of notice. Several fpecies are provided at the extremity of their body with a fmall fharp-pointed implement, but which lies concealed, and that they draw out in order to depofit their eggs, by making a puncture in the plant that fuits them. By this method the fir-tree chermes produces that enormous fcaly protuberance that is to be found at the fummit of the branches of that tree, and which is formed by the extravafation of the juices occafioned by the punctures. The young larvæ fhelter themfelves in cells contained in the tumour. The white down, under which the larva of the pine-chermes is found, feems to be produced much in the fame manner. That of the box-tree chermes produces no tubercula like thofe; but its punctures make the leaves of that tree bend and grow hollow in the fhape of a cap, which, by the union of thofe inflected leaves, produces at the extremity of the branches a kind of knobs, in which the larvæ of that infect find fhelter. The box-chermes, as well as fome others, has yet another peculiarity, which is, that the larva and its chryfalis eject at the anus a white fweet-tafted matter, that foftens under the touch, and is not unlike manna. This fubftance is found in fmall white grains within the balls formed by the box-leaves, and a ftring of the fame matter is often feen depending from the anus of the infect.

CHERMES *Mineral*. See KERMES.

CHERRY-ISLAND, an ifland in the northern ocean, lying between Norway and Greenland, in E. long. 20. 5. N. lat. 75. 0.

CHERRY-*Tree*, in botany. See PRUNUS.

CHERSO, an ifland in the gulph of Venice, with a town of the fame name near Croatia, belonging to the Venetians. The air is good, but the foil ftony; however, it abounds in wine, cattle, oil, and excellent honey. E. long. 15. 5. N. lat. 45. 8.

CHERSONESUS, among modern geographers, the fame with a peninfula; or a continent almoft encompaffed round with the fea, only joining to the main land by a narrow neck or ifthmus. The word is Greek, χερσονησος; of χερσος *land*, and νησος *ifland*; which fignifies the fame. In ancient geography, it was applied to feveral peninfulas; as the Cherfonefus Aurea, Cimbrica, Taurica, and Thracia, now thought to be Malacca, Jutland, Crim Tartary, and Romania.

CHERT, PETROSILEX, *Lapis Corneus*, the *Hornftein* of the Germans; a fpecies of ftone claffed by Cronftedt among the filiceous earths. It is of a coarfer texture than the common flint, as well as fofter; for which reafon it is not capable of fuch a fine polifh. It is femitranfparent at the edges, or when broken into very thin pieces. It is found of different colours, *viz.* white, whitifh-yellow, flefh coloured, and greenifh. According to Mr. Kirwan, it runs in veins through rocks, from whence its name is derived; its fpecific gravity being from 2590 to 2700. In the fire it whitens and decrepitates like filex, but is generally infufible *per fe*. Mineral alkali does not totally diffolve it in the dry way, but borax and microcofmic falt do fo without effervefcence. Its appearance is duller and lefs tranfparent than common flint. The reddifh petrofilex, ufed in the count de Lauragais's porcelain manufactory, and there called *feld fpat*, contained 72 *per cent.* of filex, 22 of argill, and 6 of calcareous earth. Cronftedt obferves that there are not as yet any certain characters known by which the cherts and jafpers may be diftinguifhed from one another, though they can eafily be fo by fight; the cherts appearing of a fine fparkling texture when broken; but the jafper being grained, dull, and opaque, and having the appearance of a dry clay.

CHERTSEY, a town of Surry, with a market on Wednefday. It is feated near the Thames, over which is a handfome ftone bridge of feven arches, built in 1785. It is feven miles W. of Kingfton, and 20 W. by S. of London. Lon. 0. 20. W. Lat. 51. 25. N.

CHERUB (plural, CHERUBIM); a celeftial fpirit, which in the hierarchy is placed next to the feraphim. See HIERARCHY. The figure of the cherubim was not always uniform, fince they are differently defcribed in the fhapes of men, eagles, oxen, lions, and in a compofition of all thefe figures put together. Mofes likewife calls thofe fymbolical or hieroglyphical reprefentations, which were embroidered on the veils of the tabernacle, *cherubim* of coftly work. Such were the fymbolical figures which the Egyptians placed at the gates of their temples, and images of the generality of their gods, which were commonly nothing but ftatues compofed of men and animals.

CHERVIL, in botany. See CHÆROPHYLLUM.

CHESAPEAK, in America, one of the largeft bays in the known world. Its entrance is between Cape Charles and Cape Henry in Virginia, 12 miles wide; and it extends 270 miles to the northward, dividing Virginia and Maryland. Through this extent it is from 7 to 18 miles broad, and generally about 9 fathoms deep; affording many commodious harbours, and a fafe and eafy navigation. It receives the waters of the Sufquehannah, Patomak, Rappahannock, York, and James rivers, which are all large and navigable.

CHESELDEN (William), an eminent anatomift and furgeon, was born at Burrow on the Hill, in the county of Leicefter, defcended from an ancient family in the county of Rutland, whofe arms and pedigree are in Wright's "Hiftory of Rutland." He received the rudiments of his profeffional fkill at Leicefter; and married Deborah Knight, a citizen's daughter, by whom he had one daughter. In 1713 he publifhed his Anatomy of the Human Body, in one volume 8vo; and in 1723, A Treatife on the High Operation for the Stone. He was one of the earlieft of his profeffion who contributed by his writings to raife it to its prefent eminence. In the beginning of 1736, he was honourably mentioned by Mr. Pope; as "the moft noted and moft deferving man in the whole profeffion of chirurgery." He appears indeed to have been on terms of the moft intimate friendfhip with Mr. Pope, who frequently, in his Letters to Mr. Richardfon, talks of dining with Mr. Chefelden, who then lived in or near Queen Square. In February 1737, Mr. Chefelden was appointed furgeon to Chelfea hofpital. He died at Bath, April 11, 1752, of a diforder arifing from drinking ale after eating hot buns. Finding himfelf uneafy, he fent for a phyfician, who advifed vomiting immediately; and if the advice had been taken, it was thought his life might have been faved. By his direction, he was buried at Chelfea.

CHESHIRE, a maritime county of England, bounded by Lancafhire on the north; Shropfhire and part of Flintfhire, on the fouth; Derbyfhire and Staffordfhire, on the eaft and fouth-eaft; and Denbighfhire and part of Flintfhire on the weft and north-weft. It extends in length about 44 miles, in breadth 25:


Cimex
Various
Cimex
Paradoxus
Chermes
Various
Coccinellæ.
Clio.
Chiton.
Coalzontecoxchitl.
Coccus hesperidum.
Cicindela.
Cocos
Nucifera
or Cocoa Nut Tree.
Citrus
Forbidden Fruit Tree.
Colymbus.
Coccus lacca.
A Dun
or Burgh.

and is fuppofed to contain 125,000 inhabitants. Both the air and foil in general are good. In many places of the country are peat-moffes, in which are often found trunks of fir-trees, fometimes feveral feet under ground, that are ufed by the inhabitants both for fuel and candles. Here alfo are many lakes and pools well ftored with fifh; befides the rivers Merfey, Weaver, and Dee, which laft falls into a creek of the Irifh fea near Chefter. This country alfo abounds with wood: but what it is chiefly remarkable for, is its cheefe. The principal towns are, Chefter the capital, Cholmondeley, Namptwich, &c. William the Conqueror erected this county into a palatinate, or county-palatine, in favour of his nephew Hugh Lupus, to whom he granted the fame fovereign jurifdiction in it that he himfelf had in the reft of the ifland. By virtue of this grant, the town of Chefter enjoyed fovereign jurifdiction within its own precincts; and that in fo high a degree, that the earls held parliaments, confifting of their barons and tenants, which were not bound by the acts of the Englifh parliament. But this exorbitant power of the palatinates was at laft reduced by Henry VIII.; however, all cafes and crimes, except thofe of error, foreign-plea, foreign-voucher, and high treafon, are ftill heard and determined within the fhire. The earls were anciently fuperiors of the whole county, and all the land-holders were mediately or immediately their vaffals, and under the like fovereign allegiance to them as they were to the kings of England; but the earldoms were united to the crown by Edward III. fince which time, the eldeft fons of kings of England have always been earls of Chefter, as well as princes of Wales. Chefhire fends four members to parliament; two for the county, and two for the capital.

CHESNE (Andrew du), ftyled the father of French hiftory, was born in 1584. He wrote, 1. A hiftory of the popes. 2. An hiftory of England. 3. An inquiry into the antiquities of the towns of France. 4. An hiftory of the cardinals. 5. A bibliotheca of the authors who have written the hiftory and topography of France, &c. He was crufhed to death by a cart, in going from Paris to his country-houfe at Verriere, in 1640.

CHESNUT-TREE. See Fagus.

CHESS, an ingenious game performed with different pieces of wood, on a board divided into 64 fquares or houfes; in which chance has fo fmall a fhare, that it may be doubted whether a perfon ever loft a game but by his own fault. Each player has eight dignified pieces, *viz.* a king, a queen, two bifhops, two knights, and two rooks, alfo eight pawns: all which, for diftinction's fake, are of two different colours, as white and black.

As to their difpofition on the board, the white king is to be placed on the fourth black houfe from the corner of the board, in the firft and lower rank; and the black king is to be placed on the fourth white houfe on the oppofite, or adverfary's end of the board. The queens are to be placed next to the kings, on houfes of their own colour. Next to the king and queen, on each hand, place the two bifhops; next to them, the two knights; and laft of all, on the corners of the board, the two rooks. As to the pawns, they are placed, without diftinction, on the fecond rank of the board, one before each of the dignified pieces. Having thus difpofed the men, the onfet is commonly begun by the pawns, which march ftraight forward in their own file, one houfe at a time, except the firft move, when it can advance two houfes, but never moves backwards: the manner of their taking the adverfary's men is fide-ways, in the next houfe forwards; where having captured the enemy, they move forward as before. The rook goes forward or crofs-ways through the whole file, and back again. The knight fkips backward and forward to the next houfe, fave one, of a different colour, with a fidling march, or a flope, and thus kills his enemies that fall in his way, or guards his friends that may be expofed on that fide. The bifhop walks always in the fame colour of the field that he is placed in at firft, forward and backward, aflope, or diagonally, as far as he lifts. The queen's walk is more univerfal, as fhe takes all the fteps of the before-mentioned pieces, excepting that of the knight; and as to the king's motion, it is one houfe at a time, and that, either forward, backward, floping, or fide-ways.

As to the value of the different pieces, next to the king is the queen, after her the rooks, then the bifhops, and laft of the dignified pieces comes the knight. The difference of the worth of pawns, is not fo great as that of noblemen; only, it muft be obferved, that the king's bifhop's pawn is the beft in the field, and therefore the fkilful gamefter will be careful of him. It ought alfo to be obferved, that whereas any man may be taken, when he falls within the reach of any of his adverfary's pieces, it is otherwife with the king, who, in fuch a cafe, is only to be faluted with the word *check*, warning him of his danger, out of which it is abfolutely neceffary that he move; and, if it fo happen that he cannot move without expofing himfelf to the like inconvenience, it is check-mate, and the game is loft. The rules of the game are thefe:

1. In order to begin the game, the pawns muft be moved before the pieces, and afterwards the pieces muft be brought out to fupport them. The king's, queen's, and bifhop's pawns fhould be moved firft, that the game may be well opened; the pieces muft not be played out early in the game, becaufe the player may thereby lofe his moves: but above all, the game fhould be well arranged before the queen is played out. Ufelefs checks fhould alfo be avoided, unlefs fome advantage is to be gained by them, becaufe the move may be loft, if the adverfary can either take or drive the piece away.

2. If the game is crowded, the player will meet with obftructions in moving his pieces; for which reafon he fhould exchange pieces or pawns, and caftle* his king as foon as it is convenient, endeavouring at the fame time to crowd the adverfary's game, which may be done by attacking his pieces with the pawns, if the adverfary fhould move out his pieces too foon.

3. The men fhould be fo guarded by one another, that if a man fhould be loft, the player may have it in his power to take one of the adverfary's in return; and if he can take a fuperior piece in lieu of that which he lofes, it will be an advantage, and diftrefs the adverfary.

4. The adverfary's king fhould never be attacked without a fufficient force; and if the player's king fhould be attacked without having it in his power to attack the adverfary's, he fhould offer to make an exchange of pieces, which may caufe the adverfary to lofe a move.

5. The board fhould be looked over with attention, and the men reconnoitred, fo as to be aware of any ftroke that the adverfary might attempt in confequence of his laft move. If, by counting as many moves forward as poffible, the player has a profpect of fuccefs, he fhould not fail doing it, and even facrifice a piece or two to accomplifh his end.

6. No man fhould be played till the board is thoroughly examined, that the player may defend himfelf againft any move

* *To caftle his king*, is to cover the king with a caftle; which is done by a certain move which each player has a right to put in practice whenever he thinks proper.

the adverſary has in view; neither ſhould any attack be made till the conſequences of the adverſary's next move are conſidered; and when an attack may with ſafety be made, it ſhould be purſued without catching at any bait that might be thrown out in order for the adverſary to gain a move, and thereby cauſe the deſign to miſcarry.

7. The queen ſhould never ſtand in ſuch a manner before the king, that the adverſary, by bringing a rook or biſhop, could check the king if ſhe were not there; as it might occaſion the loſs of the queen.

8. The adverſary's knight ſhould never be ſuffered to check the king and queen, or king and rook, or queen and rook, or the two rooks at the ſame time; eſpecially if the knight is properly guarded: becauſe, in the two firſt caſes, the king being forced to go out of the check, the queen or the rook muſt be loſt; and in the two laſt caſes a rook muſt be loſt at leaſt for a worſe piece.

9. The player ſhould take care that no guarded pawn of the adverſary fork two of his pieces.

10. As ſoon as the kings have caſtled on different ſides of the board, the pawns on that ſide of the board ſhould be advanced upon the adverſary's king, and the pieces, eſpecially the queen and rook, ſhould be brought to ſupport them; and the three pawns belonging to the king that is caſtled muſt not be moved.

11. The more moves a player can have as it were in ambuſcade, the better; that is to ſay, the queen, biſhop, or rook, is to be placed behind a pawn or a piece, in ſuch a poſition as that upon playing that pawn or piece a check is diſcovered upon the adverſary's king, by which means a piece or ſome advantage is often gained.

12. An inferior piece ſhould never be guarded with a ſuperior, when a pawn would anſwer the ſame purpoſe; for this reaſon, the ſuperior piece may remain out of play; neither ſhould a pawn be guarded with a piece when a pawn would do as well.

13. A well ſupported pawn that is paſſed often coſts the adverſary a piece; and when a pawn or any other advantage is gained without endangering the loſs of the move, the player ſhould make as frequent exchanges of pieces as he can. The advantage of a paſſed pawn is this: for example, if the player and his adverſary have each three pawns upon the board, and no piece, and the player has one of his pawns on one ſide of the board, and the other two on the other ſide, and the adverſary's three pawns are oppoſite to the player's two pawns, he ſhould march with his king as ſoon as he can, and take the adverſary's pawns: if the adverſary goes with his king to ſupport them, the player ſhould go on to queen with his ſingle pawn; and then if the adverſary goes to hinder him, he ſhould take the adverſary's pawns, and move the others to queen*.

14. When the game is near finiſhed, each party having only three or four pawns on each ſide of the board, the kings muſt endeavour to gain the move in order to win the game. For inſtance, when the player brings his king oppoſite to the adverſary's with only one ſquare between, he will gain the move.

15. If the adverſary has his king and one pawn on the board, and the player has only his king, he cannot loſe the game, provided he brings his king oppoſite to the adverſary's, when the adverſary is directly before or on one ſide of his pawn, and there is only one ſquare between the kings.

16. If the adverſary has a biſhop and one pawn on the rook's line, and this biſhop is not of the colour that commands the corner ſquare the pawn is going to, and the player has only his king, if he can get into that corner, he cannot loſe; but, on the contrary, may win by a ſtale †.

17. If the player has greatly the diſadvantage of the game, having only his queen left in play, and his king happens to be in a poſition to win, as above mentioned, he ſhould keep giving check to the adverſary's king, always taking care not to check him where he can interpoſe any of his pieces that make the ſtale: by ſo doing he will at laſt force the adverſary to take his queen, and then he will win the game by being in a ſtale-mate.

18. The player ſhould never cover a check with a piece that a pawn puſhed upon it may take, for fear of getting only the pawn in exchange for the piece.

19. A player ſhould never crowd his adverſary up with pieces, for fear of giving a ſtale-mate inadvertently, but always ſhould leave room for his king to move.

By way of corroborating what has been already ſaid with reſpect to this game, it is neceſſary to warn a player againſt playing a timid game. He ſhould never be too much afraid of loſing a rook for an inferior piece; becauſe, although a rook is a better piece than any other except the queen, it ſeldom comes into play to be of any great uſe till at the end of the game; for which reaſon it is often better to have an inferior piece in play, than a ſuperior one to ſtand ſtill, or moving to no great purpoſe. If a piece is moved, and is immediately driven away by a pawn, it may be reckoned a bad move, becauſe the adverſary gains a double advantage over the player, in advancing at the ſame time the other is made to retire; although the firſt move may not ſeem of conſequence between equal players, yet a move or two more loſt after the firſt makes the game ſcarcely to be recovered.

There never can want variety at this game, provided the pieces have been brought out regularly; but if otherwiſe, it often happens that a player has ſcarce any thing to play.

Many indifferent players think nothing of the pawns, whereas three pawns together are ſtrong; but four, which conſtitute a ſquare, with the aſſiſtance of other pieces, well managed, make an invincible ſtrength, and in all probability may produce a queen when very much wanted. It is true, that two pawns with a ſpace between, are no better than one; and if there ſhould be three over each other in a line, the game cannot be in a worſe way. This ſhows that the pawns are of great conſequence, provided they are kept cloſe together.

Some middling players are very apt to riſk loſing the game in order to recover a piece: this is improper; for it is much better to give up a piece and attack the enemy in another quarter. By ſo doing, the player has a chance of ſnatching a pawn or two from, or gaining ſome advantage over, the adverſary, whilſt his attention is taken up in purſuing this piece.

If the queen and another piece are attacked at the ſame time, and that by removing the queen the piece muſt be loſt; provided two pieces can be gained in exchange for the queen, the queen ſhould be given up, it being the difference of three pieces, and conſequently more than the value of the queen. By loſing the queen, the game is not thrown into that diſorder which it would otherwiſe have been: in this caſe it would be judicious to give the queen for even a piece, or a pawn or two; it being well known among good players, that he who begins the attack, and cannot maintain it, being obliged to retire, generally loſes the game.

A player ſhould never be fond of changing without reaſon,

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* *To queen*, is to make a queen; that is, to move a pawn into the adverſary's back row, which is the rule at this game when the original one is loſt.

† *Stale-mate* is when the king is blocked up ſo as to have no move at all.

becaufe the adverfary, if he is a good player, will ruin his fituation, and gain a confiderable advantage over him. But rather than lofe a move, when the player is ftronger than the adverfary, it is good play to change, for he thereby increafes his ftrength. When the game is almoft drawn to a conclufion, the player fhould recollect that his king is a capital piece, and confequently fhould keep him in motion; for by fo doing he generally gets the move, and often the game. As the queen, rook, and bifhop, operate at a diftance, it is not always neceffary in the attack to have them near the adverfary's king. If a man can be taken with different pieces, the player fhould take his time, and confider which of thofe pieces it is beft to take it with. If a piece can be taken almoft at any time, the player fhould not be in a hurry about it, but try to make a good move elfewhere before he takes it. A player fhould be cautious how he takes his adverfary's pawn with his king, as it often happens to be a fafe-guard to it. The *laws of the game* are, 1. If a player touches his man, he muft play it, and if he quits it, he cannot recall it. 2. If by miftake or otherwife a falfe move is played, and the adverfary takes no notice of it till he hath played his next move, it cannot be recalled by either of the parties. 3. If a player mifplaces the men, and he plays two moves, it is at the option of the adverfary to permit him to begin the game or not. 4. If the adverfary plays or difcovers a check to a player's king, and gives no notice of it, the player may let him ftand ftill till he does. 5. After the king is moved, a player cannot caftle.

Authors are by no means agreed with regard to the origin of the game of chefs. Though it came to us from the Saracens, it is by no means probable that they were the original inventors of it. According to fome, it was invented by the celebrated Grecian hero Diomedes. Others fay, that two Grecian brothers, Ledo and Tyrrheno, were the inventors; and that being much preffed with hunger, they fought to alleviate the pain by this amufement. It is certain, however, that it is a game of very ancient ftanding, and in former ages has been very fafhionable in every part of Europe; though in this country it is not now fo very common, probably on account of the intenfe application of thought required to play at it. It has long been a favourite of the Icelanders and other northern people; and there is little difference between their game and ours.

The game of chefs has been generally practifed by the greateft warriors and generals; and fome have even fuppofed that it was neceffary for a military man to be well fkilled in this game. We read that Tamerlane was a great chefs-player, and was engaged in a game during the very time of the decifive battle with Bajazet the Turkifh emperor, who was defeated and taken prifoner. It is alfo related of Al Amin the khalif of Bagdad, that he was engaged at chefs with his freedman Kuthar at the time when Al Mamun's forces were carrying on the fiege of that city with fo much vigour that it was on the point of being carried by affault. Dr. Hyde quotes an Arabic hiftory of the Saracens, in which the khaliff is faid to have cried out when warned of his danger, "Let me alone, for I fee check-mate againft Kuthar!" We are told that Charles I. was at chefs when news was brought of the final intention of the Scots to fell him to the Englifh; but fo little was he difcompofed by this alarming intelligence, that he continued his game with the utmoft compofure; fo that no perfon could have known that the letter he received had given him information of any thing remarkable. King John was playing at chefs when the deputies from Rouen came to acquaint him that their city was befieged by Philip Auguftus; but he would not hear them until he had finifhed his game.

The following remarkable anecdote we have from Dr. Robertfon, in his Hiftory of Charles V.—John Frederic, elector of Saxony, having been taken prifoner by Charles, was condemned to death. The decree was intimated to him while at chefs with Erneft of Brunfwic, his fellow-prifoner. After a fhort paufe, and making fome reflections on the irregularity and injuftice of the emperor's proceedings, he turned to his antagonift, whom he challenged to finifh the game. He played with his ufual ingenuity and attention; and having beat Erneft, expreffed all the fatisfaction that is commonly felt on gaining fuch victories. He was not, however, put to death, but fet at liberty after five years imprifonment.

In the Chronicle of the Moorifh kings of Granada we find it related, that in 1396 Mehemed Balba feized upon the crown in prejudice of his elder brother, and paffed his life in one continual round of difafters. His wars with Caftile were invariably unfuccefsful; and his death was occafioned by a poifoned veft. Finding his cafe defperate, he difpatched an officer to the fort of Salobreno to put his brother Juzaf to death, left that prince's adherents fhould form any obftacle to his fon's fucceffion. The alcayde found the prince playing at chefs with an *alfaqui* or prieft. Juzaf begged hard for two hours refpite, which was denied him; at laft with great reluctance the officer permitted him to finifh the game; but before it was finifhed a meffenger arrived with the news of the death of Mehemed, and the unanimous election of Juzaf to the crown.

The game of chefs has undergone confiderable variations fince it was firft invented. We have it on good authority, that among the eaftern nations, the piece now called the *queen* was formerly called the *vizir* or king's minifter, and that the powers of the queen herfelf were but very fmall. The chefs-boards ufed by Tamerlane were larger, and contained many more fquares than thofe at prefent in ufe. Carrera invented two new pieces to be added to the eight commonly in ufe. One of thefe, which he calls *Campione*, is placed between the king's knight aud caftle; the other, named *Centaur*, between the queen's knight and caftle, has the move of the bifhop and knight united. This invention, however, did not furvive its author. In another of this kind, the two additional pieces are called the *centurion* and *decurion*; the former fituated between the king and his bifhop, in its move the fame with that of the queen, but only for two fquares; the latter moves as the bifhop, but only one fquare at a time. This, like the former, died with its inventor. The chefs-board of Tamerlane was a parallelogram, having 11 fquares one way and 12 the other. In the Memoirs of the late Marfhal Keith, we find it related, that he invented an amufement fomething fimilar to that of chefs, with which the king of Pruffia was highly entertained. Several thoufand fmall ftatues were caft by a founder; and thefe were ranged oppofite to each other as if they had been drawn up in an army; making the different movements with them as in real fervice in the field. A very complicated kind of chefs was likewife invented by the late duke of Rutland.

There is an amufing variety at the game of chefs, in which the king with eight pawns engages the whole fet, by being allowed to make two moves for every one of his adverfary. In this he is almoft certain of coming off victorious; as he can make his firft move into check, and the fecond out of it. Thus he can take the queen when fhe ftands immediately before her king, and then retreat; for he cannot remain in check. He cannot be check-mated unlefs his adverfary has preferved his queen and both caftles.

Chess-*trees*; *taquets d'amure*; two pieces of wood bolted perpendicularly, one on the ftarboard, and another on the larboard fide of the fhip. They are ufed to confine the *clue*, or lower corners of the main-fail; for which purpofe there is a hole in the upper part, through which the rope paffes that ufually extends the clue of the fail to windward. See Tack.

The chefs-trees are commonly placed as far before the main-maft as the length of the main-beam.

CHEST, in commerce, a kind of meafure, containing an uncertain quantity of feveral commodities. A cheft of fugar, *e. g.* contains from 10 to 15 hundred weight; a cheft of glafs, from two hundred to three hundred feet; of Caftile foap, from two and an half to three hundred weight; of indigo, from one and an half to two hundred weight, five fcore to the hundred.

CHEST, or *Thorax*. See ANATOMY, page 166.

CHESTER, commonly called *Weft-Chefter*, to diftinguifh it from many other Chefters in the kingdom; the capital of Chefhire in England. It is a very ancient city, fuppofed to have been founded by the Romans; and plainly appears to have been a Roman ftation by the many antiquities which have been and are ftill difcovered in and about the town. It was among the laft places the Romans quitted; and here the Britons maintained their liberty long after the Saxons had got poffeffion of the reft of their country. At prefent it is a large well-built wealthy city, and carries on a confiderable trade. Mr. Pennant calls it *a city without parallel*, on account of the fingular ftructure of the four principal ftreets. They are as if excavated out of the earth, and funk many feet beneath the furface: the carriages drive far beneath the level of the kitchens on a line with ranges of fhops. The houfes are moftly of wood, with galleries, piazzas, and covered walls before them; by which not only the fhops, but thofe who are walking about the town, are fo hid, that one would imagine there were fcarce any inhabitants in it, though it is very populous. But though by this contrivance fuch as walk the ftreets are fcreened from rain, &c. yet the fhops are thereby rendered dark and inconvenient. The back courts of all the houfes are on a level with the ground; but to go into any of the four principal ftreets, it is neceffary to defcend a flight of feveral fteps.

Chefter is a bifhop's fee. It was anciently part of the diocefe of Lichfield; one of whofe bifhops removing the feat of his fee hither in the year 1075, occafioned his fucceffors to be frequently ftyled *bifhops of Chefter*. But it was not erected into a diftinct bifhopric until the general diffolution of monafteries, when king Henry VIII. in the year 1541, raifed it to this dignity, and allotted the church of the abbey of St. Werberg for the cathedral, ftyling it the *cathedral church of Chrift and the bleffed Virgin*; adding the bifhopric to the province of Canterbury: but foon after he disjoined it from Canterbury, and added it to the province of York. When this abbey was diffolved, its revenues were valued at 1003l. 5s. 11d. This diocefe contains the entire counties of Chefter and Lancafter, part of the counties of Weftmoreland, Cumberland, and Yorkfhire, two chapelries in Denbighfhire, and five parifhes in Flintfhire; amounting in all to 256 parifhes, of which 101 are impropriations. This bifhopric is valued in the king's books at 420l. 1s. 8d., and is computed to be worth annually 2700l. the clergy's tenth amounting to 435l. 12s. 0d. To this cathedral belong a dean, two archdeacons, a chancellor, a treafurer, fix prebendaries, and other inferior officers and fervants. W. long. 3. 0. N. lat. 53. 12.

CHESTER *le Street*, the *Cuneacefter* of the Saxons; a fmall thoroughfare town between Newcaftle and Durham, with a good church and fine fpire. In the Saxon times this place was greatly refpected on account of the relics of St. Cuthbert, depofited here by bifhop Eardulf, for fear of the Danes, who at that time (about 884) ravaged the country. His fhrine became afterwards an object of great devotion. King Athelftan, on his expedition to Scotland, paid it a vifit, to obtain, by interceffion of the faint, fuccefs on his arms; beftowed a multitude of gifts on the church; and directed, in cafe he died in his enterprife, that his body fhould be interred there. At the fame time that this place was honoured with the remains of St. Cuthbert, the bifhopric of Lindesfarn was removed here, and endowed with all the lands between the Tyne and the Were, the prefent county of Durham. It was ftyled *St. Cuthbert's patrimony*. The inhabitants had great privileges, and always thought themfelves exempt from military duty, except that of defending the body of their faint. Chefter-le-Street may be confidered as the parent of the fee of Durham; for when the relics were removed there, the fee in 995 followed them. Tanner fays, that probably a chapter of monks, or rather fecular canons, attended the body at this place from its firft arrival: but bifhop Beke, in 1286, in honour of the faint, made the church collegiate, and eftablifhed there a dean and fuitable ecclefiaftics; and among other privileges, gave the dean a right of fifhing on the Were, and the tythe of fifh.

New-CHESTER, a town of Pennfylvania in America, and capital of a county of that name. It is feated on the Delawar; and has a fine capacious harbour, admitting veffels of any burden. W. long. 74. 7. N. lat. 40. 15.

CHESTERFIELD, a market town of Derbyfhire in England, pleafantly fituated on a hill between two fmall rivers. It has the title of an earldom; and a confiderable market for corn, lead, and other country commodities. The houfes are for the moft part built of rough ftone, and covered with flate. W. long. 1. 25. N. lat. 53. 20.

CHESTERFIELD (Earl of). See STANHOPE.

CHEVAL *de* FRISE, a large piece of timber pierced, and traverfed with wooden fpikes, armed or pointed with iron, five or fix feet long. See plate 80. The term is French, and properly fignifies a *Friefland horfe*; as having been firft invented in that country. It is alfo called a *Turnpike* or *Turniquet*. Its ufe is to defend a paffage, ftop a breach, or make a retrenchment to ftop the cavalry. It is fometimes alfo mounted on wheels, with artificial fires, to roll down in an affault. Errard obferves, that the prince of Orange ufed to inclofe his camp with *Chevaux de Frife*, placing them over one another.

CHEVALER, in the manege, is faid of a horfe, when, in paffaging upon a walk or trot, his off fore-leg croffes or overlaps the near fore-leg every fecond motion.

CHEVALIER, a French term, ordinarily fignifying a KNIGHT. The word is formed of the French, *cheval* horfe, and the barbarous Latin *cavallus*. It is ufed, in heraldry, to fignify any *cavalier*, or horfeman armed at all points; by the Romans called *cataphractus eques:* now out of ufe, and only to be feen in coat-armour.

CHEVAUX *de* FRISE. See CHEVAL *de Frife*.

CHEVIN, a name ufed in fome parts of England for the CHUB.

CHEVIOT (or TIVIOT) HILLS, run from north to fouth through Cumberland; and were formerly the borders or boundaries between England and Scotland, where many a bloody battle has been fought between the two nations; one of which is recorded in the battle of Chevy-chafe. Thefe hills are the firft difcovered by failors in coming from the eaft into Scotland.

CHEVISANCE, in law, denotes an agreement or compofition, as an end or order fet down between a creditor and his debtor, &c. In the ftatutes, this word is moft commonly ufed for an unlawful bargain or contract.

CHEVREAU (Urban), a learned writer, born at Lundun in 1613. He diftinguifhed himfelf in his youth by his knowledge of the belles lettres; and became fecretary of ftate to queen Chriftina of Sweden. Several German princes invited him to their courts; and Charles Lewis, the elector palatine, retained him under the title of counfellor. After the death of that prince, he returned to France, and became preceptor to the duke of Maine. At length retiring to Lundun, he died there in 1701, aged 88. He was the author of feveral books; and

amongſt others, of an Univerſal Hiſtory, which has been often reprinted.

CHEVRON, or Cheveron, in heraldry. See Heraldry.

CHEWING-balls, a kind of balls made of aſafœtida, liver of antimony, bay-wood, juniper-wood, and pellitory of Spain; which being dried in the ſun, and wrapped in linen cloth, are tied to the bit of the bridle for the horſe to chew. They are ſaid to create an appetite.

CHEYKS. See Bengal.

CHEYNE (Dr. George), a phyſician of great learning and abilities, born in Scotland in 1671, and educated at Edinburgh. He paſſed his youth in cloſe ſtudy, and with great temperance; but coming to ſettle in London, when about 30, and finding the younger gentry and free-livers to be the moſt eaſy of acceſs and moſt ſuſceptible of friendſhip, he changed on a ſudden his former manner of living, in order to get practice, having obſerved this method to ſucceed with ſome others. The conſequence was, that he grew daily in bulk, and in intimacy with his gay acquaintance; ſwelling to ſuch an enormous ſize, that he exceeded 32 ſtone in weight; and he was forced to have the whole ſide of his chariot open to receive him into it. He grew ſhort-breathed, lethargic, nervous, and ſcorbutic; ſo that his life became an intolerable burden. In this deplorable condition, after having tried all the power of medicine in vain, he reſolved to try a milk and vegetable diet; the good effects of which quickly appeared. His ſize was reduced almoſt to a third; and he recovered his ſtrength, activity, and cheerfulneſs, with the perfect uſe of all his faculties. In ſhort, by a regular adherence to this regimen, he lived to a mature period, dying at Bath in 1742, aged 72. He wrote ſeveral treatiſes that were well received; particularly, "An Eſſay on Health and Long Life;" and "The Engliſh malady, or a Treatiſe on Nervous Diſeaſes;" both the reſult of his own experience. In ſhort, he had great reputation in his own time, both as a practitioner and as a writer; and moſt of his pieces paſſed through ſeveral editions. Some of the metaphyſical notions which he has introduced into his books may perhaps juſtly be thought fanciful and ill-grounded; but there is an agreeable vivacity in his productions, together with much openneſs and frankneſs, and in general great perſpicuity.

CHIABRERA (Gabriel), eſteemed the Pindar of Italy, was born at Savona in 1552, and went to ſtudy at Rome. The Italian princes, and Urban VIII. gave him public marks of their eſteem. He wrote a great number of poems; but his lyric verſes are moſt admired. He died at Savona in 1638, aged 86.

CHIAN earth, in pharmacy, one of the medicinal earths of the ancients, the name of which is preſerved in the catalogues of the materia medica, but of which nothing more than the name has been known for many ages in practice. It is a very denſe and compact earth; and is ſent hither in ſmall flat pieces from the iſland of Chios, in which it is found in great plenty. It is recommended as an aſtringent, and extolled alſo as the greateſt of all coſmetics.

CHIAOUS, a word in the original Turkiſh, ſignifying "envoys," are officers to the number of five or ſix hundred in the grand ſignior's court, under the command of a chiaous baſchi. They frequently meet in the grand viſir's palace, that they may be in readineſs to execute his orders, and carry his diſpatches into all the provinces of the empire. The chiaous baſchi aſſiſts at the divan, and introduces thoſe who have buſineſs there.

CHIAPA, the capital of a province of the ſame name in Mexico, ſituated about 300 miles eaſt of Acapulco. W. long. 98. 0. N. lat. 16. 30.

Chiapa *el Real*, a town in Mexico. in a province of the ſame name, with a biſhop's ſee. Its principal trade conſiſts in chocolate-nuts, cotton, and ſugar. W. long. 98. 35. N. lat. 16. 20.

Chiapas *de los Indos*, a large and rich town in North America, in Mexico, and in a province in the ſame name. The governor and moſt of the inhabitants are originally Americans. W. long. 98. 5. N. lat. 15. 6.

CHIARI (Joſeph), a celebrated Italian painter, was the diſciple of Carlo Maratti; and adorned the churches and palaces of Rome with a great number of fine paintings. He died of an apoplexy in 1727, aged 73.

Chiari, a town of Italy, in the province of Breſcia, and territory of Venice, 7 miles weſt of Breſcia, and 27 eaſt of Milan. E. long. 18. 18. N. lat. 45. 30.

CHIARO-scuro. See Claro-*Obſcuro*.

CHIAVENNA, a handſome, populous, and large town of Swiſſerland, in the country of Griſons. It is a trading place, eſpecially in wine and delicate fruits. The governor's palace and the churches are very magnificent, and the inhabitants are Roman Catholics. It is ſeated near the lake Como. E. long. 9. 29. N. lat. 46. 15.

CHIAUSI, among the Turks, officers employed in executing the vizirs, baſhaws, and other great men. The orders for doing this, the grand ſignior ſends wrapped up in a black cloth; on the reception of which they perform their office.

CHICANE, or Chicanery, in law, an abuſe of judiciary proceeding, tending to delay the cauſe, to puzzle the judge, or impoſe upon the parties.

In the ſchools, this term is applied to vain ſophiſms, diſtinctions, and ſubtleties, which protract diſputes, and obſcure the truth.

CHICHESTER, the capital of Suſſex, having markets on Wedneſday and Saturday. It is ſeated in a plain, on the river Levant. It is a biſhop's ſee, and has a cathedral, with ſeven ſmall churches built with flint ſtone. It ſends two members to parliament, and is governed by a mayor, recorder, deputy-recorder, 14 aldermen, ſix bailiffs, 27 commoners and a portreeve. The city being walled round, a perſon may ſtand in the market-place, which is the centre, and ſee the four gates. It exports corn, malt, &c. and has ſome foreign commerce, and a manufactory of needles. The haven affords fine lobſters. It is 61 miles S. W. of London. Lon. 0. 48. W. Lat. 50. 50. N.

CHICK, or Chicken, in zoology, denotes the young of the gallinaceous order of birds, eſpecially the common hen. See Phasianus.

Chick-*Weed*, in botany. See Alsine.

Chicken-*Pox*. See Medicine.

CHICKLING-pea, in botany, a name given to the Lathyrus.

CHICUITOS, a province of South America, in the government of Santa-Cruz de la Sierra. Their chief riches conſiſt of honey and wax; and the original inhabitants are very voluptuous, yet very warlike. They maintained bloody wars with the Spaniards till 1690; ſince which, ſome of them have become Chriſtians. It is bounded by la Plata on the north eaſt, and by Chili on the weſt.

CHIDLEY, or Chimley, a market-town in Devonſhire, ſituated in W. long. 4. 0. N. lat. 51. 0.

CHIEF, a term ſignifying the head or principal part of a thing or perſon. Thus we ſay, the chief of a party, the chief of a family, &c. The word is formed of the French *chef* head; of the Greek κεφαλη, *caput*, head; though Menage derives it from the Italian *capo*, formed of the Latin *caput*.

Chief, in heraldry, is that which takes up all the upper part of the eſcutcheon from ſide to ſide, and repreſents a man's head. *In chief*, imports ſomething borne in the chief part or top of the eſcutcheon.

CHIEFTAIN, denotes the captain or chief of any clafs, family, or body of men: Thus the chieftains or chiefs of the Highland clans, were the principal noblemen or gentlemen of their refpective clans. See CLANS.

CHIELEFA, a ftrong town of Turkey in Europe, in the Morea. It was taken by the Venetians in 1685; but after that the Turks retook it, with all the Morea. E. long. 22. 21. N. lat. 26. 50.

CHILBLAIN, *pernio* in medicine, a tumour affecting the feet and hands; accompanied with an inflammation, pain, and fometimes an ulcer or folution of continuity. Chilblain is compounded of *chill* and *blain*; *q. d.* a blain or fore by cold. Chilblains are occafioned by exceffive cold diminifhing the vital energy of the part, and ftopping the motion of the blood in the capillary veffels. See the article PERNIO.

CHILD, a term of relation to *parent*. (See PARENT and CHILDREN.) Bartholine, Paré, Licetus, and many other writers, give an account of a petrified child, which has feemed wholly incredible to fome people. The child, however, which they defcribe, is ftill in being; and is kept as a great rarity in the king of Denmark's mufeum at Copenhagen. The woman who was big with this, lived at Sens in Champaign in the year 1582. It was cut out of her belly, and was univerfally fuppofed to have lain there about 20 years. That it is a real human fœtus, and not artificial, is evident to the eyes of any obferver; and the upper part of it, when examined, is found to be of a fubftance refembling gypfum or ftone whereof they make plafter of Paris. The lower part is much harder, the thighs and buttocks being perfect ftone of a reddifh colour, and as hard as common quarry-ftone: the grain and furface of this part appears exactly like that of the calculi or ftones taken out of human bladders: and the whole fubftance examined ever fo nearly, and felt ever fo carefully, appears to be abfolute ftone. It was carried from Sens to Paris, and there purchafed by a goldfmith of Venice; and Frederic III. king of Denmark purchafed it of this man at Venice for a very large fum, and added it to the collection of rarities.

CHILD-*Bed*. } See MIDWIFERY.
CHILD-*Birth*. }

CHILD-*Wit*, a power to take a fine of a bond-woman unlawfully gotten with child, that is, without confent of her lord. Every reputed father of a bafe child got within the manor of Writtel in Effex, pays to the lord a fine of 3s. 4d. where, it feems, child-wit extends to free as well as bond-women.

CHILDERMAS-DAY, or INNOCENT'S *Day*, an anniverfary held by the church of England on the 28th of December, in commemoration of the children of Bethlehem maffacred by order of Herod.

CHILDREN, the plural of CHILD. Mr. Derham computes, that marriages, one with another, produce four children not only in England but in other parts alfo. In the genealogical hiftory of Tufcany, wrote by Gamarini, mention is made of a nobleman of Sienna, named Pichi, who of three wives had 150 *children*; and that, being fent ambaffador to the pope and the emperor, he had 48 of his fons in his retinue. In a monument in the church-yard of St. Innocent, at Paris, erected to a woman who died at 88 years of age, it is recorded, that fhe might have feen 288 *children* directly iffued from her. This exceeds what Hakewell relates of Mrs. Honeywood, a gentlewoman of Kent, born in the year 1527, was married at 16 to her only hufband R. Honeywood, of Charing, Efq; and died in her 93d year. She had 16 *children* of her own body; of which three died young, and a fourth had no iffue: yet her *grandchildren*, in the fecond generation, amounted to 114; in the third to 228; though in the fourth, they fell to 9. The whole number fhe might have feen in her life-time, was 367. $16+114+228+9=367$.

CHILDREN are, in law, a man's iffue begotten on his wife. As to the duties of children to their parents, they arife from a principle of natural juftice and retribution; for to thofe who gave us exiftence, we naturally owe fubjection and obedience during our minority, and honour and reverence ever after. They who protected the weaknefs of our infancy, are intitled to our protection in the infirmity of their age; they who by fuftenance and education enable their offspring to profper, ought, in return, to be fupported by that offspring, in cafe they ftand in need of affiftance. Upon this principle proceed all the duties of children to their parents, which are enjoined by pofitive laws. The Athenians carried this into practice with a fcrupulous kind of nicety: obliging all children to provide for their father when fallen into poverty; with an exception to fpurious children, to thofe whofe chaftity had been proftituted with confent of their father, and to thofe whom he had not put in any way of gaining a livelihood. Our laws agree with thofe of Athens, with regard to the firft only of thefe particulars, the cafe of fpurious iffue. In the other cafes, the law does not hold the tie of nature to be diffolved by any mifbehaviour of the parents; and therefore a child is equally required to defend and provide for the perfon, or maintain the caufe of a bad parent as of a good one. See the article FILIAL *Affection*.

Illegitimate CHILDREN. See BASTARDS.

Management of CHILDREN. See INFANT.

Overlaying of CHILDREN, is a misfortune that fometimes happens. To prevent it, the Florentines have contrived an inftrument called *arcuccio*. See ARCUCCIO.

CHILI, a large country of S. America, on the South Sea, 750 miles in length, and from 37 to 50 in breadth. It was difcovered by Don Diego d'Almagro in 1525. It abounds in trees, fruits, Indian corn, cattle, and mines of all kinds. The greateft part is inhabited by the native Americans, who have neither towns nor villages, properly fpeaking, but only wretched huts, at a diftance from each other. The colour of their fkin is that of a red copper, as in all other parts of America; and fince the introduction of horfes by the Europeans, they feldom travel without one, there being plenty of them. It is bounded on the W. by the South Sea, and on the E. by the Andes. Chili is governed by a chief, who is abfolute in all civil, political, and military affairs, and is alfo independent of the viceroy. The latter has no authority except when the governor dies; in which cafe he may appoint one in his room for a time, till the mother-country names a fucceffor. If, on fome occafions, the viceroy has interfered in the government of Chili, it was when he has been either authorifed by a particular truft repofed in him by the court, or by the deference paid to the eminence of his office; or when he has been actuated by his own ambition to extend his authority. In the whole province of Chili there are not 20,000 white men, and not more than 60,000 negroes, or Indians, able to bear arms. The military eftablifhment amounted formerly to 2000 men; but the maintaining of them being found too expenfive, they were reduced to 500 at the beginning of this century.

CHILIAD, an affemblage of feveral things ranged by thoufands. The word is formed of the Greek χιλιας, *mille*, a thoufand.

CHILIAGON, in geometry, a regular plain figure of 100 fides and angles. Though the imagination cannot form an idea of fuch a figure, yet we may have a very clear notion of it in the mind, and can eafily demonftrate that the fum of all its angles is equal to 1996 right ones: for the internal angles of every plane figure are equal to twice as many right ones as the figure hath fides, except thofe four which are about the centre of the figure, from whence it may be refolved into as many triangles as it has fides. The author of *l'Art de Penfer*, p. 44,

has brought this instance to show the distinction between imagination and conceiving.

CHILIARCHA, or Chiliarchus, an officer in the armies of the ancients, who had the command of a thousand men.

CHILIASTS, in church-history. See Millenarians.

CHILLINGWORTH (William), an eminent divine of the church of England, was born at Oxford in 1602, and bred there. He early made great proficiency in his studies, being of a very quick genius. He was an expert mathematician, as well as an able divine, and a very good poet. Study and conversation at the university turning upon controversy between the church of England and that of Rome, on account of the king's marriage with Henrietta daughter to Henry IV. king of France, Mr. Chillingworth forsook the church of England, and embraced the Romish religion. Dr. Laud, then bishop of London, hearing of this, and being greatly concerned at it, wrote to Mr. Chillingworth; who expressing a great deal of candour and impartiality, that prelate continued to correspond with him. This set Mr. Chillingworth on a new inquiry; and at last determined him to return to his former religion. He was zealously attached to the royal party; and, in August 1643, was present in king Charles I.'s army at the siege of Gloucester, where he advised and directed the making certain engines for assaulting the town. Soon after, having accompanied the Lord Hopton, general of the king's forces in the west, to Arundel castle in Sussex, he was there taken prisoner by the parliamentary forces under the command of Sir William Waller, who obliged the castle to surrender. But his illness increasing, he obtained leave to be conveyed to Chichester, where he was lodged at the bishop's palace; and, after a short sickness, died in 1644. He left several excellent works behind him.

CHILMINAR. See Persepolis.

CHILO, one of the seven sages of Greece, and of the ephori of Sparta the place of his birth, flourished about 556 years before Christ. He was accustomed to say that there were three things very difficult: "To keep a secret, to know how best to employ our time; and to suffer injuries without murmuring." According to Pliny, it was he who caused the short sentence, *Know thyself*, to be written in letters of gold in the temple of Delphos. It is said that he died with joy, while embracing his son, who had been crowned at the Olympic games.

CHILOE, an island lying near the coast of Chili, in South America, under the 43d degree of south latitude. It is the coast of an archipelago of 40 islands, and its principal town is Castro. It rains here almost all the year, insomuch that nothing but Indian corn, or some such grain, that requires but little heat to ripen it, can ever come to perfection. They have excellent shell-fish, very good wild-fowl, hogs, sheep, and beeves; as also a great deal of honey and wax. They carry on a trade with Peru and Chili; whither they send boards of cedar, of which they have vast forests.

CHILTENHAM, or Cheltenham, a town in Gloucestershire, six miles from Gloucester; noted for its purgative spring, which has rendered it of late years a place of fashionable resort. This water, which is thought to resemble the medicinal springs at Scarborough, operates with great ease, is deemed useful in scorbutic complaints, and in affections of the kidneys. It is 9 miles N. E. of Gloucester, and 95 W. by N. of London. Lon. 2. 21. W. Lat. 51. 55. N.

CHILTERN, a chain of chalky hills forming the southern part of Buckinghamshire, the northern part of the county being distinguished by the name of the *Vale*. The air on these heights is extremely healthful. The soil, though stony, produces good crops of wheat and barley; and in many places it is covered with thick woods, among which are great quantities of beech.--*Chiltern* is also applied to the hilly parts of Berkshire, and it is believed has the same meaning in some other counties. Hence the Hundreds lying in those parts are called the *Chiltern Hundreds*.

Chiltern *Hundreds* (*Stewards of*). Of the Hundreds into which many of the English counties were divided by King Alfred for their better government, the jurisdiction was originally vested in peculiar courts; but came afterwards to be devolved to the county courts, and so remains at present; except with regard to some, as the *chilterns*, which have been by privilege annexed to the crown. These having still their own courts, a *Steward* of those courts is appointed by the chancellor of the exchequer, with a salary of 20s. and all fees, &c. belonging to the office. This is made a matter of convenience to the minister, whenever he wishes to remove a member of parliament in order to put another into his place. Such a one is made to *accept* the *Stewardship* of the *Chiltern Hundreds*, which vacates his seat.

CHIMÆRA, a port town of Turkey in Europe, situated at the entrance of the gulf of Venice, in the province of Epirus, about 32 miles north of the city Corfu, near which are the mountains of Chimæra, which divide Epirus from Thessaly. E. long. 20. 40. N. lat. 40. 20.

Chimæra, in fabulous history, a celebrated monster, sprung from Echidna and Typhon. It had three heads; that of a lion, a goat, and a dragon; and continually vomited flames. The foreparts of its body were those of a lion, the middle was that of a goat, and the hinder parts were those of a dragon. It generally lived in Lycia, about the reign of Jobates, by whose orders Bellerophon, mounted on the horse Pegasus, overcame it. This fabulous tradition is explained by the recollection that there was a burning mountain in Lycia, whose top was the resort of lions on account of its desolate wilderness; the middle, which was fruitful, was covered with goats; and at the bottom the marshy ground abounded with serpents. Bellerophon is said to have conquered the Chimæra, because he destroyed the wild beasts on that mountain, and rendered it habitable. Plutarch says that it was the captain of some pirates who adorned their ship with the images of a lion, a goat, and a dragon. By a *chimæra* philosophers understand a mere creature of the imagination, composed of such contradictions and absurdities as cannot possibly any where exist but in thought.

CHIMES *of a* Clock, a kind of periodical music, produced at equal intervals of time, by means of a particular apparatus added to a clock. In order to calculate numbers for the chimes, and adapt the chime-barrel, it must be observed, that the barrel must turn round in the same time that the tune it is to play requires in singing. As for the chime-barrel, it may be made up of certain bars that run athwart it, with a convenient number of holes punched in them to put in the pins that are to draw each hammer: and these pins, in order to play the time of the tune rightly, must stand upright, or hang down from the bar, some more, some less. To place the pins rightly, you may proceed by the way of changes on bells, viz, 1, 2, 3, 4; or rather make use of the musical notes. Observe what is the compass of your tune, and divide the barrel accordingly from end to end. For instance, in Plate 79, Fig. 1 and 2 represent the notes of the 100th psalm tune. Each is eight notes in compass; and accordingly the barrel is divided into eight parts. These divisions are struck around the barrel; opposite to which are the hammer-tails.

We speak here as if there were only one hammer to each bell, that it may be more clearly apprehended; but when two notes of the same sound come together in a tune, there must be two hammers to the bell to strike it: so that if in all the tunes you intend to chime of eight notes compass, there should happen to be such double notes on every bell, instead of eight you must have sixteen hammers; and accordingly you must divide the barrel, and strike sixteen strokes round it, opposite to each hammer-tail: then you are to divide it round about into as many divisions as there are musical bars, semibreves, minims, &c. in

the tune. Thus the 100th pſalm tune has 20 ſemibreves, and each diviſion of it is a ſemibreve: the firſt note of it alſo is a ſemibreve; and, therefore, on the chime-barrel muſt be a whole diviſion, from five to five; as you may underſtand plainly, if you conceive the ſurface of a chime-barrel to be repreſented by the above figures, as if the cylindrical ſuperficies of the barrel were ſtretched out at length, or extended on a plane: and then ſuch a table, ſo divided, if it were to be wrapped round the barrel, would ſhow the places where all the pins are to ſtand in the barrel; for the dots running about the table are the places for the pins that play the tune. See the Table for dividing the chime board, at Fig. 2.

Indeed, if the chimes are to be complete, you ought to have a ſet of bells to the gamut notes; ſo as that each bell having the true ſound of *ſol, la, mi, fa,* you may play any tune with its flats and ſharps; nay, you may by this means play both the baſs and treble with one barrel: and by ſetting the names of your bells at the head of any tune, that tune may eaſily be transferred to the chime-barrel, without any ſkill in muſic. But it muſt be obſerved, that each line in the muſic is three notes diſtant; that is, there is a note between each line, as well as upon it.

CHIMNEY, in architecture, a particular part of a houſe, where the fire is made, having a tube or funnel to carry off the ſmoke. The word *chimney* comes from the French *cheminée*; and that from the Latin *caminata,* a chamber wherein is a chimney; *caminata,* again, comes from *caminus*; and that from the Greek καμινος, a chimney; of καιω, *uro,* I burn. Chimneys are uſually ſuppoſed a modern invention; the ancients only making uſe of ſtoves: but Octavio Ferrari ſeems to have ſucceeded in proving that chimneys were in uſe among the ancients.

The moſt judicious remarks on the modes of conſtructing chimneys which may not be liable to ſmoke, are thoſe of the celebrated Dr. Franklin. In his letter on that ſubject he endeavours to correct the vulgar errors that prevail reſpecting the cauſes of the aſcent of ſmoke, which, of itſelf, is not diſpoſed to riſe in the atmoſphere, but owes that diſpoſition to the circumſtance of its being *heated.* Neither does he allow that any particular *form* of the funnel of a chimney, except its height, is of conſequence to its regular and proper operation. The moſt ſimple view of the theory on which ſmoke is made to aſcend is conveyed to us in theſe words: "The longer the funnel, if erect, the greater its force, when filled with heated and rarefied air, to *draw* in below and drive up the ſmoke, if one may, in compliance with cuſtom, uſe the expreſſion *draw* when in fact it is the ſuperior weight of the ſurrounding atmoſphere that *preſſes* to enter the funnel below, and ſo *drives up* before it the ſmoke and warm air it meets with in its paſſage." The author next goes on to enumerate the different cauſes which may occaſion a ſmoky chimney; theſe are the nine following. 1. Mere want of a ſupply of air from without doors. 2. The openings, or fire places, being too wide, or too high. 3. Too ſhort a funnel. 4. Chimneys overpowering each other, or robbing each other of the means by which the draft is kept up. 5. The tops of chimneys being commanded by higher buildings or by a hill, from whence the wind beats downwards upon the aperture from whence the ſmoke iſſues. 6. The reverſe of the laſt; viz. where the commanding eminence is farther from the wind than the chimney commanded. 7. The improper and inconvenient ſituation of a door. 8. The deſcent of ſmoke through a cold funnel from an adjoining chimney. 9. The paſſage of ſtrong winds over the tops of the funnels, although there may be no commanding eminence near.

For each of theſe evils Dr. Franklin points out a remedy; but we will confine ourſelves to the firſt, which is one of the moſt prevalent. "When you find (ſays the Doctor) on trial, that opening the door or a window enables the chimney to carry up all the ſmoke, you may be ſure that want of air *from without* was the cauſe of its ſmoking: I ſay *from without,* to guard you againſt a common miſtake of thoſe who may tell you, the room is large, contains abundance of air ſufficient to ſupply any chimney, and therefore it cannot be that the chimney wants air. Theſe reaſoners are ignorant, that the largeneſs of a room, if tight, is in this caſe of ſmall importance, ſince it cannot part with a chimney full of its air without occaſioning ſo much vacuum; which it requires a great force to effect, and could not be borne if effected.

"It appearing plainly, then, that ſome of the outward air muſt be admitted, the queſtion will be, how much is *abſolutely neceſſary?* For you would avoid admitting more, as being contrary to one of your intentions in having a fire, viz. that of warming your room. To diſcover this quantity, ſhut the door gradually while a middling fire is burning, till you find that, before it is quite ſhut, the ſmoke begins to come out into the room; then open it a little, till you perceive the ſmoke comes out no longer. There hold the door, and obſerve the width of the open crevice between the edge of the door and the rabbit it ſhould ſhut into. Suppoſe the diſtance to be half an inch, and the door eight feet high, you find thence that your room requires an entrance for air equal in area to ninety-ſix half inches, or forty-eight ſquare inches, or a paſſage of ſix inches by eight. This however is a large ſuppoſition, there being few chimneys that, having a moderate opening and a tolerable height of funnel, will not be ſatisfied with ſuch a crevice of a quarter of an inch; and I have found a ſquare of ſix by ſix, or thirty-ſix ſquare inches, to be a pretty good medium, that will ſerve for moſt chimneys. High funnels, with ſmall and low openings, may indeed be ſupplied through a leſs ſpace, becauſe, for reaſons that will appear hereafter, the *force of levity,* if one may ſo ſpeak, being greater in ſuch funnels, the cool air enters the room with greater velocity, and conſequently more enters in the ſame time. This however has its limits; for experience ſhews, that no increaſed velocity ſo occaſioned has made the admiſſion of air through the key-hole equal in quantity to that through an open door, though through the door the current moves ſlowly, and through the key-hole with great rapidity.

"It remains then to be conſidered how and where this neceſſary quantity of air from without is to be admitted ſo as to be leaſt inconvenient. For if at the door left ſo much open, the air thence proceeds directly to the chimney, and in its way comes cold to your back and heels as you ſit before your fire. If you keep the door ſhut, and raiſe a little the ſaſh of your window, you feel the ſame inconvenience. Various have been the contrivances to avoid this; ſuch as bringing in freſh air through pipes in the jams of the chimney, which pointing upwards ſhould blow the ſmoke up the funnel; opening paſſages into the funnel above, to let in air for the ſame purpoſe. But theſe produce an effect contrary to that intended: for as it is the conſtant current of air paſſing from the room *through the opening of the chimney* into the funnel, which prevents the ſmoke coming out into the room, if you ſupply the funnel by other means or in other ways with the air it wants, and eſpecially if that air be cold, you diminiſh the force of that current, and the ſmoke, in its efforts to enter the room, finds leſs reſiſtance.

"The wanted air muſt then *indiſpenſably* be admitted into the room, to ſupply what goes off through the opening of the chimney. M. Gauger, a very ingenious and intelligent French writer on the ſubject, propoſes with judgment to admit it *above* the opening of the chimney; and to prevent inconvenience from its coldneſs, he directs its being made to paſs in its entrance through winding cavities made behind the iron back and ſides of the fire-place, and under the iron hearth-plate; in

COINING.

Fig. 1.

Fig. 2.

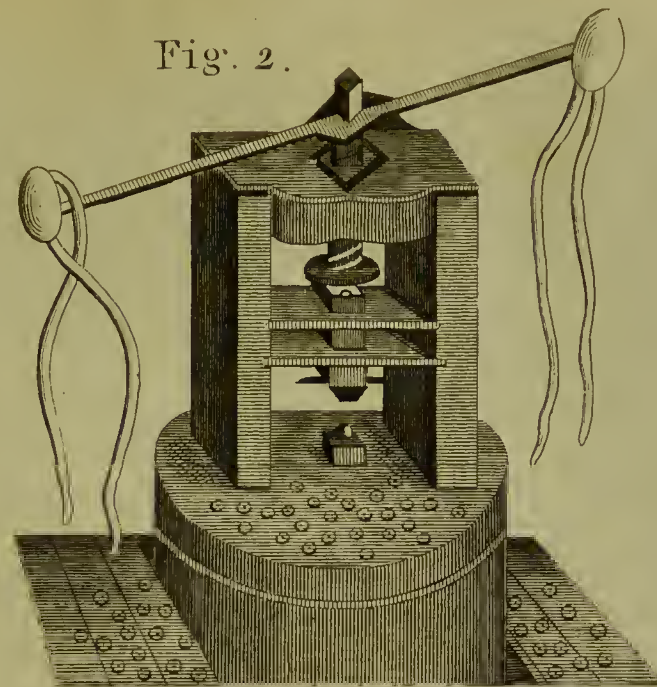
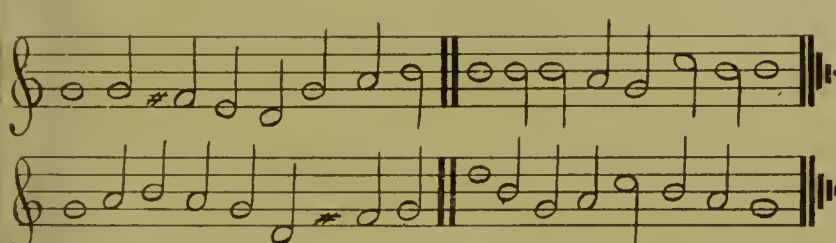


Fig. 3.

CHIMES

Fig. 1.



Clef

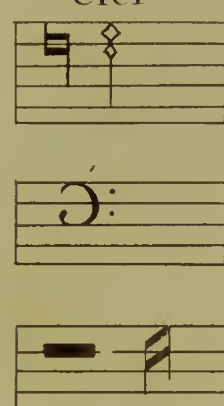


Fig. 2.

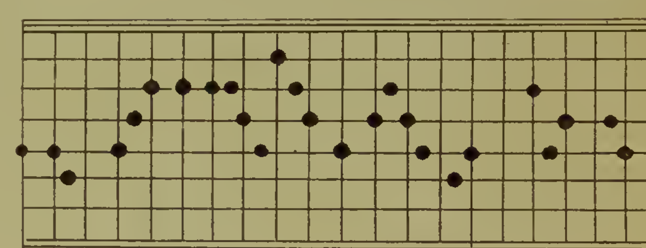


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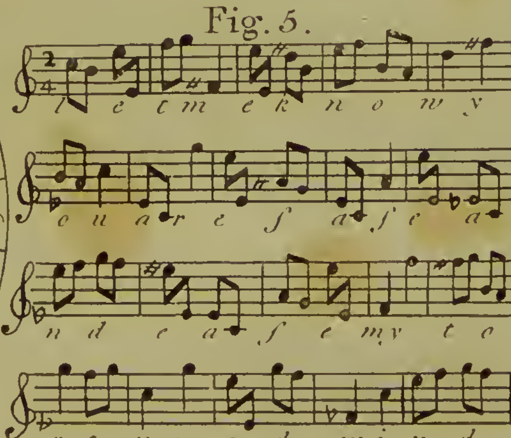
Fig. 3.

Fig. 5.



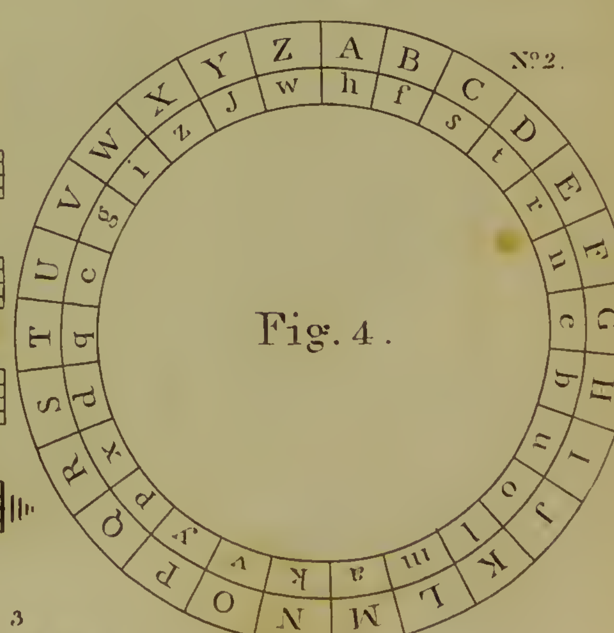


Fig. 4.

CROWN

1

2

3

4

5

6

7

8

J. Barlow sculp.

which cavities it will be warmed, and even heated, fo as to contribute much, inftead of cooling, to the warming of the room. This invention is excellent in itfelf, and may be ufed with advantage in building new houfes; becaufe the chimneys may then be fo difpofed, as to admit conveniently the cold air to enter fuch paffages: but in houfes built with fuch views, the chimneys are often fo fituated, as not to afford that convenience without great and expenfive alterations. Eafy and cheap methods, though not quite fo perfect in themfelves, are of more general utility; and fuch are the following:

"In all rooms where there is a fire, the body of air warmed and rarefied before the chimney is continually changing place, and making room for other air that is to be warmed in its turn. Part of it enters and goes up the chimney, and the reft rifes and takes place near the ceiling. If the room be lofty, that warm air remains above our heads as long as it continues warm, and we are little benefited by it, becaufe it does not defcend till it is cooler. Few can imagine the difference of climate between the upper and lower parts of fuch a room, who have not tried it by the thermometer, or by going up a ladder till their heads are near the ceiling. It is then among this warm air that the wanted quantity of outward air is beft admitted, with which being mixed, its coldnefs is abated, and its inconvenience diminifhed, fo as to become fcarce obfervable. This may be eafily done, by drawing down about an inch the upper fafh of a window; or, if not moveable, by cutting fuch a crevice through its frame; in both which cafes, it will be well to place a thin fhelf of the length, to conceal the opening, and floping upwards to direct the entering air horizontally along and under the ceiling. In fome houfes the air may be admitted by fuch a crevice made in the wainfcot, cornice, or plaftering, near the ceiling, and over the opening of the chimney. This, if practicable, is to be chofen, becaufe the entering cold air will there meet with the warmeft rifing air from before the fire, and be fooneft tempered by the mixture: the fame kind of fhelf fhould alfo be placed here. Another way, and not a very difficult one, is to take out an upper pane of glafs in one of your fafhes, fet it in a tin frame, giving it two fpringing angular fides, and then replacing it, with hinges below on which it may be turned to open more or lefs above. It will then have the appearance of an internal fky-light. By drawing this pane in, more or lefs, you may admit what air you find neceffary. Its pofition will naturally throw that air up and along the ceiling. This is what is called in France a *Was ift das?* As this is a German queftion, the invention is probably of that nation, and takes its name from the frequent afking of that queftion when it firft appeared."

Dr. Franklin evinces the ductility and manageable nature of fmoke in feveral ways, but particularly by defcribing the common Staffordfhire fire-place, in which the grate is formed of a feries of femicircular bars which project into the room, and the fmoke is driven backwards into the chimney through a very inconfiderable opening; by which means lefs of the warm air efcapes than in other inftances. A fketch of this fire-place we have given in plate 89.

CHIMNEY-*Money*, otherwife called *Hearth-money*, a duty to the crown on houfes. By ftat. 14 Char. II. cap. 2. every fire-hearth and ftove of every dwelling or other houfe, within England and Wales (except fuch as pay not to church and poor), was chargeable with 2s. *per annum*, payable at Michaelmas and Lady-day to the king and his heirs and fucceffors, &c.; which payment was commonly called *chimney money*. This tax, being much complained of as burdenfome to the people, has been fince taken off, and others impofed in its ftead; among which that on windows has by fome been efteemed almoft equally grievous.

CHIMPANZEE, in natural hiftory. See SIMIA.

CHINA, a country of Afia, fituated on the moft eafterly part of that continent. It is bounded on the north by Tartary; from which it is divided, partly by a prodigious wall of 1500 miles in length, and partly by high, craggy, and inacceffible mountains. On the eaft, it is bounded by the ocean; on the weft, by part of the Mogul's empire, and India beyond the Ganges, from which it is parted by other ridges of high mountains and fandy deferts; on the fouth, it is bounded partly by the kingdoms of Lao, Tonquin, Ava, and Cochin-China, and partly by the fouthern or Indian fea, which flows between it and the Philippine iflands. There are feveral ways of computing its length and breadth. According to fome of thefe, it is reckoned 1269, 1600, or 1800 miles in length, and as much in breadth: however, by the beft and lateft accounts, this vaft country is fomewhat of an oval form, the breadth being lefs than the length by a little more than a fourth part. It contains 15 provinces, exclufive of that of Lyau-tong, which is fituated without the great wall, though under the fame dominion. Their names are, 1. Shenfi; 2. Shanfi; 3. Pecheli; which are fituated on the north fide, along the wall. 4. Shantong; 5. Kyan-nang; 6. Che-kyang; 7. Fo-kyen; which are fituated along the eaftern ocean. 8. Quang-tong; 9. Quang-fi; 10. Yu-nang; 11. Se-chuen; which ftretch themfelves towards the fouth and fouth-weft. And 12. Honan; 13. Hu-quand; 14. Quey-chew; 15. Kyang-fi; which take up the middle part. This country probably owes its name to a Chinefe word, fignifying *middle*, from a notion the natives had that their country lay in the middle of the world. Except to the north, China is a plain country, and contains no remarkable mountains. Its chief *Rivers* and *Waters* are the Yamour and the Argun, which are the boundary between the Ruffian and Chinefe Tartary; the Croceus, or Whambo, or the Yellow River; the Kiam, or the Blue River, and the Tay. Common water in China is very indifferent, and in fome places boiled to make it fit for ufe. The chief of its *Bays* are thofe of Nankin and Canton. Its *Canals*, however, are fufficient to entitle the ancient Chinefe to the character of a moft wife and induftrious people. The commodioufnefs and length of thefe are incredible. The chief of them are lined with hewn ftone on the fides, and they are fo deep, that they carry large veffels, and fometimes they extend above 1000 miles in length. Thofe veffels are fitted up for all the conveniencies of life; and it has been thought by fome, that in China the water contains as many inhabitants as the land. They are furnifhed with ftone quays, and fometimes with bridges of an amazing conftruction. The navigation is flow, and the veffels fometimes drawn by men. No precautions are wanting, that could be formed by art or perfeverance, for the fafety of the paffengers, in cafe a canal is croffed by a rapid river, or expofed to torrents from the mountains. Thefe canals, and the variety that is feen upon their borders, render China delightful in a very high degree, as well as fertile, in places that are not fo by nature.

Such is the induftry of the Chinefe, that they are not encumbered with *Forefts* or woods, though no country is better fitted for producing timber of all kinds. They fuffer, however, none to grow but for ornament and ufe, or on the fides of mountains, from whence the trees, when cut down, can be conveyed to any place by water.

The *Air* of this empire differs according to the fituation of the different places: towards the north it is fharp, in the middle mild, and in the fouth hot. The *Soil* is, either by nature or art, fruitful of every thing that can minifter to the neceffities, conveniencies, or luxuries of life. The culture of the cotton and rice fields, from which the bulk of the inhabitants are clothed and fed, is ingenious almoft beyond defcription. The rare trees, and aromatic productions, either ornamental or medicinal, that abound in other parts of the world,

are to be found in China, and fome are peculiar to itfelf; but even a catalogue of them would form a little volume. Some, however, muft be mentioned. The *tallow-tree* has a fhort trunk, a fmooth bark, crooked branches, red leaves fhaped like a heart, and is about the height of a common cherry-tree. The fruit it produces has all the qualities of our tallow, and, when manufactured with oil, ferves the natives as candles; but they fmell ftrong, nor is their light clear. Of the other trees peculiar to China, are fome which yield a kind of flour; and fome partake of the nature of pepper. The gum of fome is poifonous, but affords the fineft varnifh in the world. After all that can be faid of thefe, and many other beautiful and ufeful trees, the Chinefe, notwithftanding their induftry, are fo wedded to their ancient cuftoms, that they are very little, if at all, meliorated by cultivation. The fame may be faid of their richeft fruits, which, in general, are far from being fo delicious as thofe of Europe, or indeed of America. This is owing to the Chinefe never practifing grafting, or inoculation of trees, and knowing nothing of experimental gardening.

It would be unpardonable here not to mention the raw-filk, which fo much abounds in China, and above all the *tea-plant* or fhrub. It is planted in rows, and pruned to prevent luxuriancy. Notwithftanding our long intercourfe with China, writers are ftill divided about the different fpecies and culture of this plant. It is generally thought that the green and bohea grow on the fame fhrub, but that the latter admits of fome kind of preparation, which takes away its raking qualities, and gives it a deeper colour. The other kinds, which go by the names of imperial, congo, finglo, and the like, are diftinguifhed probably by the nature of the foils, and from the provinces in which they grow. The culture of this plant feems to be very fimple; and it is certain that fome kinds are of a much higher and more delicious flavour than others. It is thought that the fineft, which is called the flour of the tea, is imported over land to Ruffia; but we know of little difference in their effects on the human body. The greateft is between the bohea and green which difagrees with many.

It is fuppofed that the Portuguefe had the ufe of tea long before the Englifh, but it was introduced among the latter before the Reftoration, as mention of it is made in the firft act of parliament that fettled the excife on the king for life, in 1660. Catharine of Lifbon, wife to Charles II. rendered the ufe of it common at his court. The *ginfeng*, fo famous among the Chinefe as the univerfal remedy, and monopolized even by their emperors, is now found to be but a common root, and is plentiful in Britifh-America. When brought to Europe, it is little diftinguifhed for its healing qualities; and this inftance alone ought to teach us with what caution the former accounts of China are to be read. The ginfeng, however, is a native of the Chinefe Tartary.

If we are to believe fome naturalifts, China produces all *metals* and *minerals* that are known in the world. White copper is peculiar to itfelf, but we know of no extraordinary quality it poffeffes. One of the fundamental maxims of the Chinefe government is, that of not introducing a fuperabundance of gold and filver, for fear of hurting induftry. Their gold mines, therefore, are but flightly worked, and the currency of that metal is fupplied by the grains the people pick up in the fand of rivers and mountains. The filver fpecie is furnifhed from the mines of Honan.

According to fome accounts, there are *fifty-eight millions of inhabitants* in China; and all between twenty and fixty years of age pay an annual tax. Notwithftanding the induftry of the people, their amazing population frequently occafions a dearth. Parents, who cannot fupport their female children, are allowed to caft them into the river; but they faften a gourd to each child, that it may float on the water; and there are often compaffionate people of fortune, who are moved by the cries of the children to fave them from death. The Chinefe, in their perfons, are middle fized, their faces broad, their eyes black and fmall, their nofes rather fhort. The Chinefe have fingular ideas of beauty. They pluck up the hairs of the lower part of their faces by the roots with tweezers, leaving a few ftraggling ones by way of beard. Their Tartar princes compel them to cut off the hair of their heads, and, like Mahometans, to wear only a lock on the crown. Their complexion towards the north is fair, towards the fouth fwarthy, and the fatter a man is, they think him the handfomer. Men of quality and learning, who are not much expofed to the fun, are delicately complexioned, and they who are bred to letters let the nails of their fingers grow to an enormous length, to fhew that they are not employed in manual labour. The women have little eyes, plump, rofy lips, black hair, regular features, and a delicate though florid complexion. The fmallnefs of their feet is reckoned a principal part of their beauty, and no fwathing is omitted, when they are young, to give them that accomplifhment; fo that when they grow up, they may be faid to totter rather than to walk. This fanciful piece of beauty was probably invented by the ancient Chinefe, to palliate their jealoufy.

To enter into all the ftarch ridiculous formalities of the Chinefe, efpecially of their men of quality, when paying or receiving vifits, would give little information, and lefs amufement, and very probably come too late, as the manners of the Chinefe, fince they fell under the power of the Tartars, are greatly altered, and vary daily. It is fufficient to obferve, that the legiflators of China, looking upon fubmiffion and fubordination as the corner ftones of all fociety, devifed thofe outward marks of refpect, ridiculous as they appear to us, as the teft of duty and refpect from inferiors to fuperiors; and their capital maxim was, that the man who was deficient in civility was void of good fenfe.

The Chinefe in general have been reprefented as the moft difhoneft, low, thieving fet in the world: employing their natural quicknefs only to improve the arts of cheating the nations they deal with, efpecially the Europeans, whom they trick with great eafe, particularly the Englifh; but they obferve, that none but a Chinefe can cheat a Chinefe. They are fond of law difputes beyond any people in the world. Their hypocrify is without bounds; and the men of property among them practife the moft avowed bribery, and the loweft meanneffes, to obtain preferment. It fhould, however, be remembered, that fome of the late accounts of China have been drawn up by thofe who were little acquainted with any parts of that empire but the fea-port towns; in which they probably met with many knavifh and defigning people. But it feems not juft to attempt to characterife a great nation by a few inftances of this kind, though well attefted; and we appear not to be fufficiently acquainted with the interior parts of China to form an accurate judgment of the manners and character of the inhabitants. By fome of the Jefuit miffionaries the Chinefe feem to have been too much extolled, and by later writers too much degraded.

With regard to the drefs of the Chinefe, it varies according to the diftinction of ranks, and is entirely under the regulation of the law, which has even fixed the colours that diftinguifh the different conditions. The emperor, and princes of the blood, have alone a right to wear yellow; certain mandarins are intitled to wear fattin of a red ground, but only upon days of ceremony: in general, they are clothed in black, blue, or violet. The colour to which the common people are confined, is blue or black; and their drefs is always compofed of plain cotton cloth. The men wear caps on their heads of the fafhion of a bell; thofe of quality are ornamented with jewels. The reft of their drefs is eafy and loofe, confifting of a veft and fafh,

a coat or gown thrown over them, filk boots quilted with cotton, and a pair of drawers. The ladies towards the fouth wear nothing on their heads. Sometimes their hair is drawn up in a net, and fometimes it is difhevelled. Their drefs differs but little from that of the men, only their gown or upper garment has very large open fleeves. The drefs both of men and women varies, however, according to the climate.

Their *marriages* are remarkable; for the parties never fee each other till the bargain is concluded by the parents, and that is generally when the parties are perfect children. Next to being barren, the greateft fcandal is to bring females into the world; and if a woman of poor family happens to have three or four girls fucceffively, it not unfrequently happens that fhe will expofe them on the high roads, or caft them into a river.

People of note caufe their coffins to be made, and their tombs to be built in their life-time. No perfons are buried within the walls of a city, nor is a dead corpfe fuffered to be brought into a town if a perfon died in the country. Every Chinefe keeps in his houfe a table, upon which are written the names of his father, grandfather, and great grandfather, before which they frequently burn incenfe, and proftrate themfelves; and when the father of a family dies, the name of the great grandfather is taken away, and that of the deceafed is added.

The *Chinefe language* contains only three hundred and thirty words, each of one fyllable: but then each word is pronounced with fuch various modulations, and alfo with a different meaning, that it becomes more copious than could be eafily imagined, and enables them to exprefs themfelves very well on the common occafions of life. The miffionaries, who adapt the European characters, as well as they can, to the expreffion of Chinefe words, have devifed eleven different, and fome of them very compounded, marks and afpirations, to fignify the various modulations, elevations, and depreffions of the voice, which diftinguifh the feveral readings of the fame monofyllable. The Chinefe oral language being thus barren and contracted, is unfit for literature; and, therefore, their literature is all comprifed in arbitrary characters, which are amazingly complicated and numerous, amounting to about eighty thoufand. This language, being wholly addreffed to the eye, and having no affinity with their tongue, as fpoken, the latter hath ftill continued in its original rude, uncultivated ftate, while the former has received all poffible improvement.

The genius of the Chinefe is peculiar to themfelves: they have no conception of what is beautiful in writing, regular in architecture, or natural in painting; and yet in their gardening, and planning their grounds, they hit upon the true fublime and beautiful. They perform all the operations of arithmetic with prodigious quicknefs, but differently from the Europeans. Till the latter came among them, they were ignorant of mathematical learning, and all its depending arts. They had no proper apparatus for aftronomical obfervations; and the metaphyfical learning which exifted among them, was only known to their philofophers. But even the arts introduced by the Jefuits were of very inconfiderable duration, and lafted very little longer than the reign of Canghi, who was contemporary with our Charles II. nor is it probable they will ever be revived. It has been generally faid, that they underftood printing before the Europeans; but that can only be applied to block-printing, for the fufible and moveable types were undoubtedly Dutch or German inventions. The Chinefe, however, had almanacks, which were ftamped from plates or blocks, many hundred years before printing was difcovered in Europe.

The difficulty of maftering and retaining fuch a number of arbitrary marks and characters, as there are in what may be called the Chinefe written language, greatly retards the progrefs of their erudition. But there is no part of the globe where learning is attended with fuch honours and rewards, and where there are more powerful inducements to cultivate and purfue it. The literati are reverenced as another fpecies, and are the only nobility known in China. If their birth be ever fo mean and low, they become mandarins of the higheft rank, in proportion to the extent of their learning. On the other hand, however exalted their birth may be, they quickly fink into poverty and obfcurity, if they do not cultivate thofe ftudies which raifed their fathers. It has been obferved, that there is no nation in the world where the firft honours of the ftate lie fo open to the loweft of the people, and where there is lefs of hereditary greatnefs. The Chinefe divide all their works of literature into four claffes. The firft is the clafs of *King*, or the facred books, which contain the principles of the Chinefe religion, morality, and government, and feveral curious and obfcure records relative to thefe important fubjects. Hiftory forms a clafs apart; yet, in this firft clafs, there are placed fome hiftorical monuments on account of their relation to religion and government, and among others, the *Tchun tficou*, a work of Confucius, which contains the annals of twelve kings of Low, the native country of that illuftrious fage. The fecond clafs is that of the *Su*, or *Che*, that is, of hiftory and the hiftorians. The third clafs, called *Tfu* or *Tfe*, comprehends philofophy and the philofophers, and contains all the works of the Chinefe literati, the productions alfo of foreign fects and religions, which the Chinefe confider only in the light of philofophical opinions; and all books relative to mathematics, aftronomy, phyfic, military fcience, the art of divination, agriculture, and the arts and fciences in general. The fourth is called *Tcie*, or *Mifcellanies*, and contains all the poetical books of the Chinefe, their pieces of eloquence, their fongs, romances, tragedies, and comedies. The Chinefe literati, in all the periods of their monarchy, have applied themfelves lefs to the ftudy of nature, and to the refearches of natural philofophy, than to moral inquiries, the practical fcience of life, and internal polity and manners. It is faid that it was not before the dynafty of the Song in the 10th and 11th centuries after Chrift, that the Chinefe philofophers formed hypothefes concerning the natural fyftem of the univerfe, and entered into difcuffions of a fcholaftic kind, in confequence perhaps of the intercourfe they had long kept up with the Arabians, who ftudied with ardour the works of Ariftotle. And fince the Chinefe have begun to pay fome attention to natural philofophy, their progrefs in it has been much inferior to that of the Europeans.

The invention of gun-powder is juftly claimed by the Chinefe, who made ufe of it againft Zinghis Khan and Tamerlane. They feem to have known nothing of fmall fire-arms, and to have been acquainted only with the cannon, which they call the *fire-pan*. Their induftry in their manufactures of ftuffs, porcelane, japanning, and the like fedentary trades, is amazing, and can be equalled only by their labours in the field, in making canals, levelling mountains, raifing gardens, and navigating their junks and boats.

The *Natural Curiofities* that prefent themfelves in China are not very numerous. Some volcanos, and rivers and lakes of particular qualities, are to be found in different parts of the empire. The volcano of Linefung is faid fometimes to make fo furious a difcharge of fire and afhes, as to occafion a tempeft in the air; and fome of their lakes are faid to petrify fifhes when put into them. The great wall feparating China from Tartary, to prevent the incurfions of the Tartars, is fuppofed to extend from 1200 to 1500 miles. It is carried over mountains and vallies, and reaches, according to M. Grofier, from the province of the Shenfi to the Whang-Hay, or Yellow Sea. It is in moft places built of brick and mortar, which is fo well tempered that, though it has ftood for 1800 years, it is but little decayed. The beginning of this wall is a large bulwark of ftone raifed in the fea, in the province of Petcheli, to the eaft of Peking, and almoft in the fame latitude. It is built like the

walls of the capital city of the empire, but much wider, being terraſſed and caſed with bricks, and is from twenty to twenty-five feet high. P. Regis, and the other gentlemen who took a map of theſe provinces, often ſtretched a line on the top, to meaſure the baſis of triangles, and to take diſtant points with an inſtrument. They always found it paved wide enough for five or ſix horſemen to travel abreaſt with eaſe. Mention has been already made of the prodigious canals and roads that are cut through this empire.

The artificial mountains preſent, on their tops, temples, monaſteries, and other edifices. Some part, however, of what we are told concerning the cavities in theſe mountains, ſeems to be fabulous. The Chineſe bridges cannot be ſufficiently admired. They are built ſometimes upon barges ſtrongly chained together, yet ſo as to be parted, and to let the veſſels paſs that ſail up and down the river. Some of them run from mountain to mountain, and conſiſt only of one arch; that over the river Saffrany is 400 cubits long, and 500 high, though a ſingle arch, and joins two mountains; and ſome in the interior parts of the empire are ſaid to be ſtill more ſtupendous. The triumphal arches of this country form the next ſpecies of artificial curioſities. Though they are not built in the Greek or Roman ſtyle of architecture, yet they are ſuperb and beautiful, and erected to the memory of their great men, with vaſt labour and expence. They are ſaid in the whole to be eleven hundred, two hundred of which are particularly magnificent. Their ſepulchral monuments make likewiſe a great figure. Their towers, the models of which are now ſo common in Europe under the name of pagodas, are vaſt embelliſhments to the face of their country. They ſeem to be conſtructed by a regular order, and all of them are finiſhed with exquiſite carvings and gildings, and other ornaments. That at Nanking, which is 200 feet high, and 40 in diameter, is the moſt admired. It is called the Porcelane Tower, becauſe it is lined with Chineſe tiles. Their temples are chiefly remarkable for the diſagreeable taſte in which they are built, for their capacioufneſs, their whimſical ornaments, and the uglineſs of the idols they contain. The Chineſe are remarkably fond of bells, which gave name to one of their principal feſtivals. A bell of Peking weighs 120,000 pounds, but its ſound is ſaid to be diſagreeable. The laſt curioſity to be mentioned, is their fire-works, which in China exceed thoſe of all other nations. In ſhort, every province in China is a ſcene of curioſities. Their buildings, except the pagodas, being confined to no order, and ſuſceptible of all kinds of ornaments, have a wild variety, and a pleaſing elegance, not void of magnificence, agreeable to the obſerver, and preſenting a diverſity of objects not to be found in European architecture.

Little can be ſaid of their chief cities, more than that ſome of them are immenſe, and there is great reaſon to believe their population is much exaggerated. The empire is ſaid to contain 4400 walled cities; the chief of which are Peking, Nanking, and Canton. Peking, the capital of the whole empire of China, and the ordinary reſidence of the emperors, is ſituated in a very fertile plain, 20 leagues diſtant from the great wall. It is an oblong ſquare, and is divided into two cities: that which contains the emperor's palace is called the Tartar city, becauſe the houſes were given to the Tartars when the preſent family came to the throne; and they refuſing to ſuffer the Chineſe to inhabit it, forced them to live without the walls, where they in a ſhort time built a new city; which, by being joined to the other, renders the whole an irregular form, ſix leagues in compaſs. The walls and gates of Peking are of the ſurpriſing height of fifty cubits, ſo that they hide the whole city; and are ſo broad, that centinels are placed upon them on horſeback; for there are ſlopes within the city of conſiderable length, by which horſemen may aſcend the walls; and in ſeveral places there are houſes built for the guards. The gates, which are nine in number, are neither embelliſhed with ſtatues, nor other carving; all their beauty conſiſting in their prodigious height, which at a diſtance gives them a noble appearance. The arches of the gates are built of marble, and the reſt with large bricks, cemented with excellent mortar. Moſt of the ſtreets run in a direct line: the largeſt are about 120 feet broad, and a league in length. The ſhops where they ſell ſilks and china-ware generally take up the whole ſtreet, and afford a very agreeable proſpect. Each ſhop-keeper places before his ſhop, on a ſmall kind of pedeſtal, a board about twenty feet high, painted, varniſhed, and often gilt, on which are written in large characters the names of the ſeveral commodities he ſells. Theſe being placed on each ſide of the ſtreet, at nearly an equal diſtance from each other, have a very pretty appearance; but the houſes are poorly built in front, and very low, moſt of them having only a ground floor, and none exceeding one ſtory above it. Of all the buildings in this great city, the moſt remarkable is the imperial palace, the grandeur of which does not conſiſt ſo much in the nobleneſs and elegance of the architecture, as the multitude of its buildings, courts, and gardens, all regularly diſpoſed; for within the walls are not only the emperor's houſe, but a little town, inhabited by the officers of the court, and a multitude of artificers employed and kept by the emperor; but the houſes of the courtiers and artificers are low and ill contrived. F. Artier, a French Jeſuit, who was indulged with a ſight of the palace and gardens, ſays, that the palace is more than three miles in circumference, and that the front of the building ſhines with gilding, paint, and varniſh, while the inſide is ſet off and furniſhed with every thing that is beautiful and precious in China, the Indies, and Europe. The gardens of this palace are large tracts of ground, in which are raiſed, at proper diſtances, artificial mountains, from 20 to 60 feet high, which form a number of ſmall vallies, plentifully watered by canals, which uniting, form lakes and meres. Beautiful and magnificent barks ſail on theſe pieces of water, and the banks are ornamented with ranges of building, not any two of which are ſaid to have any reſemblance to each other; which diverſity produces a very pleaſing effect. Every valley has its houſe of pleaſure, large enough to lodge one of the greateſt lords in Europe with all his retinue: many of theſe houſes are built with cedar, brought at a vaſt expence the diſtance of 500 leagues. Of theſe palaces, or houſes of pleaſure, there are more than 200 in this vaſt incloſure. In the middle of a lake, which is near half a league in diameter every way, is a rocky iſland, on which is built a palace, containing more than an hundred apartments. It has four fronts, and is a very elegant and magnificent ſtructure. The mountains and hills are covered with trees, particularly ſuch as produce beautiful and aromatic flowers; and the canals are edged with ruſtic pieces of rock, diſpoſed with ſuch art, as exactly to reſemble the wilderneſs of nature.

The city of Peking is computed to contain two millions of inhabitants, though Nankin is ſaid to exceed it both in extent and population. But Canton is the greateſt port in China, and the only port that has been much frequented by Europeans. The city wall is above five miles in circumference, with very pleaſant walks around it. From the top of ſome adjacent hills, on which forts are built, you have a fine proſpect of the country. It is beautifully interſperſed with mountains, little hills, and vallies, all green; and theſe again pleaſantly diverſified with ſmall towns, villages, high towers, temples, the ſeats of mandarins and other great men, which are watered with delightful lakes, canals, and ſmall branches from the river Ta; on which are numberleſs boats and junks, ſailing different ways through the moſt fertile parts of the country. The city is entered by ſeveral iron gates, and within-ſide of each there is a guard-houſe. The ſtreets of Canton are very ſtraight, but generally narrow, paved with flag ſtones. There are many pretty buildings in this city, great numbers of triumphal arches, and temples well ſtocked with images. The ſtreets of Canton are ſo crowded, that it is

difficult to walk in them; yet a woman of any faſhion is ſeldom to be ſeen, unleſs by chance when coming out of her chair. There are great numbers of market places for fiſh, fleſh, poultry, vegetables, and all kinds of proviſions, which are ſold very cheap. There are many private walks about the ſkirts of the town, where thoſe of the better ſort have their houſes, which are very little frequented by Europeans, whoſe buſineſs lies chiefly in the trading part of the city, where there are only ſhops and warehouſes. Few of the Chineſe traders of any ſubſtance keep their families in houſes where they do buſineſs, but either in the city, in the more remote ſuburbs, or farther up in the country. They have all ſuch a regard to privacy, that no windows are made towards the ſtreets, but in ſhops and places of public buſineſs, nor do any of their windows look towards thoſe of their neighbours. The ſhops of thoſe that deal in ſilk are very neat, make a fine ſhow, and are all in one place; for tradeſmen, or dealers in one kind of goods, herd together in the ſame ſtreet. It is computed that there are in this city, and its ſuburbs, 1,200,000 people; and there are often 5000 trading veſſels lying before the city.'

China is ſo happily ſituated, and produces ſuch a variety of materials for *Manufactures*, that it may be ſaid to be the native land of induſtry; but it is an induſtry without taſte or elegance, though carried on with great art and neatneſs. They make paper of the bark of bamboo, and other trees, as well as of cotton, but not comparable, for records and printing, to the European. Their ink for the uſe of drawing is well known in England, and is ſaid to be made of oil and lampblack. We have already mentioned the antiquity of their printing, which they ſtill do by cutting their characters on blocks of wood. The manufacture of that earthen ware generally known by the name of China was long a ſecret in Europe, and brought immenſe ſums to that country. The ancients knew and eſteemed it highly under the name of porcelain, but it was of much better fabric than the modern. Though the Chineſe affect to keep that manufacture ſtill a ſecret, yet it is well known that the principal material is a prepared pulveriſed earth, and that ſeveral European countries far exceed the Chineſe in manufacturing this commodity. The Chineſe ſilks are generally plain and flowered gauzes, and they are ſaid to have been originally fabricated in that country, where the art of rearing ſilk-worms was firſt diſcovered. They manufacture ſilks likewiſe of a more durable kind, and their cotton and other cloths are famous for furniſhing a light warm wear. Their trade, it is well known, is open to all the European nations, with whom they deal for ready money; for ſuch is the pride and avarice of the Chineſe, that they think no manufactures equal to their own. But it is certain, that ſince the diſcovery of the porcelain manufactures, and the vaſt improvements the Europeans have made in the weaving branches, the Chineſe commerce has been very rapidly on the decline.

The original plan of the *Chineſe Government* was patriarchal, almoſt in the ſtricteſt ſenſe of the word. Duty and obedience to the father of each family was recommended and enforced in the moſt rigorous manner; but, at the ſame time, the emperor was conſidered as the father of the whole. His mandarins, or great officers of ſtate, were looked upon as his ſubſtitutes, and the degrees of ſubmiſſion which were due from the inferior ranks to the ſuperior, were ſettled and obſerved with the moſt ſcrupulous preciſion, and in a manner that to us ſeems highly ridiculous. This ſimple claim of obedience required great addreſs and knowledge of human nature to render it effectual; and the Chineſe legiſlators, Confucius particularly, appear to have been men of wonderful abilities. They enveloped their dictates in a number of myſtical appearances, ſo as to ſtrike the people with awe and veneration. The mandarins had modes of ſpeaking and writing different from thoſe of other ſubjects, and the people were taught to believe that the princes partook of divinity, ſo that they were ſeldom ſeen and more ſeldom approached. Though this ſyſtem preſerved the public tranquillity for an incredible number of years, yet it had a fundamental defect that often convulſed, and at laſt proved fatal to the ſtate, becauſe the ſame attention was not paid to the military as to the civil duties. The Chineſe had paſſions like other men, and ſometimes a weak or wicked adminiſtration drove them into arms, and a revolution eaſily ſucceeded, which they juſtified by ſaying that their ſovereign had ceaſed to be their father. During thoſe commotions, one of the parties naturally invited their neighbours the Tartars to their aſſiſtance; and it was thus thoſe barbarians, who had great ſagacity, became acquainted with the weak ſide of their conſtitution; and they availed themſelves accordingly, by invading and conquering the empire, and conforming to the Chineſe inſtitutions.

Beſides the great doctrine of the patriarchal obedience, the Chineſe had ſumptuary laws, and regulations for the expences of all degrees of ſubjects, which were very uſeful in preſerving the public tranquillity, and preventing the effects of ambition. By their inſtitutions likewiſe, the mandarins might remonſtrate to the emperor, but in the moſt ſubmiſſive manner, upon the errors of his government; and when he was a virtuous prince, this freedom was often attended with the moſt ſalutary effects. No country in the world is ſo well provided with magiſtrates for the diſcharge of juſtice, both in civil and criminal matters, as China; but they are often ineffectual through want of public virtue in the execution. The emperor is ſtyled " *Holy Son of Heaven, Sole Governor of the Earth, Great Father of his People*."

With regard to their *Religion*, though the ancient Chineſe worſhipped idols, yet their philoſophers and legiſlators had juſter ſentiments of the Deity, and indulged the people in the worſhip of ſenſible objects, only to make them more ſubmiſſive to government. The Jeſuits made little oppoſition to this when they attempted to convert the Chineſe, and ſuffered their proſelytes to worſhip Tien, pretending that it was no other than the name of God. The truth is, Confucius, and the Chineſe legiſlators, introduced a moſt excellent ſyſtem of morals among the people, and endeavoured to ſupply the want of juſt ideas of a future ſtate, by preſcribing to them the worſhip of inferior deities. Their morality approximates to that of Chriſtianity; but as we know little of their religion, but through the Jeſuits, we cannot adopt for truth the numerous inſtances which they tell us of the conformity of the Chineſe with the Chriſtian religion. Thoſe fathers, it muſt be owned, were men of great abilities, and made a wonderful progreſs above a century ago in their converſions; but they miſtook the true character of the emperor, who was their patron; for he no ſooner found that they were in fact aſpiring to the civil direction of the government, than he expelled them, levelled their churches with the ground, and prohibited the exerciſe of their religion; ſince which time Chriſtianity has made no figure in China.

The ſecurity of travellers, and an eaſy mode of conveyance for paſſengers and merchandize of every kind, are objects to which particular attention ſeems to have been paid by adminiſtration in China. The manner in which the public roads are managed, greatly contributed to the former. Theſe roads are in general very broad; they are paved in all the ſouthern provinces, and ſome of the northern. Valleys have been filled up, and paſſages have been cut through rocks and mountains, in order to make commodious highways, and to preſerve them as nearly as poſſible on a level. They are generally bordered with lofty trees, and ſometimes with walls eight or ten feet in height, to prevent travellers from entering into the fields. Openings are left in them at certain intervals, which give a paſſage into croſs roads, that conduct to different villages. On all the great roads covered ſeats are erected at proper diſtances,

where the traveller may ſhelter himſelf from the inclemency of the winter, or the exceſſive heats of the ſummer. There is no want of inns on the principal highways, and even on the croſs roads. The former are very ſpacious, but they are badly ſupplied with proviſions. People are even obliged to carry beds with them, or to ſleep on a plain mat. Government requires of thoſe who inhabit them, to give lodging only to thoſe who aſk and pay for it. We meet with many turrets, (ſays Mr. Bell) called poſt-houſes, erected at certain diſtances one from another, with a flag-ſtaff, on which is hoiſted the imperial pendant. Theſe places are guarded by ſoldiers, who run from one poſt to another with great ſpeed, carrying letters which concern the emperor. The turrets are in ſight of one another, and by ſignals they can convey intelligence of any remarkable event. By theſe means the court is informed in the ſpeedieſt manner of whatever diſturbance may happen in the moſt remote part of the empire.

The *Revenues* of China are ſaid by ſome to amount to twenty, or, according to the abbé Groſier, to forty-one millions ſterling a year; but this cannot be meant in money, which does not at all abound in China. The taxes collected for the uſe of government in rice, and other commodities, are certainly very great, and may eaſily be impoſed, as an account of every man's family and ſubſtance is annually enrolled, and very poſſibly may amount to that ſum.

With regard to its *Military and Marine Strength*, China is, at this time, a far more powerful empire than it was before its conqueſt by the eaſtern Tartars in 1644. This is owing to the conſummate policy of Chun-tchi, the firſt Tartarian emperor of China, who obliged his hereditary ſubjects to conform themſelves to the Chineſe manners and policy, and the Chineſe to wear the Tartar dreſs and arms. The two nations were thereby incorporated. The Chineſe were appointed to all the civil offices of the empire. The emperor made Peking the ſeat of his government, and the Tartars quietly ſubmitted to a change of their country and condition, which was ſo much in their favour. This ſecurity, however, of the Chineſe from the Tartars, takes from them all military objects; the Tartar power alone being formidable to that empire. The only danger that threatens it at preſent, is the diſuſe of arms. The Chineſe land army is ſaid to conſiſt of more than ſeven hundred thouſand men; but in theſe are comprehended all who are employed in the collection of the revenue, and the preſervation of the canals, the great roads, and the public peace. The imperial guards amount to about 30,000. As to the marine force, it is compoſed chiefly of the junks we have already mentioned, and other ſmall ſhips, that trade coaſt-ways, or to the neighbouring countries, or to prevent ſudden deſcents. A treatiſe on the military art, tranſlated from the Chineſe into the French language, was publiſhed in Paris in 1772, from which it appears that the Chineſe are well verſed in the theory of the art of war: but caution and care, and circumſpection, are much recommended to their generals; and one of their maxims is, never to fight with enemies either more numerous or better armed than themſelves.

The Chineſe pretend, as a nation, to an *Antiquity* beyond all meaſure of credibility; and their annals have been carried beyond the period to which the Scripture chronology aſſigns the creation of the world. Poan-Kou is ſaid by them to have been the firſt man; and the interval of time betwixt him and the death of their celebrated Confucius, which was in the year before Chriſt 479, had been reckoned from 276,000 to 96,961,740 years. But upon an accurate inveſtigation of this ſubject it appears, that all the Chineſe hiſtorical relations of events prior to the reign of the emperor Yao, who lived 2057 years before Chriſt, are entirely fabulous, compoſed in modern times, unſupported by authentic records, and full of contradictions. It appears alſo, that the origin of the Chineſe empire cannot be placed higher than two or three generations before Yao. But even this is carrying the empire of China to a very high antiquity: and it is certain that the materials for the Chineſe hiſtory are extremely ample: the grand annals of the empire being comprehended in no leſs than 668 volumes. But the limits to which our work is confined will not permit us to enlarge upon ſo copious a ſubject, which, indeed, would be very unintereſting to the generality of European readers. A ſucceſſion of excellent princes, and a duration of domeſtic tranquillity, united legiſlation with philoſophy, and produced their Fo-hi, whoſe hiſtory is wrapped up in myſteries; their Li-Laokum; and above all their Confucius, at once the Solon and the Socrates of China. After all, the internal revolutions of the empire, though rare, produced the moſt dreadful effects, in proportion as its conſtitution was pacific, and they were attended with the moſt bloody exterminations in ſome provinces: ſo that though the Chineſe empire is hereditary, the imperial ſucceſſion was more than once broken into, and altered. Upwards of twenty dynaſties, or different tribes and families of ſucceſſion, are enumerated in their annals.

Neither the great Zinghis Khan, nor Tamerlane, though they often defeated the Chineſe, could ſubdue their empire, and neither of them could keep the conqueſts they made there. Their celebrated wall proved but a feeble barrier againſt the arms of thoſe famous Tartars. After their invaſions were over, the Chineſe went to war with the Manchew Tartars while an indolent worthleſs emperor, Tſong-tching, was upon the throne. In the mean while, a bold rebel, named Li-congtſe, in the province of Se-tchuen, dethroned the emperor, who hanged himſelf, as did moſt of his courtiers and women. Ou-ſan-quey, the Chineſe general, on the frontiers of Tartary, refuſed to recogniſe the uſurper, and made a peace with Tſongate, or Chun-tchi, the Manchew prince, who drove the uſurper from the throne, and took poſſeſſion of it himſelf, about the year 1644. The Tartar maintained himſelf in his authority; and, as has been already mentioned, wiſely incorporated his hereditary ſubjects with the Chineſe, ſo that in effect Tartary became an acquiſition to China. He was ſucceeded by a prince of great natural and acquired abilities, who was the patron of the Jeſuits, but knew how to check them when he found them intermeddling with the affairs of his government. About the year 1661, the Chineſe, under this Tartar family, drove the Dutch out of the iſland of Formoſa, which the latter had taken from the Portugueſe.

In the year 1771, all the Tartars which compoſed the nation of the Tourgouths, left the ſettlements which they had under the Ruſſian government on the banks of the Wolga, and the Iaick, at a ſmall diſtance from the Caſpian ſea, and, in a vaſt body of fifty thouſand families, they paſſed through the country of the Haſacks. After a march of eight months, in which they ſurmounted innumerable difficulties and dangers, they arrived in the plains that lie on the frontier of Carapan, not far from the banks of the river Ily, and offered themſelves as ſubjects to Kien-long, emperor of China, who was then in the thirty-ſixth year of his reign. He received them graciouſly, furniſhed them with proviſions, clothes, and money, and allotted to each family a portion of land for agriculture and paſturage. The year following there was a ſecond emigration of about thirty thouſand other Tartar families, who alſo quitted the ſettlements which they enjoyed under the Ruſſian government, and ſubmitted to the Chineſe ſceptre. The emperor cauſed the hiſtory of theſe emigrations to be engraven upon ſtone in four different languages.

We ſhall conclude this article by referring the reader to the accounts lately given of Lord Macartney's embaſſy to China, which, though unſucceſsful as to its object, has nevertheleſs

been the means of supplying many particulars, not before known, with regard to the manners and customs of the people of that country.

CHINA-*Root*, in the materia medica, the root of a species of smilax, brought both from the East and West Indies; and thence distinguished into oriental and occidental. Both sorts are longish, full of joints, of a pale-red colour, with no smell, and very little taste. The oriental, which is the most esteemed, is considerably harder, and paler-coloured than the other. Such should be chosen as is fresh, close, heavy, and, upon being chewed, appears full of a fat unctuous juice. It is generally supposed to promote insensible perspiration and the urinary discharge, and by its unctuous quality to correct the animal juices. China-root was first brought into Europe in the year 1535, and used as a specific against venereal and cutaneous disorders. With this view it was made use of for some time; but has long since given place to more powerful medicines.

CHINA-*Ware*. See PORCELAIN.

CHINCA, a sea port town of Peru in South America, situated in an extensive valley of the same name, in W. long. 76. 0. S. lat. 13. 0.

CHINCOUGH, otherwise called HOOPING-*Cough*, a convulsive kind of cough which is contagious, and to which children are very generally subject. See MEDICINE.

CHINKAPIN. See FAGUS.

CHINNOR, a musical instrument among the Hebrews, consisting of 33 chords. Kircher has given a figure of it, which is represented in plate 69.

CHINON, an ancient town of France, in the department of Indre and Loire and late province of Touraine. In the castle of this place, Henry II. king of England expired; and here the celebrated Joan of Arc first presented herself, in a military habit, before Charles VII. Chinon was the birth-place of Rabelais and of Quillet. It is seated on the river Vienne, 10 miles N. of Richelieu, and 150 S. W. of Paris. Lon. 0. 22. E. Lat. 47. 12. N.

CHIO, or CHIOS, an Asiatic island lying near the coast of Natolia, opposite to the peninsula of Ionia. It was known to the ancients by the name of Æthalia, Macris, Pithynsa, &c. as well as that of Chios. According to Herodotus, the island of Chios was peopled originally from Ionia. It was at first governed by kings: but afterwards the government assumed a republican form, which, by the direction of Isocrates, was modelled after that of Athens. They were, however, soon enslaved by tyrants, and afterwards conquered by Cyrus king of Persia. It is now subject to the Turks, and is called SCIO. See that article.

CHIOCOCCA, in botany; a genus of the monogynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 48th order, *Aggregatæ*. The corolla is funnel-shaped and equal; the berry unilocular, dispermous, inferior.

CHIONANTHUS, the SNOW-DROP or FRINGE-TREE; a genus of the monogynia order, belonging to the diandria class of plants; and in the natural method ranking under the 44th order, *Sepiariæ*. The corolla is quadrifid, with the segments very long; the fruit is a plum. There is but one species particularly described by botanists, viz. the *Virginica*. It is common in Virginia and South Carolina, where it grows by the sides of rivulets. It rises to the height of ten feet; the leaves are as large as those of the laurel, but much thinner. The flowers come out in May, and are of a pure white: from whence it has the name of the *snow-drop tree*. They hang down in large branches, and are cut into narrow segments; from which it has got its other name of the *fringe-tree*. After the flowers are fallen off, the fruit appears, which grows to the size of a sloe, having a stone in the middle. The plants are propagated from seeds sown on a hot-bed, and kept in a stove. Some have been raised from layers, but this method is very precarious, and therefore the other is to be preferred. The seeds must be procured from America, for they never come to perfection in this country.

CHIONE, in fabulous history, was daughter of Dædalion, of whom Apollo and Mercury became enamoured. To enjoy her company, Mercury lulled her to sleep with his caduceus; and Apollo, in the night, under the form of an old woman, obtained the same favours as Mercury. From this embrace Chione became mother of Philamon and Autolycus; the former of whom, as being son of Apollo, became an excellent musician; and the latter was equally notorious for his robberies, of which his father Mercury was the patron. Chione grew so proud of her commerce with the gods, that she even preferred her beauty to that of Juno; for which impiety she was killed by the goddess and changed into a hawk.—Another of the same name was daughter of Boreas and Orithyia, who had Eumolpus by Neptune. She threw her son into the sea; but he was preserved by his father.

CHIOS. See CHIO and SCIO.

CHIOURLIC, an ancient town of Turkey in Europe, and in Romania, with a see of a Greek bishop. It is seated on a river of the same name, in E. long. 7. 47. N. lat. 41. 18.

CHIOZZO, an ancient and handsome town of Italy, in the territory of Venice, and in a small island, near the Lagunes, with a podesta, a bishop's see, and a harbour defended by a fort. E. long. 12. 23. N. lat. 45. 17.

CHIPPENHAM, a town of Wiltshire, seated on the river Avon. It is a good throughfare town; has a handsome stone bridge over the river, consisting of 16 arches; and sends two members to parliament. There is here a manufacture of the best superfine woollen cloth in England. W. long. 2. 12. N. lat. 51. 25.

CHIPPING, a phrase used by the potters and china-men to express that common accident both of our own stone and earthen ware, and the porcelain of China, the flying off of small pieces from the edges. Our earthen wares are particularly subject to this, and are always spoiled by it before any other flaw appears in them. Our stone wares escape it better than these; but not so well as the porcelain of China, which is less subject to it than any other manufacture in the world. The method by which the Chinese defend their ware from this accident, is this: They carefully burn some small bamboo canes to a sort of charcoal, which is very light, and very black; this they reduce to a fine powder, and then mix it into a thin paste, with some of the varnish which they use for their ware: they next take the vessels when dried, and not yet baked, to the wheel; and turning them softly round, they, with a pencil dipped in this paste, cover the whole circumference with a thin coat of it: after this, the vessel is again dried; and the border made with this paste appears of a pale greyish colour when it is thoroughly dry. They work on it afterwards in the common way, covering both this edge and the rest of the vessel with the common varnish. When the whole is baked on, the colour given by the ashes disappears, and the edges are as white as any other part; only when the baking has not been sufficient, or the edges have not been covered with the second varnishing, we sometimes find a dusky edge, as in some of the ordinary thick tea-cups. It may be a great advantage to our English manufactures to attempt something of this kind. The willow is known to make a very light and black charcoal; but the elder, though a thing seldom used, greatly exceeds it. The young green shoots of this shrub, which are almost all pith, make the lightest and the blackest of all charcoal; this readily mixes with any liquid, and might be used in the same way that the Chinese use the charcoal of the bamboo cane, which is a light hollow ve-

getable, more reſembling the elder-ſhoots than any other Engliſh plant.' It is no wonder that the fixed ſalt and oil contained in this charcoal ſhould be able to penetrate the yet raw edges of the ware, and to give them, in the ſubſequent baking, a ſomewhat different degree of vitrification from the other parts of the veſſel; which, though, if given to the whole, it might take off from the true ſemivitrified ſtate of that ware, yet at the edges is not to be regarded, and only ſerves to defend them from common accidents, and keep them entire. The Chineſe uſe two cautions in this application: the firſt in the preparation; the ſecond in the laying it on. They prepare the bamboo canes for burning into charcoal, by peeling off the rind. This might eaſily be done with our elder-ſhoots, which are ſo ſucculent, that the bark ſtrips off with a touch. The Chineſe ſay, that if this is not done with their bamboo, the edges touched with the paſte will burſt in the baking: this does not ſeem indeed very probable; but the charcoal will certainly be lighter made from the peeled ſticks; and this is a known advantage. The other caution is, never to touch the veſſel with hands that have any greaſy or fatty ſubſtance about them; for if this is done, they always find the veſſel crack in that place.

CHIROGRAPH was anciently a deed, which, requiring a counterpart, was engroſſed twice on the ſame piece of parchment, counterwiſe; leaving a ſpace between, wherein was written CHIROGRAPH, through the middle whereof the parchment was cut, ſometimes ſtraight, ſometimes indentedly; and a moiety given to each of the parties. This was afterwards called *dividenda*, and *chartæ diviſæ*; and was the ſame with what we now call *charter-party*. See CHARTER-*Party*. The firſt uſe of theſe chirographs with us was in the time of Henry III.

CHIROGRAPH was alſo anciently uſed for a fine: and the manner of engroſſing the fines, and cutting the parchment in two pieces, is ſtill retained in the office called the *chirographer's office*.

CHIROGRAPHER *of* FINES, an officer in the common pleas, who engroſſes fines acknowledged in that court into a perpetual record (after they have been examined, and paſſed by other officers), and writes and delivers the indentures thereof to the party. He makes two indentures; one for the buyer, the other for the ſeller; and a third indented piece, containing the effect of the fine, and called *the foot of the fine*; and delivers it to the *cuſtos brevium*. The ſame officer alſo, or his deputy, proclaims all fines in court every term, and indorſes the proclamations on the backſide of the foot; keeping withal the writ of covenant, and the note of the fine.

CHIROMANCY, a ſpecies of divination drawn from the lines and lineaments of a perſon's hand, by which means, it is pretended, the diſpoſitions of the mind may be diſcovered. See DIVINATION.

CHIRON, a famous perſonage of antiquity; ſtyled by Plutarch, in his dialogue on muſic, "*The wiſe Centaur*." Sir Iſaac Newton places his birth in the firſt age after Deucalion's deluge, commonly called the *Golden Age*; and adds, that he formed the conſtellations for the uſe of the Argonauts, when he was 88 years old; for he was a practical aſtronomer, as well as his daughter Hippo: he may, therefore, be ſaid to have flouriſhed in the earlieſt ages of Greece, as he preceded the conqueſt of the Golden Fleece, and the Trojan war. He is generally called the ſon of Saturn and Phillyra; and is ſaid to have been born in Theſſaly among the Centaurs, who were the firſt Greeks that had acquired the art of breaking and riding horſes: whence the poets, painters, and ſculptors, have repreſented them as a compound of man and horſe; and perhaps it was at firſt imagined by the Greeks, as well as by the Americans, when they firſt ſaw cavalry, that the horſe and the rider conſtituted the ſame animal. Chiron was repreſented by the ancients as one of the firſt inventors of medicine, botany, and *chirurgery*; a word which ſome etymologiſts have derived from his name. He inhabited a grotto or cave in the foot of Mount Pelion, which, from his wiſdom and great knowledge of all kinds, became the moſt famous and frequented ſchool throughout Greece. Almoſt all the heroes of his time were fond of receiving his inſtructions; but among all his diſciples no one reflected ſo much honour upon him as Achilles, whoſe renown he in ſome degree ſhared; and to whoſe education he in a particular manner attended, being his grandfather by the mother's ſide. The death of this philoſophic muſician was occaſioned, at an extreme old age, by an accidental wound in the knee with a poiſoned arrow, ſhot by his ſcholar Hercules at another. He was placed after his death by Muſæus among the conſtellations, through reſpect for his virtues, and in gratitude for the great ſervices which he had rendered the people of Greece.

CHIRONIA, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 20th order, *Rotaceæ*. The corolla is wheel-ſhaped; the piſtil declining downwards; the ſtamina placed in the tube of the corolla; the antheræ in their laſt ſtage ſpiral; the ſeed-caſe bilocular. There are eight ſpecies, of which the *fruteſcens* is the moſt remarkable. It is a native of the Cape of Good Hope. The root is fibrous, and ſpreads near the ſurface of the ground. The ſtalks are round, and inclining to be ligneous, but are of a very ſoft texture; theſe riſe from two to three feet high, ſending out ſeveral branches which grow erect, and are garniſhed with ſucculent leaves an inch or more in length, and about an eighth of an inch in breadth. At the end of each ſhoot the flowers are produced, which are tubulous, and ſpread open at the top; they are of a bright red colour; and when there are a large number of flowers open on the ſame plant, they make a fine appearance. The flowers are produced from June to autumn; and the ſeeds ripen in October. The plants are propagated by ſeeds, which muſt be ſown in pots filled with light ſandy earth, and plunged in a moderate hot-bed. In ſummer they may be inured to the open air; but muſt always be ſheltered in winter.

CHIRONOMY, in antiquity, the art of repreſenting any paſt tranſaction by the geſtures of the body, more eſpecially by the motions of the hands: this made a part of liberal education; it had the approbation of Socrates, and was ranked by Plato among the political virtues.

CHIROTONY, among eccleſiaſtical writers, denotes the impoſition of hands uſed in conferring prieſtly orders. However, it is proper to remark that chirotony originally was a method of electing magiſtrates, by holding up the hands.

CHIRURGEON, or SURGEON. See SURGEON.

CHIRURGERY. See SURGERY.

CHISLEY-LAND, in agriculture, a ſoil of a middle nature between ſandy and clayey land, with a large admixture of pebbles.

CHISON, KISON, or KISSON, (Judges, ch. iv. and v.) a river of Galilee; ſaid to riſe in mount Tabor, to run by the town of Naim, and to fall into the Mediterranean between mount Carmel and Ptolemais, 1 Kings xviii. 40.

CHISSEL, or CHISEL, an inſtrument much uſed in ſculpture, maſonry, joinery, carpentry, &c. There are chiſſels of various kinds; though their chief difference lies in their different ſize and ſtrength, as being all made of ſteel well ſharpened and tempered: but they have appropriate names, according to the ſeveral uſes to which they are applied.—The chiſſels uſed in carpentry and joinery are, 1. The former; which is uſed firſt of all before the paring chiſſel, and juſt after the work is ſcribed. 2. The paring-chiſſel; which has a fine ſmooth edge, and is uſed to pare off or ſmooth the irregularities which the former makes. This is not ſtruck with a mallet as the former is, but is preſſed with the ſhoulder of the workman.

3. Skew-former: this is uſed for cleanſing acute angles with the point or corner of its narrow edge. 4. The mortiſe-chiſſel; which is narrow, but very thick and ſtrong, to endure hard blows; and it is cut to a very broad baſil. Its uſe is to cut deep ſquare holes in the wood for mortiſes. 5. The gouge, which is a chiſſel with a round edge; one ſide whereof ſerves to prepare the way for an augre, and the other to cut ſuch wood as is to be rounded, hollowed, &c. 6. Socket-chiſſels, which are chiefly uſed by carpenters, &c. have their ſhank made with a hollow ſocket at top, to receive a ſtrong wooden ſprig, fitted into it with a ſhoulder. Theſe chiſſels are diſtinguiſhed, according to the breadth of their blades, into half-inch chiſſels, three-quarter-inch chiſſels, &c. 7. Ripping chiſſels; which is a ſocket-chiſſel of an inch broad, having a blunt edge, with no baſil to it. Its uſe is to rip or tear two pieces of wood aſunder, by forcing in the blunt edge between them.

CHITON, in zoology, a genus of the order of vermes teſtaceæ. The name *chiton* is from χιτων, *lorica*, a coat of mail. The ſhell is plated, and conſiſts of many parts lying upon each other tranſverſely: the inhabitant is a ſpecies of the DORIS. They are common on the ſhores of Scarborough, Aberdeen, and Lochbroom. See ſeveral ſpecies repreſented of their natural ſize in Plate 78.

CHITTRICK's MEDICINE FOR THE STONE: a noſtrum, which, ſome years ago, had great reputation as a lithontriptic. It was no other than ſoap-lye; and the following are the directions for uſing it: Take one tea-ſpoonful of the ſtrongeſt ſoap-lye, mixed in two table-ſpoonfuls of milk, an hour before breakfaſt and at going to bed. Before you take the medicine, take a draught of pure milk, and immediately after you have ſwallowed the medicine, take another. If you find this agrees for two or three days, you may add half as much more to the doſe.

CHIVALRY, from *cheval*, "a horſe;" an abſtract term, uſed to expreſs the peculiar privileges, obligations, and turn of mind, with all the other diſtinguiſhing characteriſtics of that order of men who flouriſhed in Europe in the dark ages, during the vigour of the feudal ſyſtems of government, under the name of *Knights*, or *Knights Errant*.

Chivalry, though founded in caprice, and productive of extravagance, had a very conſiderable influence in refining the manners of the European nations, during the twelfth, thirteenth, fourteenth, and fifteenth centuries. The objects of this romantic inſtitution were, to check the inſolence of overgrown oppreſſors, to ſuccour the diſtreſſed, to reſcue the helpleſs from captivity, to protect or to avenge women, orphans, and eccleſiaſtics, who would not bear arms in their own defence, to redreſs wrongs, and to remove grievances. Valour, gallantry, and religion, were blended in this inſtitution; men were trained to knighthood by long previous diſcipline; they were admitted into the order by ſolemnities, no leſs devout than pompous. Every perſon of noble birth courted the honour; it was deemed a diſtinction ſuperior to royalty, and monarchs are found to have received it from the hands of private gentlemen. Theſe various circumſtances contributed to render a whimſical inſtitution of ſubſtantial benefit to mankind. See Robertſon's Hiſt. of Charles V. vol. i. p. 82, &c. ed. 2. 8vo.

"Between the age of Charlemagne and that of the cruſades, (ſays Gibbon) a revolution had taken place among the Spaniards, the Normans, and the French, which was gradually extended to the reſt of Europe. The ſervice of the infantry was degraded to the plebeians; the cavalry formed the ſtrength of the armies, and the honourable name of *miles*, or ſoldier, was confined to the gentlemen who ſerved on horſeback, and were inveſted with the character of knighthood. The dukes and counts, who had uſurped the rights of ſovereignty, divided the provinces among their faithful barons: the barons diſtributed among their vaſſals the fiefs or benefices of their juriſdiction; and theſe military tenants, the peers of each other and of their lord, compoſed the noble or equeſtrian order, which diſdained to conceive the peaſant or burgher as of the ſame ſpecies with themſelves. The dignity of their birth was preſerved by pure and equal alliances; their ſons alone who could produce four quarters or lines of anceſtry, without ſpot or reproach, might legally pretend to the honour of knighthood; but a valiant plebeian was ſometimes enriched and ennobled by the ſword, and became the father of a new race. A ſingle knight could impart, according to his judgment, the character which he received; and the war-like ſovereigns of Europe derived more glory from this perſonal diſtinction than from the luſtre of their diadems. This ceremony was in its origin ſimple and profane; the candidate, after ſome previous trial, was inveſted with his ſword and ſpurs; and his cheek or ſhoulder was touched with a ſlight blow, as an emblem of the laſt affront which it was lawful for him to endure. But ſuperſtition mingled in every public and private action of life: In the holy wars it ſanctified the profeſſion of arms: and the order of chivalry was aſſimilated in its rights and privileges to the ſacred orders of prieſthood. The bath and white garment of the novice were an indecent copy of the regeneration of baptiſm: his ſword, which he offered on the altar, was bleſſed by the miniſters of religion; his ſolemn reception was preceded by faſts and vigils; and he was created a knight in the name of God, of St. George, and of St. Michael the arch-angel. He ſwore to accompliſh the duties of his profeſſion; and education, example, and the public opinion, were the inviolable guardians of his oath. As the champion of God and the ladies, he devoted himſelf to ſpeak the truth; to maintain the right; to protect the diſtreſſed; to practiſe *courteſy*, a virtue leſs familiar to the ancients; to purſue the infidels; to deſpiſe the allurements of eaſe and ſafety; and to vindicate in every perilous adventure the honour of his character. The abuſe of the ſame ſpirit provoked the illiterate knight to diſdain the arts of induſtry and peace; to eſteem himſelf the ſole judge and avenger of his own injuries; and proudly to neglect the laws of civil ſociety and military diſcipline. Yet the benefits of this inſtitution, to refine the temper of barbarians, and to infuſe ſome principles of faith, juſtice, and humanity, were ſtrongly felt, and have been often obſerved. The aſperity of national prejudice was ſoftened; and the community of religion and arms ſpread a ſimilar colour and generous emulation over the face of Chriſtendom. Abroad, in enterpriſe and pilgrimage; at home, in martial exerciſe, the warriors of every country were perpetually aſſociated; and impartial taſte muſt prefer a Gothic tournament to the Olympic games of claſſic antiquity. Inſtead of the naked ſpectacles which corrupted the manners of the Greeks, and baniſhed from the ſtadium the virgins and matrons, the pompous decoration of the liſts was crowned with the preſence of chaſte and high-born beauty, from whoſe hands the conqueror received the prize of his dexterity and courage. The ſkill and ſtrength that were exerted in wreſtling and boxing, bear a diſtant and doubtful relation to the merit of a ſoldier; but the tournaments, as they were invented in France, and eagerly adopted both in the eaſt and weſt, preſented a lively image of the buſineſs of the field. The ſingle combats, the general ſkirmiſh, the defence of a paſs or caſtle, were rehearſed as in actual ſervice; and the conteſt, both in real and mimic war, was decided by the ſuperior management of the horſe and lance. The lance was the proper and peculiar weapon of the knight: his horſe was of a large and heavy breed; but this charger, till he was rouſed by the approaching danger, was uſually led by an attendant, and he quietly rode a pad or palfrey of a more eaſy pace. His helmet and ſword, his greaves and buckler, it would be ſuperfluous to deſcribe; but I may remark, that at the period of the cruſades, the armour was leſs

ponderous than in later times; and that, instead of a massy cuirass, his breast was defended by an hauberk or coat of mail. When their long lances were fixed in the rest, the warriors furiously spurred their horses against the foe; and the light cavalry of the Turks and Arabs could seldom stand against the direct and impetuous weight of their charge. Each knight was attended to the field by his faithful squire, a youth of equal birth and similar hopes; he was followed by his archers and men at arms; and four, or five, or six soldiers, were computed as the furniture of a complete *lance*. In the expeditions to the neighbouring kingdoms or the Holy Land, the duties of the feudal tenure no longer subsisted; the voluntary service of the knights and their followers was either prompted by zeal or attachment, or purchased with rewards and promises; and the numbers of each squadron were measured by the power, the wealth, and the fame of each independent chieftain. They were distinguished by his banner, his armorial coat, and his cry of war; and the most ancient families of Europe must seek in these atchievements the origin and proof of their nobility."

The respectable author of the Letters on Chivalry and Romance, traces, with great ingenuity and erudition, a strong resemblance between the manners of the age of chivalry and those of the old heroic ages delineated by Homer. "There is (says he) a remarkable correspondence between the manners of the old heroic times, as painted by their great romancer Homer, and those which are represented to us in the modern books of knight-errantry." This is a fact of which no good account can be given, but by another not less certain; that the political states of Greece, in the earliest periods of its story, were similar in many respects to that of Europe, as broken by the feudal system into an infinite number of petty independent governments.

Dr. Hurd, in his letters on Chivalry and Romance, traces the origin of this institution immediately to the feudal constitution; and he supposes that the spirit of chivalry had considerably prevailed before the rise of the CRUSADES.

CHIVALRY, in law, was a tenure of service, whereby the tenant was obliged to perform some noble or military office unto his lord: and it was of two kinds; either *regal*, that is, held only of the king; or *common*, where held of a common person. That which might be held only of the king was called *servitium*, or *sergeantia*; and was again divided into *grand* and *petit* serjeanty. The grand serjeanty was where one held lands of the king by service, which he ought to do in his own person; as, to bear the king's banner or spear, to lead his host, to find men at arms to fight, &c. Petit serjeanty was when a man held lands of the king, to yield him annually some small thing towards his wars, as a sword, dagger, bow, &c. Chivalry that might be holden of a common person was termed *scutagium*, "escuage;" that is, service of the shield; which was either *uncertain* or *certain*. By a statute of 12 Car. II. cap. 24. all tenures by *chivalry*, *in capite*, &c. are abolished.

Court of CHIVALRY, a court formerly held before the lord high constable and earl marshal of England jointly, and having both civil and criminal jurisdiction: but since the attainder of Stafford Duke of Buckingham under Henry VIII. and the consequent extinction of the office of lord high constable, it has usually, with respect to civil matters, been heard before the earl marshal only. This court, by stat. 13. Rich. II. c. 2. hath cognizance of contracts and other matters touching deeds of arms and war, as well out of the realm as in it. And from its sentences lies an immediate appeal to the king in person. This court was in great reputation in the times of pure chivalry; and afterwards during the English connections with the continent, by the territories which their princes held in France: but it is now grown almost entirely out of use, on account of the feebleness of its jurisdiction, and want of power to enforce its judgments; as it can neither fine nor imprison, not being a court of record.

CHIVES, in botany, are slender thread-like substances, generally placed within the blossom, and surrounding the pointals. They are formed of the woody substance of the plants.

CHIUM MARMOR, in the natural history of the ancients, the name of a black marble, called also the *lapis opsidianus*. It is very hard, and of a fine black; and, beside the many uses which the ancients put it to, is well known among our goldsmiths by the name of the *touchstone*; most of them being furnished with nothing better for this purpose than a piece of this. Indeed the basaltes, which might be had plentifully enough, is greatly preferable for those uses; any black marble, also, that is tolerably hard, will do. There is a very fine and elegantly smooth marble, of a compact texture, and fine glossy black, but showing no glittering particles when fresh broken, as most of the black marbles do. It is extremely hard, and cuts with difficulty, but is capable of the highest polish of any marble. The ancients had it from Ethiopia and the island of Chios; we have it from Italy.

CHIUN, or CHEVAN, in Hebrew antiquity. We meet with this word in the prophet Amos, cited in the Acts of the Apostles. St. Luke reads the passage thus: "Ye took up the tabernacle of Moloch, and the star of your god Remphan, figures which ye made to worship them." The import of the Hebrew is as follows: "Ye have borne the tabernacle of your kings, and the pedestal (the *chiun*) of your images, the star of your gods, which ye made to yourselves." The Septuagint in all probability read *Rephan* or *Revan*, instead of *Chiun* or *Chevan*, and took the pedestal for a god. Some say that the Septuagint, who made their translation in Egypt, changed the word *Chiun* into that of *Remphan*, because they had the same signification. M. Basnage, in his book intituled *Jewish Antiquities*, after having discoursed a good deal upon *Chion* or *Remphan*, concludes that Moloch was the sun, and *Chion*, *Chiun*, or *Remphan* the moon.

CHLAMYS, in antiquity, a military habit worn by the ancients over the tunica. It belonged to the patricians, and was the same in the time of war that the toga was in the time of peace. This sort of gown was called *picta*, from the rich embroidery with figures in Phrygian work; and *purpurea*, because the ground-work was purple. The chlamydes of the emperors were all purple, adorned with a golden and embroidered border.

CHLOEIA, in antiquity, a festival celebrated at Athens in honour of Ceres, to whom, under the name Χλοη, *Grass*, they sacrificed a ram.

CHLORA, in botany, a genus of the monogynia order, belonging to the octandria class of plants. The calyx is octophyllous, the corolla monopetalous and octofid; the capsule unilocular, bivalved, and polyspermous.

CHLOROSIS, in medicine, a disease, commonly called the *green-sickness*, incident to young females, arrived at the period of menstruation. See MEDICINE.

CHOCOLATE, in commerce, a kind of paste or cake prepared of certain ingredients, the basis of which is cacao. See CACAO. To make chocolate it is first necessary to roast the cacao in a frying-pan placed on a clear fire; and having afterwards cleared them of the husks, the nuts must be first powdered coarsely, and afterwards beaten in an iron mortar, the bottom of which is made pretty hot by placing it on the fire, till the whole runs into a thick kind of oil. In this state it must be poured into thin moulds of any size or shape that is agreeable; and when cold the cakes may be taken out for use. The Spaniards mix with their cacao nuts too great a quantity of cloves and cinnamon, besides other drugs without number, as musk, ambergrease, &c. The grocers of Paris use few or none

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of these ingredients: they only choose the best nuts, which are called *caraca* from the place from whence they are brought; and with these they mix a very small quantity of cinnamon, the freshest vanilla, and the finest sugar, but very seldom any cloves. Chocolate ready made, and cacao paste, are prohibited to be imported from any part beyond seas. If made and sold in Britain it pays inland duty 1s. 6d. per lb. It must be inclosed in papers containing one pound each, and produced at the excise office to be stamped. Upon three days notice given to the officer of excise, private families may make chocolate for their own use, provided no less than half an hundred weight of nuts be made at one time. In large manufactories chocolate is prepared with a machine, viz. the double cylinder, which seems very well calculated for exact triture. If perfectly prepared, no oil appears on the solution. London chocolate gives up no oil like the foreign. The culinary solution of chocolate requires more care than is commonly imagined. It is proper to shave or break it down, and dissolve it in cold water by milling it with the chocolate stick; after which, heat should be applied slowly; otherwise the oil will be separated. Hence it is, that after much boiling chocolate is hurtful, and is commonly offensive to weak stomachs. Mr. Henly, an ingenious electrician, has lately discovered, that chocolate, fresh from the mill, as it cools in the tin pans into which it is received, becomes strongly electrical; and that it retains this property for some time after it has been turned out of the pans, but soon loses it by handling. The power may be once or twice renewed by melting it again in an iron ladle, and pouring it into the tin pans as at first; but when it becomes dry and powdery, the power is not capable of being revived by simple melting: but if a small quantity of olive oil be added, and well mixed with the chocolate in the ladle, its electricity will be completely restored by cooling it in the tin pan as before.

CHOENIX, χοινιξ, an ancient dry measure, containing the 48th part of a *medimnus*, or six bushels.

CHOERILUS, a tragic poet of Athens about the 64th olympiad; who wrote 150 tragedies, of which 13 had obtained the prize. The name also of an historian of Samos; and two other poets, one intimate with Herodotus. He wrote a poem on the victory the Athenians had obtained over Xerxes; and on account of the excellencies of the composition he received a piece of gold for each verse from the Athenians. The other was one of Alexander's flatterers and friends.

CHOERINÆ, in antiquity, a kind of sea-shells, with which the ancient Greeks used to give their suffrage or vote.

CHOIR, that part of the church or cathedral where choiristers sing divine service. It is separated from the chancel where the communion is celebrated, and also from the nave of the church where the people are placed: the patron is said to be obliged to repair the choir of the church. It was in the time of Constantine that the choir was separated from the nave. In the twelfth century, they began to inclose it with walls; but the ancient balustrades have been since restored, with a view to the beauty of the architecture.

CHOIR, in nunneries, is a large hall adjoining to the body of the church, separated by a grate, where the nuns sing the office.

CHOISI (Francis Timoleon de), dean of the cathedral of Bayeux, and one of the forty of the French academy, was born at Paris in 1644. In 1685, he was sent with the chevalier de Chaumont to the king of Siam, and was ordained priest in the Indies by the apostolical vicar. He wrote a great number of works, in a polite, florid, and easy style; the principal of which are, 1. Four dialogues on the Immortality of the Soul, &c. 2. Account of a voyage to Siam. 3. An Ecclesiastical History, in 11 vols. 4to. 4. Life of David, with an interpretation of the Psalms. 5. Life of Solomon, &c. He died at Paris in 1724.

CHOLEDOCHUS, in anatomy, a term applied to a canal, or duct, called also *ductus communis*; formed of the union of the porus biliarius and ductus cysticus. The word comes from χολη, *choler*; and δεχομαι, *I receive*, or *contain*. This duct, passing obliquely to the lower end of the duodenum, serves to convey the bile from the liver to the intestines. See ANATOMY, page 190.

CHOLER. See BILE.

CHOLERA MORBUS, a sudden effusion or overflowing of the bile on the stomach and intestines; so as to operate violently both upwards and downwards. See MEDICINE.

CHOMER, or OMER. See CORUS.

CHONDRILLA, in botany, a genus of the polygamia equalis order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *compositæ*. The receptacle is naked; the calyx calyculated; the pappus simple and stalked; the florents in a manifold series.

CHONDROPTERYGII, in ichthyology, a term formerly applied to the order of the fishes now called *amphibia nantes* by Linnæus. See AMPHIBIA.

CHOP-CHURCH, or CHURCH-CHOPPER, a name, or rather nick-name, given to parsons who make a practice of exchanging benefices. See PERMUTATION. *Chop-church* occurs in an ancient statute as a lawful trade or occupation; and some of the judges say it was a good addition. Brook holds that it was no occupation, but a thing permissible by law.

CHOPIN, or CHOPINE, a liquid measure used both in Scotland and France, and equal to half their pint. See PINT and MEASURE.

CHOPIN (Rene), a famous civilian born at Bailleul in the year 1537. He was advocate in the parliament of Paris, where he pleaded for a long time with great reputation. He at last shut himself up in his closet, and composed many works, which have been collected together, and printed in 6 vols. folio. He died at Paris in 1606.

CHORAL, signifies any person that, by virtue of any of the orders of the clergy, was in ancient times admitted to sit and serve God in the choir. Dugdale, in his history of St. Paul's church, says, that there were with the chorus formerly six vicars choral belonging to that church.

CHORASSAN, or KHORASSAN, a province of Persia adjoining to Usbec Tartary. This was the ancient Bactria, and the birth-place of Kouli Khan.

CHORAZIM, or CHORAZIN, (Luke, Matthew) a town of Galilee, whose wretched incredulity Christ deplores: now desolate, at two miles distance from Capernaum.

CHORD, or CORD, primarily denotes a slender rope or cordage. See CORDAGE. The word is formed of the Latin, *chorda*, and that from the Greek, χορδη, *a gut*, whereof strings may be made.

CHORD, in geometry, a right line drawn from one part of an arch of a circle to another. Hence, *Chord of an Arch*, is a right line joining the extremes of that arch.

CHORD, in music, the union of two or more sounds uttered at the same time, and forming together an entire harmony. The natural harmony produced by the resonance of a sounding body, is composed of three different sounds, without reckoning their octaves; which form among themselves the most agreeable and perfect chord that can possibly be heard: for which reason they are called, on account of their excellence, *perfect chords*. Hence, in order to render that harmony complete, it is necessary that each chord should at least consist of three sounds. The trio is likewise found by musicians to include the perfection of harmony; whether because in this all the chords, and each in its full perfection, are used: or, because upon such occasions as render it improper to use them all, and each in its integrity, arts have been successfully practised to deceive the ear, and to

give it contrary perſuaſion, by deluding it with the principal ſounds of each *chord*, in ſuch a manner as to render it forgetful of the other ſounds neceſſary to their completion. Yet the octave of the principal ſound produces new relations, and new conſonances, by the completion of the intervals: they commonly add this octave, to have the aſſemblage of all the conſonances in one and the ſame *chord.* (See CONSONANCE.) Moreover, the addition of the diſſonance (See DISCORD) producing a fourth ſound ſuperadded to the perfect chord, it becomes indiſpenſably neceſſary, if we would render the chord full, that we ſhould include a fourth part to expreſs this diſſonance. Thus, the ſeries of chords can neither be complete nor connected but by means of four parts.

Chords are divided into perfect and imperfect. The *perfect chord* is that which we have lately deſcribed; which is compoſed of the fundamental ſound below, of its third, its fifth, and its octave. They are likewiſe ſubdivided into major and minor, according as the thirds which enter into their compoſition are flat or ſharp. (See INTERVAL.) Some authors likewiſe give the name of *perfect* to all chords, even to diſſonances, whoſe fundamental ſounds are below. Imperfect *chords* are thoſe in which the ſixth, inſtead of the fifth, prevails, and in general all thoſe whoſe loweſt are not their fundamental ſounds. Theſe denominations, which had been given before the fundamental baſs was known, are now moſt unhappily applied: thoſe of chords *direct* and *reverſed*, are much more ſuitable in the ſame ſenſe.

Chords are once more divided into conſonances and diſſonances. The chords denominated *conſonances*, are the perfect chord, and its derivatives: every other chord is a *diſſonance.* A table of both, according to the ſyſtem of M. Rameau, may be ſeen in Rouſſeau's Muſical Dictionary, vol. I. p. 27. Rouſſeau adds likewiſe a number of obſervations, that are extremely juſt and important.

CHORDS, or CORDS *of Muſical Inſtruments*, are ſtrings, by the vibration of which the ſenſation of ſound is excited, and by the diviſions of which the ſeveral degrees of tone are determined.

CHORDEE, in ſurgery, a ſymptom attending a gonorrhœa, conſiſting in a violent pain under the frenum, and along the courſe of the urethra, during the erection of the penis, which is incurvated downwards. Theſe erections are frequent and involuntary. See SURGERY.

CHOREA SANCTI VITI. See VITUS's *Dance*. See MEDICINE.

CHOREPISCOPUS, an officer in the ancient church, about whoſe function the learned are extremely divided. The word comes from χωρος, a *region* or *little country*, and επισκοπος, *a biſhop*, or *overſeer*. The chorepiſcopi were ſuffragan or local biſhops, holding a middle rank between biſhops and preſbyters, and delegated to exerciſe epiſcopal juriſdiction within certain diſtricts, when the boundaries of particular churches, over which ſeparate biſhops preſided, were conſiderably enlarged. It is not certain when this office was firſt introduced: ſome trace it to the cloſe of the firſt century; others tell us, that chorepiſcopi were not known in the eaſt till the beginning of the fourth century; and in the weſt about the year 439. They ceaſed both in the eaſt and weſt in the tenth century.

CHOREPISCOPUS is alſo the name of a dignity ſtill ſubſiſting in ſome cathedrals, particularly in Germany; ſignifying the ſame with *chori epiſcopus*, or "biſhop of the choir." The word, in this ſenſe, does not come from χωρος, *place*, but χορος, *choir*, &c. In the church of Cologne, &c. the firſt chanter is called *chorepiſcopus*.

CHOREUS, χορειος, a foot in the ancient poetry, more commonly called *trochæus*. See TROCHEE.

CHORIAMBUS, in ancient poetry, a foot conſiſting of four ſyllables, whereof the firſt and laſt are long, and the two middle ones are ſhort; or, which is the ſame thing, it is made up of a trochæus and iambus: ſuch is the word *nobilitas*.

CHORION, in anatomy, the exterior membrane which inveſts the fœtus in the uterus. See FOETUS.

CHOROBATA, or CHOROBATES, a kind of water level among the ancients, of the figure of the letter T, according to Vitruvius's deſcription.

CHOROGRAPHY, the art of making a map of ſome country or province. Chorography differs from geography, as the deſcription of a particular country differs from that of the whole earth; and from topography, as the deſcription of a country is different from that of a town or diſtrict. See the articles GEOGRAPHY, TOPOGRAPHY, and MAP.

CHOROIDES, or CHOROEIDES, in anatomy, a term applied to ſeveral parts of the body, bearing ſome reſemblance to the Chorion. The word is formed from χοριον, *chorion*, and ειδος, *likeneſs*.

CHOROIDES is particularly uſed for the inner membrane which immediately inveſts the brain; ſo called as being intermingled with a great number of blood-veſſels, like the *chorion*: but more uſually denominated the *pia mater*.

Plexus, or *Lacis* CHOROIDES, is a knot of veins and arteries in the anterior ventricle of the brain, woven out of the branches of the carotid.

CHOROIDES is alſo applied to the inner and poſterior tunic of the eye, immediately under the ſclerotica. It is ſoft, thin, and florid; and its inner or concave ſurface is very ſmooth and poliſhed. It has its name from its conſiſting chiefly of blood veſſels.

CHORUS, in dramatic poetry, one or more perſons preſent on the ſtage during the repreſentation, and ſuppoſed to be by-ſtanders without any ſhare in the action. Tragedy in its origin was no more than a ſingle chorus, who trod the ſtage alone, and without any actors, ſinging dithyrambics or hymns in honour of Bacchus. Theſpis, to relieve the chorus, added an actor, who rehearſed the adventures of ſome of their heroes; and Æſchylus, finding a ſingle perſon too dry an entertainment, added a ſecond, at the ſame time reducing the ſinging of the chorus, to make more room for the recitation. But when once tragedy began to be formed, the recitative, which at firſt was intended only as an acceſſary part to give the chorus a breathing time, became a principal part of the tragedy. At length, however, the chorus became inſerted and incorporated into the action. Sometimes it was to ſpeak; and then their chief, whom they called *coryphæus*, ſpoke in behalf of the reſt: the ſinging was performed by the whole company; ſo that when the coryphæus ſtruck into a ſong, the chorus immediately joined him.

The chorus ſometimes alſo joined the actors in the courſe of the repreſentation, with their plaints and lamentations on account of any unhappy accidents that befel them: but the proper function, and that for which it ſeemed chiefly retained, was to ſhew the intervals of the acts. While the actors were behind the ſcenes, the chorus engaged the ſpectators; their ſongs uſually turned on what was exhibited, and were not to contain any thing but what was ſuited to the ſubject, and had a natural connection with it; ſo that the chorus concurred with the actors for advancing the action. In our modern tragedies the chorus is laid aſide, and the fiddles ſupply its place. Mr. Dacier looks on this retrenchment as of ill conſequence, and thinks it robs tragedy of a great part of its luſtre; he therefore judges it neceſſary to re-eſtabliſh it, not only on account of the regularity of the piece, but alſo to correct, by prudent and virtuous reflections, any extravagancies that might fall from the mouths of the actors when under any violent paſſion.

M. Dacier obſerved alſo, that there was a chorus, or grex,

in the ancient comedy: but this is suppressed in the new comedy, because it was used to reprove vices by attacking particular persons; as the chorus of the tragedy was laid aside to give the greater probability to those kinds of intrigue which require secrecy.

Chorus, in music, is when, at certain periods of a song, the whole company are to join the singer in repeating certain couplets or verses.

CHOSE, *(Fr.)* "a thing;" used in the common law with different epithets; as *chose local*, *chose transitory*, and *chose in action*. Chose local is such a thing as is annexed to a place, as a mill and the like; chose transitory is that thing which is moveable, and may be taken away, or carried from place to place; and chose in action is a thing incorporeal, and only a *right*, as an obligation for debt, annuity, &c. And generally all causes of suit for any debt, duty, or wrong, are to be accounted choses in action: and it seems, chose in action may be also called *chose in suspence*; because it hath no real existence or being, nor can properly be said to be in our possession.

CHOSROES I. the Great, king of Persia, after his father Cabades, A. D. 532. He made peace with the Romans; but broke it the third year, and forced Justinian to a disadvantageous peace. Afterward, he was so swelled with his victories, as to bid the emperor's ambassador follow him for audience to Cæsarea: but Tiberius sent an army under Justinian, who made himself master of the country, and put Chosroes to death in 586.

Chosroes II. His subjects put his father Hormisdas in prison, and the son upon the throne of Persia. He used his father tenderly at first; but afterwards caused him to be put to death. This, together with his killing some of the nobility, obliged him to fly: he gave his horse the bridle, which carried him into a town of the Romans, where Mauricius the emperor received him kindly, and sent an army under Narses, which set him again upon the throne. He took Jerusalem; after which he made himself master of Libya and Egypt, and carried Carthage. Heraclius sued for peace; which was offered him on condition, *That he and his subjects should deny Jesus Christ.* Hereupon Heraclius attacked him with success, and put him to flight. His own son pursued him, and he was starved in prison in 627.

CHOUGH, in ornithology, the trivial name of a species of Corvus.

CHOUS, in the eastern military orders, the title of the messengers of the divan of Janisaries. There are several degrees of honour in this post. When a person is first advanced to it, he is called a *cucbuk*, or little *chous*; after this he is advanced to be the *alloy chous*; that is, the messenger of ceremonies; and from this, having passed through the office of *petelma*, or procurator of the effects of the body, he is advanced to be the *bas chous*.

CHOWDER beer, a provincial phrase of Devonshire, denoting a cheap and easily prepared drink, highly commended for preventing the scurvy in long voyages, or for the cure of it where it may have been contracted. It is prepared in the following manner: Take twelve gallons of water, in which put three pounds and a half of black spruce: boil it for three hours, and having taken out the fir or spruce, mix with the liquor seven pounds of melasses, and just boil it up; strain it through a sieve, and when milk-warm put to it about four spoonfuls of yeast to work it. In two or three days stop the bung of the cask; and in five or six days, when fine, bottle it for drinking. Two gallons of melasses are sufficient for an hogshead of liquor; but if melasses cannot be procured, treacle or coarse sugar will answer the purpose.

CHREMNITZ, the principal of the nine towns in Upper Hungary, situated about 68 miles north-east of Presburgh, and subject to the house of Austria. E. long. 19. N. lat. 48. 45.

CHRENECRUDA, a term occurring in writers of the middle age, and expressing a custom of those times; but its signification is doubtful. It is mentioned in *Lege Salica*, tit. 61 which says, he who kills a man, and hath not wherewithal to satisfy the law or pay the fine, makes oath that he has delivered up every thing he was possessed of; the truth of which must be confirmed by the oaths of 12 other persons. Then he invites his next relations by the father's side to pay off the remainder of the fine, having first made over to them all his effects by the following ceremony: He goes into his house, and taking in his hand a small quantity of dust from each of the four corners, he returns to the door, and with his face inwards throws the dust with his left hand over his shoulders upon his nearest of kin. Which done, he strips to his shirt; and coming out with a pole in his hand, jumps over the hedge. His relations, whether one or several, are upon this obliged to pay off the composition for the murder. And if these (or any one of them) are not able to pay, *iterum super illum chrenecruda, qui pauperior est, jactat, et ille totam legem componat.* Whence it appears, that *chrenecruda jactare*, is the same with throwing the dust, gathered from the four corners of the house. Goldastus and Spelman translate it *viridem herbam*, "green grass," from the German *gruen kraut*, or from the Dutch *groen*, "green," and *gruid*, "grass." Wendelinus is of a contrary opinion, who thinks that by this word *denotari purificationis approbationem*, from *chrein*, "pure, chaste, clean;" and *keuren*, "to prove;" so that it must refer to the oaths of the twelve jurors. Be this as it will, king Childebert reformed this law by a decree, chap. 15, both because it favoured of Pagan ceremonies, and because several persons were thereby obliged to make over all their effects: *De chrenecruda lex quam paganorum tempore observabant, deinceps nunquam valeat, quia per ipsam cecidit multorum potestas.*

CHRISM (from χρίω, *I anoint*), oil consecrated by the bishop, and used in the Romish and Greek churches, in the administration of baptism, confirmation, ordination, and extreme unction, which is prepared on Holy Thursday with much ceremony. In Spain it was anciently the custom for the bishop to take one third of a sol for the chrism distributed to each church, on account of the balsam that entered its composition. Du Cange observes, that there are two kinds of chrism; the one prepared of oil and balsam, used in baptism, confirmation, and ordination; the other of oil alone, consecrated by the bishop, used anciently for the catechumens, and still in extreme unction. The Maronites, before their reconciliation with Rome, besides oil and balsam, used musk, saffron, cinnamon, roses, white frankincense, and several other drugs mentioned by Rynaldus, in 1541, with the doses of each. The Jesuit Dandini, who went to mount Libanus in quality of the pope's nuncio, ordained, in a synod held there in 1596, that chrism for the future should be made only of two ingredients, oil and balsam; the one representing the human nature of Jesus Christ, the other his divine nature. The action of imposing the chrism is called *chrismation*: this the generality of the Romish divines hold to be the next matter of the sacrament of confirmation. The chrismation in baptism is performed by the priest; that in confirmation by the bishop; that in ordination, &c. is more usually styled *unction*.

Chrism *Pence*, Chrismatus *Denarii*, or Chrismales *Denarii*, a tribute anciently paid to the bishop by the parish clergy, for their chrism, consecrated at Easter for the ensuing year. This was afterwards condemned as simoniacal.

CHRISOM, Chrismale, was anciently the face-cloth or piece of linen laid over the child's head when it was baptized. Whence, in our bills of mortality, children who die in the month are called *chrisoms*. The time between the child's birth and baptism was also called *chrisomus*.

CHRIST, an appellation ſynonymous with *Meſſiah*, uſually added to Jeſus; and, together therewith, denominating the Saviour of the world. See CHRISTIANITY and MESSIAH. The word χριϛὸς ſignifies *anointed*, from χριω, *ungo*, "I anoint." Sometimes the word *Chriſt* is uſed ſingly, by way of *antonomaſis*, to denote a perſon ſent from God, as an anointed prophet, king, or prieſt.

Order of CHRIST, a military order, founded by Dionyſius I. king of Portugal, to animate his nobles againſt the Moors. The arms of this order are gules, a patriarchal croſs, charged with another croſs argent: they had their reſidence at firſt at Caſtromarin; afterwards they removed to the city of Thomar, as being nearer to the Moors of Andaluſia, and Eſtremadura.

CHRIST is alſo the name of a military order in Livonia, inſtituted in 1205 by Albert biſhop of Riga. The end of this inſtitution was to defend the new Chriſtians, who were converted every day in Livonia, but were perſecuted by the heathens. They wore on their cloaks a ſword with a croſs over it, whence they were alſo denominated *brothers of the ſword*.

CHRIST *Burgh*, a town of Poland, near the lake Draufen, and about three Poliſh miles from Marienburgh.

CHRIST *Church*, a borough-town of Hampſhire, 30 miles ſouth-weſt of Wincheſter, near the ſea-coaſt. W. long. 2. N. lat. 50. 40. It ſends two members to parliament.

CHRIST *Thorn*, in botany. See RHAMNUS.

CHRISTIAN. See CHRISTIAN *Religion*.

Moſt CHRISTIAN *King*, one of the titles by which the kings of France were diſtinguiſhed. The French antiquaries trace the origin of this appellation up to Gregory the Great, who, writing a letter to Charles Martel, occaſionally gave him that title, which his ſucceſſors afterwards retained.

CHRISTIAN *Religion*, or CHRISTIANITY, that inſtituted by Jeſus Chriſt, comprehending doctrines of faith, and rules of practice, all of which are contained in the New Teſtament, and are deſigned to recover mankind from ignorance and vice, from guilt and death, to true knowledge and virtue, to the divine favour, and everlaſting life. Its aptitude to this end, its conformity to reaſon, and to the ſtate of man, the ſublimity and excellence of its doctrines, the equally venerable and lovely character of its author, the purity of its precepts, its benign tendency and ſalutary effects, concur, with the external evidence of PROPHECY and MIRACLES, to eſtabliſh its divine origin and truth. The name *Chriſtian* was firſt given at Antioch, in the year 42, to ſuch as believed in Chriſt, as we read in the Acts: till that time they were called *diſciples*.

It is no difficult matter to diſcover the cauſes of the many perſecutions to which the Chriſtians were expoſed during the three firſt centuries. The purity of the Chriſtian morality, directly oppoſite to the corruption of the Pagans, was doubtleſs one of the moſt powerful motives of the public averſion. To this may be added, the many calumnies unjuſtly ſpread about concerning them by their enemies, particularly the Jews. And this occaſioned ſo ſtrong a prejudice againſt them, that the Pagans condemned them without inquiring into their doctrine, or permitting them to defend themſelves. Beſides, their worſhipping Jeſus Chriſt, as God, was contrary to one of the moſt ancient laws of the Roman empire, which expreſsly forbad the acknowledging of any God that had not been approved by the ſenate.

But notwithſtanding the violent oppoſition made to the eſtabliſhment of the Chriſtian religion, it gained ground daily, and very ſoon made a ſurpriſing progreſs in the Roman empire. In the third century, there were Chriſtians in the camp, in the ſenate, in the palace; in ſhort, every where but in the temples and the theatres: they filled the towns, the country, the iſlands. Men and women of all ages and conditions, and even thoſe of the firſt dignities, embraced the faith; inſomuch that the Pagans complained that the revenues of their temples were ruined. They were in ſuch great numbers in the empire, that (as Tertullian expreſſes it) were they to have retired into another country, they would have left the Romans only a frightful ſolitude.

The Chriſtian religion has by degrees ſpread itſelf over all parts of the world, though not with equal purity in all places. And though, by the providence of God, Mahometans and Idolaters have been ſuffered to poſſeſs themſelves of thoſe places in Greece, Aſia, and Africa, where the Chriſtian religion formerly moſt flouriſhed; yet there are ſtill ſuch remains of the Chriſtian religion among them as to give them opportunity ſufficient to be converted. For, in the dominions of the Turk in Europe, the Chriſtians make two third parts at leaſt of the inhabitants; and in Conſtantinople itſelf there are above twenty Chriſtian churches, and above thirty in Theſſalonica. Philadelphia, now called *Ala ſhahir*, has no fewer than twelve Chriſtian churches. The whole iſland of Chio is governed by Chriſtians; and ſome iſlands of the Archipelago are inhabited by Chriſtians only. In Africa, beſides the Chriſtians living in Egypt and in the kingdoms of Congo and Angola, the iſlands upon the weſtern coaſts are inhabited by Chriſtians; and the vaſt kingdom of Abyſſinia, ſuppoſed to be as big as Germany, France, Spain, and Italy, put together, is poſſeſſed by Chriſtians. In Aſia, moſt part of the empire of Ruſſia, the countries of Circaſſia and Mingrelia, Georgia, and Mount Libanus, are inhabited only by Chriſtians. In America, it is notorious that the Chriſtians are very numerous, and ſpread over moſt parts of that vaſt continent.

CHRISTIANS *of St. John*, a ſect of Chriſtians very numerous in Balſara and the neighbouring towns: they formerly inhabited along the river Jordan, where St. John baptized, and it was from thence they had their name. They hold an anniverſary feaſt of five days; during which they all go to the biſhop, who baptizes them with the baptiſm of St. John. Their baptiſm is alſo performed in rivers, and that only on Sundays: they have no notion of the third perſon in the Trinity; nor have they any canonical book; but a number full of charms, &c. Their biſhoprics deſcend by inheritance, as our eſtates do, though they have the ceremony of an election.

CHRISTIANS *of St. Thomas*, a ſort of Chriſtians in a peninſula of India on the ſide of the Gulph; they inhabit chiefly at Cranganor, and the neighbouring country: theſe admit of no images; and receive only the croſs, to which they pay a great veneration: they affirm, that the ſouls of the ſaints do not ſee God till after the day of judgment; they acknowledge but three ſacraments, *viz.* baptiſm, orders, and the euchariſt: they make no uſe of holy oils in the adminiſtration of baptiſm; but, after the ceremony, anoint the infant with an unction compoſed of oil and walnuts, without any benediction. In the euchariſt, they conſecrate with little cakes made of oil and ſalt; and inſtead of wine make uſe of water in which raiſins have been infuſed.

CHRISTIANIA, a city of Southern Norway, in the government of Aggerhuys, ſituated at the extremity of a fertile valley, forming a ſemicircular bend along the ſhore of the beautiful bay of Biorning, which forms the N. extremity of the gulf of Chriſtiania. It is divided into the city, and the ſuburbs of Waterlandt, Peterwigen, and Fierdingen: the fortreſs of Aggerhuys; and the old town of Opſloe or Anſloe. The city contains 418 houſes, the ſuburbs 682, Opſloe 400, and the inhabitants amount to about 9000. The city was rebuilt in its preſent ſituation by Chriſtian IV. after a plan deſigned by himſelf. The ſtreets are carried in a ſtraight line, and at right angles to each other, are uniformly 40 feet broad, and very neat and clean. The caſtle of Aggerhuys is built on a rocky eminence on the W. ſide of the bay, at a ſmall diſtance from the city. The governor is the chief governor of Norway, and preſides in the high court of juſtice. Opſloe was the ſite of

the old city, burnt in 1624: it contains the epifcopal palace. Chriftiania has an excellent harbour, and carries on a confiderable trade. Its principal exports are tar, foap, iron, copper, planks, deals, and alum. The planks and deals are of fuperior eftimation to thofe fent from America, and from Ruffia and the other parts of the Baltic; becaufe the trees which yield them grow on the rocks, and are therefore firmer, more compact, and lefs liable to rot than the others, which fhoot chiefly from a fandy or loamy foil. There are 136 privileged fawmills at Chriftiania, of which 100 belong to a fingle family of the name of Anker. Chriftiania is 30 miles from the open fea, and 290 N. by W. of Copenhagen. Lon. 10. 50. E. Lat. 59. 6. N.

CHRISTIANSTADT, a ftrong fortified town of Sweden, fituated in the territory of Blecking and province of South Gothland. It was built in 1614 by Chriftian IV. king of Denmark, when this province belonged to the Danes; and finally ceded to the Swedes by the peace of Rofkild in 1658. The town is fmall, but neatly built, and is efteemed the ftrongeft fortrefs in Sweden. The houfes are all of brick, and moftly ftuccoed white It ftands in a marfhy plain clofe to the river Helge-a, which flows into the Baltic at Ahus, about the diftance of 20 miles, and is navigable only for fmall craft of feven tons burthen. Englifh veffels annually refort to this port for alum, pitch, and tar. The inhabitants have manufactures of cloth and filken ftuffs, and carry on a fmall degree of commerce. E. long. 14. 40. N. lat. 56. 30.

CHRISTINA, queen of Sweden, and daughter of Guftavus Adolphus the Great, was born Dec. 8, 1626; and has at leaft been as famous as her father was before her. She fucceeded him in the government of the kingdom in 1633, and governed it with great wifdom and prudence till 1654, when fhe refigned it in favour of her coufin Charles Guftavus. Some time before her refignation, Antony Macedo, a Jefuit, was chofen by John IV. king of Portugal, to accompany the ambaffador he fent into Sweden to queen Chriftina; and the Jefuit pleafed this princefs fo highly, that fhe fecretly opened to him the defign fhe had of changing her religion. She fent him to Rome with letters to the general of the Jefuits; in which fhe defired, that two of their fociety might be difpatched to her, Italians by nation, and learned men, who fhould take another habit, that fhe might confer with them at more eafe upon matters of religion. Her requeft was granted; and two Jefuits were immediately fent to her, viz. Francis Malines, divinity profeffor at Turin, and Paul Cafatus, profeffor of mathematics at Rome, who eafily effected what Antony Macedo, the firft confident of her defign, had begun. She then retired to Rome; yet upon the death of Charles Guftavus, which happened in 1660, returned to Sweden, with an intent to refume the government. But this could not be admitted, becaufe, by the laws and conftitution of the land, Roman Catholics are excluded from the crown; and therefore fhe confirmed her abdication the fame year, referving only the free exercife of the Roman Catholic religion for herfelf, domeftics, and attendants, in cafe fhe fhould afterwards return to Sweden. She did not return, but died at Rome April 19, 1689, aged 63.

She was a woman of uncommon parts, and as uncommon learning; for fhe underftood feveral languages, and was a perfect miftrefs of the belles lettres. It is faid, that fhe made the Greek tongue only her diverfion at leifure hours; and that the reading of this language and others did not keep her from her ferious ftudies: fo fhe called, among others, Tacitus's hiftory, fome pages of which fhe read conftantly every day.

There is a letter of hers extant to Bayle, which gives us no fmall idea of her literary character. Bayle had offended her, in his "Nouvelles de la République des Lettres for June 1686," by fome expreffions which gave occafion to fay, that fhe was not altogether a good Catholic; and the making up this important matter drew on a correfpondence between them by letters, in one of which from Chriftina there is the following paffage. "But you fhall not get off fo cheap as you imagine. I will enjoin you a penance; which is, that you fhall henceforth take the trouble of fending me all curious books that may be publifhed in Latin, French, Spanifh, or Italian, on whatever fubject or fcience, provided they are worthy of being looked into. I do not even except romances or fatires; and above all, if there are any books of chemiftry, I defire you will fend them to me as foon as poffible. Do not forget likewife to fend me your journal." As delicate however as her majefty was upon the fubject of religion, and as fincere a convert as fhe was to the Church of Rome, fhe is faid not to have been over-rigid in her life and manners; and it is certain, that books have been written of her intrigues.

Santa CHRISTINA, one of the MARQUESAS *Iflands* in the South Sea. Lon. 132. 9. W. Lat. 9. 56. S.

CHRISTMAS-DAY, a feftival of the Chriftian church; obferved on the 25th of December, in memory of the *nativity* or birth of Jefus Chrift. As to the antiquity of this feftival, the firft traces we find of it are in the fecond century, about the time of the emperor Commodus. The decretal epiftles indeed carry it up a little higher; and fay that Telefphorus, who lived in the reign of Antoninus Pius, ordered divine fervice to be celebrated, and an angelical hymn to be fung, the night before the nativity of our Saviour. However, that it was kept before the time of Conftantine we have a melancholy proof: for whilft the perfecution raged under Dioclefian, who then kept his court at Nicomedia, that prince, among other acts of cruelty, finding multitudes of Chriftians affembled together to celebrate Chrift's nativity, commanded the church doors where they were met to be fhut, and fire to be put to it, which, in a fhort time, reduced them and the church to afhes.

CHRISTMAS ISLAND, fo named by capt. Cook, on account of his firft landing there on Chriftmas-day. It is 45 miles in circumference; bounded by a reef of coral rocks, on the W. fide of which is a bank of fine fand, extending a mile into the fea, and affording good anchorage. The foil, in fome places, is light and black, compofed of decayed vegetables, the dung of birds, and fand. In other places, nothing but broken corals and fhells are to be feen. No frefh water was found by digging. The vegetable productions are only a few cocoa-nut trees, and fome low trees, fhrubs, and plants, fuch as are found on other iflands of the fame appearance, in a foil half formed. Here are a few forts of birds, and plenty of fifh and turtles. Lon. 157. 30. W. Lat. 1. 59. N.

CHRISTOPHER'S, (St.) one of the Caribbee iflands, in America, lying to the north-weft of Nevis, and about 60 miles weft of Antigua. It was formerly inhabited by the French and Englifh; but, in 1713, it was ceded entirely to the latter. In 1782 it was taken by the French, but reftored to Britain at the peace. It is about 20 miles in breadth, and feven in length; and has high mountains in the middle, whence rivulets run down. Between the mountains are dreadful rocks, horrid precipices, and thick woods; and in the fouth-weft part of the ifland, hot fulphureous fprings at the foot of them. The air is good; the foil light, fandy, and fruitful; but the ifland is fubject to hurricanes. The produce is chiefly fugar, cotton, ginger, indigo, and the tropical fruits. W. long. 62. 32. N. lat. 17. 30.

CHROASTACES, in natural hiftory, a genus of pellucid gems, comprehending all thofe of variable colours, as viewed in different lights; of which kinds are the *opal* and the *afteria* or *oculus cali*. See OPAL, and ASTERIA.

CHROMATIC, a kind of mufic which proceeds by feveral femitones in fucceffion. The word is derived from the Greek

χρωμα, which fignifies *colour*. For this denomination feveral caufes are affigned, of which none appear certain, and all equally unfatisfactory. Inftead, therefore, of fixing upon any, we fhall offer a conjecture of our own; which, however, we do not impofe upon the reader as more worthy of his attention than any of the other. Χρωμα may perhaps not only fignify a *colour*, but that fhade of a colour by which it melts into another, or what the French call *nuance*. If this interpretation be admitted, it will be highly applicable to femitones; which being the fmalleft interval allowed in the diatonic fcale, will moft eafily run one into another. To find the reafons affigned by the ancients for this denomination, and their various divifions of the chromatic fpecies, the reader may have recourfe to the fame article in Rouffeau's Mufical Dictionary. At prefent, that fpecies confifts in giving fuch a procedure to the fundamental bafs, that the parts in the harmony, or at leaft fome of them, may proceed by femitones, as well in rifing as defcending; which is moft freqnently found in the minor mode, from the alterations to which the fixth and feventh notes are fubjected by the nature of the mode itfelf.

The fucceffive femitones ufed in the *chromatic* fpecies are rarely of the fame kind; but alternately major and minor, that is to fay, *chromatic* and *diatonic*: for the interval of a minor tone contains a minor or chromatic femitone, and another which is major or diatonic; a meafure which temperament renders common to all tones: fo that we cannot proceed by two minor femitones which are conjunctive in fucceffion, without entering into the enharmonic fpecies; but two major femitones twice follow each other in the *chromatic* order of the fcale.

The moft certain procedure of the fundamental bafs to generate the chromatic elements in afcent, is alternately to defcend by thirds, and rife by fourths, whilft all the chords carry the third major. If the fundamental bafs proceeds from dominant to dominant by perfect cadences avoided, it produces the *chromatic* in defcending. To produce both at once, you interweave the perfect and broken cadences, but at the fame time avoid them.

As at every note in the *chromatic* fpecies one muft change the tone, that fucceffion ought to be regulated and limited for fear of deviation. For this purpofe, it will be proper to recollect, that the fpace moft fuitable to *chromatic* movements, is between the extremes of the dominant and the tonic in afcending, and between the tonic and the dominant in defcending. In the major mode, one may alfo chromatically defcend from the dominant upon the fecond note. This tranfition is very common in Italy; and, notwithftanding its beauty, begins to be a little too common amongft us.

The chromatic fpecies is admirably fitted to exprefs grief and affliction; thefe founds boldly ftruck in afcending tear the foul. Their power is no lefs magical in defcending; it is then that the ear feems to be pierced with real groans. Attended with its proper harmony, this fpecies appears proper to exprefs every thing: but its completion, by concealing the melody, facrifices a part of its expreffion; and for this difadvantage, arifing from the fullnefs of the harmony, it can only be compenfated by the nature and genius of the movement. We may add, that in proportion to the energy of this fpecies, the compofer ought to ufe it with greater caution and parfimony. Like thofe delicate viands, which, when profufely adminiftered, immediately furfeit us with their abundance; as much as they delight us when enjoyed with temperance, fo much do they difguft when devoured with prodigality.

CHROMATIC, *Enharmonic*. See ENHARMONIC.

CHROMATICS,

THAT part of the fcience of optics by which the feveral properties of the colours of light, and of natural bodies, are illuftrated and explained.

Natural philofophers were formerly of opinion, that the folar light was fimple and uniform, without any difference or variety in its parts, and that the different colours of objects were made by refraction, reflection, or fhadows. But Newton taught them the errors of their former opinions; he fhewed them to diffect a fingle ray of light with the minuteft precifion, and demonftrated that every ray was itfelf a compofition of feveral rays all of different colours, each of which when feparate held to its own nature, fimple and unchanged by every experiment that could be tried upon it. Or to be more particular, light is not all fimilar and homogenial, but compounded of heterogenial and diffimilar rays, fome of which in like inftances being more refrangible, and others lefs refrangible, and thofe which are moft refrangible are alfo moft reflexible; and according as they differ in refrangibility and reflexibility, they are endowed with the power of exciting in us fenfations of different colours.

SECT. I. *Theory of Light and Colours.*

SIR Ifaac Newton's theory of light and colours is ftriking and beautiful in itfelf, and deduced from clear and decifive experiments, and may be almoft faid to demonftrate clearly,

1ft, That lights which differ in colour, differ alfo in degrees of refrangibility.

2d, That the light of the fun, notwithftanding its uniform appearance, confifts of rays differently refrangible.

3d, That thofe rays which are more refrangible than others, are alfo more reflexible.

4th, That as the rays of light differ in degrees of refrangibility and reflexibility, fo they alfo differ in their difpofition to exhibit this or that particular colour; and that colours are not qualifications of light derived from refractions or reflections of natural bodies, as was generally believed, but original and connate properties, which are different in different rays, fome rays being difpofed to exhibit a red colour and no other, and fome a green and no other, and fo of the reft of the prifmatic colours.

5th, That the light of the fun confifts of *violet*-making, *indigo*-making, *blue*-making, *green*-making, *yellow*-making, *orange*-making, and *red*-making rays; and all of thefe are different in their degrees of refrangibility and reflexibility; for the rays which produce red colours are the leaft refrangible, and thofe that make the violet the moft; and the reft are more or lefs refrangible as they approach either of thefe extremes, in the order already mentioned: that is, orange is leaft refrangible next to red, yellow next to orange, and fo on; fo that to the fame degree of refrangibility there ever belongs the fame colour, and to the fame colour the fame degree of refrangibility.

6th, Every homogeneal ray, confidered apart, is refracted according to one and the fame rule, fo that its fine of incidence is to its fine of refraction in a given ratio; that is, every different coloured ray has a different ratio belonging to it.

7th, The fpecies of colour, and degree of refrangibility and reflexibility, proper to any particular fort of rays, is not mutable by reflection or refraction from natural bodies, nor by any other caufe that has been yet obferved. When any one

kind of rays has been feparated from thofe of other kinds, it has obftinately retained its colours, notwithftanding all endeavours to bring about a change.

8th, Yet feeming tranfmutations of colours may be made, where there is any mixture of divers forts of rays; for, in fuch mixtures, the component colours appear not, but, by their mutually alloying each other, conftitute an intermediate colour.

9th, There are therefore two forts of colour, the one original and fimple, the other compounded of thefe; and all the colours in the univerfe are either the colours of homogeneal, fimple light, or compounded of thefe mixed together in certain proportions. The colours of fimple light are, as we obferved before, violet, indigo, blue, green, yellow, orange, and red, together with an indefinite variety of intermediate gradations. The colours of compounded light are differently compounded of thefe fimple rays, mixed in various proportions: thus a mixture of yellow-making and blue-making rays exhibits a green colour, and a mixture of red and yellow makes an orange; and in any colour the fame in fpecie with the primary ones may be produced by the compofition of the two colours next adjacent in the feries of colours generated by the prifm, whereof the one is next moft refrangible, and the other next leaft refrangible. But this is not the cafe with thofe which are fituated at too great a diftance; orange and indigo do not produce the intermediate green, nor fcarlet and green the intermediate yellow.

10th, The moft furprifing and wonderful compofition of light, is that of *whitenefs*; there is no one fort of rays which can alone exhibit that colour: it is ever compounded, and to its compofition all the aforefaid primary colours are requifite.

11th, As *whitenefs* is produced by a copious reflection of rays of all forts of colours, when there is a due proportion in the mixture; fo, on the contrary, *blacknefs* is produced by a fuffocation and abforption of the incident light, which being ftopped and fuppreffed in the black body, is not reflected outward, but reflected and refracted within the body till it be ftifled and loft.

Newton's method of accounting for the different colours of bodies, from their reflecting this or that kind of rays moft copioufly, is fo eafy and natural, that his fyftem quickly overcame all objections, and to this day continues to be almoft univerfally believed. It is now acknowledged, that the light of the fun, which to us feems perfectly homogeneal and white, is compofed of no fewer than feven different colours, *viz.* red, orange, yellow, green, blue, purple, and violet or indigo. A body which appears of a red colour, hath the property of reflecting the red rays more powerfully than any of the others; and fo of the orange, yellow, green, &c. A body which is of a black colour, inftead of reflecting, *abforbs* all or the greateft part of the rays that fall upon it; and, on the contrary, a body which appears white, reflects the greateft part of the rays indifcriminately, without feparating the one from the other.

Sect. II. *Of the Separation of the original Rays of Light, by Reflection or Tranfmiffion, but depending on the Thicknefs of the Medium upon which they are incident.*

The foundation of a rational theory being laid, it next became natural to inquire by what peculiar mechanifm in the ftructure of each particular body, it was fitted to reflect one kind of rays more than another. This Sir I. Newton attributes to the denfity of thefe bodies. This fubject however is not fo clear as the preceding; for the prefent theory fuggefts many doubts to every inquifitive mind, and is allowed by all to be attended with difficulties. There are no optical experiments, however, in which Sir I. Newton feems to have taken more pains, than thofe relating to the rings of colours which appear in *thin plates*, and which we now propofe to explain. In all his obfervations and inveftigations concerning them, he difcovers the greateft fagacity, both as a philofopher and a mathematician.

The bubbles which children blow with a mixture of foap and water, were obferved by Dr. Hooke to exhibit various colours according to their thinnefs, and that when they have a confiderable degree of thicknefs they appear colourlefs; from this the prefent theory has taken its rife. It is thus that things overlooked by the reft of mankind, are often the moft fertile in fuggefting hints to thofe who are habituated to reflection.

Sir I. Newton blew up a large bubble from a ftrong mixture of foap and water, and fet himfelf attentively to confider the different changes of colour it underwent, from its enlargement to its diffolution. He in general perceived that the thinner the plate of water which compofed the fides of the bubble, the more it reflected the violet-colour ray; and that in proportion as the fides of the bubble were more thick and denfe, the more they reflected the red: he therefore was induced to believe, that the colours of all bodies proceeded from the thicknefs and denfity of the little tranfparent plates of which they are compofed. To bring this opinion nearer to certainty, it was neceffary to meafure the thicknefs of the plate of water which compofed the bubble; but this was a matter of great difficulty, as the bubble was of itfelf of too tranfient a nature to undergo the neceffary experiments.

Our philofopher, ever fertile in expedients, recollected having obferved, that as two prifms were compreffed hard together, in order to make their fides (which happened to be a little convex) touch one another, they were both as perfectly *tranfparent* in the place of contact as if they had been but one piece of glafs; but that round the point of contact, where the glaffes were a little feparated from each other, *rings of different colours* appeared.

To obferve more accurately the order of the colours produced in this manner, he placed a glafs lens, whofe convexity was very fmall, upon a plain glafs. Now it is evident, that thofe would only touch at one particular point; and therefore, at all other places between the adjacent furfaces, a thin plate of air was interpofed, whofe thicknefs increafed in a certain ratio, according to the diftance from the point of contact.

He preffed thefe glaffes flowly together, by which means the colours very foon emerged, and appeared diftinct to a confiderable diftance; next to the pellucid central fpot made by the contact of the glaffes, fucceeded blue, yellow, white, yellow and red. The blue was very little in quantity, nor could he difcern any violet in it; but the yellow and red were very copious, extending about as far as the white, and four or five times as far as the blue. The next circuit immediately furrounding thefe confifted of violet, blue, green, yellow, and red; all thefe were very copious except the green, which was very little in quantity, and feemed more faint and dilute than the other colours. The third circle of colours was purple, blue, green, yellow, and red; in this the purple was more reddifh than the violet in the former circuit, and the green was more confpicuous, being as bright and copious as any of the other colours, except the yellow; the red was alfo fomewhat faded. The fourth circle confifted of green and red; the green was copious and lively, inclining on one fide to blue, on the other to yellow, but there was neither violet, blue, nor yellow; and the red was very imperfect and dirty. Each outer circuit or ring was more obfcure than thofe within, like the circular waves upon a difturbed fheet of water, till they at laft ended in perfect whitenefs.

As the colours were thus found to vary according to the different diftances of the glafs plates from each other, Sir Ifaac judged that they proceeded from the different thicknefs of the

plate of air, intercepted between the glaſſes; and that this plate was by the mere circumſtance of thinneſs or thickneſs diſpoſed to reflect or tranſmit this or that particular colour; from whence he concluded, as before obſerved, that the colours of all natural bodies depended on their component particles. He alſo conſtructed a table, wherein the thickneſs of a plate, neceſſary to reflect any particular colour, was expreſſed in parts of an inch, divided into 1,000,000 parts.

It has been already obſerved, that the thin plates, made uſe of in the different experiments, reflected ſome kinds of rays in particular parts, and tranſmitted others in the ſame parts. Hence the coloured rings appeared variouſly diſpoſed, according as they were viewed by reflected or tranſmitted light; that is, according as the plates were or were not held up between the eye and the window. That we may underſtand this better, the following table has been formed. On one ſide are mentioned the colours appearing on the plates by reflected light, and on the other thoſe which are perceptible when the glaſſes are held between the eye and the window. The centre, when the glaſſes are in full contact, is perfectly tranſparent; this ſpot therefore, when viewed by reflected light, appears black, becauſe it tranſmits all the rays; and for the ſame reaſon it appears white, when viewed by tranſmitted light.

Colours by reflected light.	*Colours by tranſmitted light.*
Black	White
Blue	Yellowiſh-red
White	Black.
Yellow	Violet
Red	Blue
Violet	White
Blue	Yellow
Green	Red
Yellow	Violet
Red	Blue
Purple	Green
Blue	Yellow
Green, Yellow, Red	Red, Blueiſh Green
Green	Red
Red	Blueiſh-green
Greeniſh-blue	Red
Red	

In comparing the rings produced by tranſmitted with thoſe produced by reflected light, the white is found oppoſed to the black, the red to the blue, the yellow to the violet, and the green to a colour compoſed of red and violet; in other words, the parts of the glaſs, that when looked at are white, appear black on looking through the glaſs; and on the contrary, thoſe which appear black in the firſt inſtance, appear white in the ſecond; and ſo of the other colours, which you will more readily comprehend by conſidering this figure, where A B, C D, fig. 1, pl. 89, repreſent the glaſſes which touch at E; the black lines traced between them are the diſtances between the two ſurfaces, at different diſtances from the centre, each diſtance anſwering to a coloured ring; the colours written above are thoſe ſeen by reflected light; thoſe underneath, are the colours exhibited by tranſmitted light. Newton has ſhewn, that the rays of any particular colour are diſpoſed to be reflected, when the thickneſſes of the plate of air are as the numbers 1, 3, 5, 7, 9, 11, &c. and that the ſame rays are diſpoſed to be tranſmitted, at the intermediate thickneſſes, which are as the numbers 0, 2, 4, 6, 8, 10, &c.

The places of reflection or tranſmiſſion of the ſeveral colours in a ſeries, are ſo near each other, that the colours dilute each other by mixture; whence the number of ſeries, in the open day-light, ſeldom exceeds 7 or 8. But if the ſyſtem be viewed through a priſm, by which means the rings of various colours are ſeparated, according to their refrangibility, they may be ſeen on that ſide towards which the refraction is made, ſo numerous that it is impoſſible to count them. Or, if in a dark chamber the ſun's light be ſeparated into its original rays, by a priſm, and a ray of one uncompounded colour be received upon the two glaſſes, the number of circles will become very numerous, and both the reflected and tranſmitted light will remain of the ſame colour as the original incident ray. This experiment ſhews, that in any ſeries, the circles formed by the leſs refrangible rays exceed, in magnitude, thoſe which are formed by the more refrangible; and, conſequently, that in any ſeries, the more refrangible rays are reflected at leſs thickneſſes than thoſe which are leſs refrangible.

If we apply water to the edges of the glaſs, it will be attracted between them; and, filling all the intercedent ſpace, it will become a thin plate of the ſame dimenſions as that which before was conſtituted of air: in this caſe, the circular rings grow leſs, and the colours fainter, but not varied in ſpecies. They become contracted in diameter, nearly in proportion of 7 to 8, and conſequently, the intervals of the glaſſes, at ſimilar circles, as cauſed by theſe two mediums, are as about 3 to 4; that is, as the ſines of refraction out of water into air.

We have already ſpoken of the variety of colours produced by bubbles blown in ſoap-water: but, as theſe colours are commonly too much agitated by the external air to admit of any certain obſervation, it is neceſſary to cover the bubble with a clear glaſs, in which ſituation the following appearances take place: the colours emerge from the top of the bubble, and as it grows thinner, by the ſubſidence of the water, they dilate into rings parallel to the horizon, which deſcend ſlowly, and vaniſh ſucceſſively, at the bottom. This emergence continues till the water at the upper part of the bubble becomes too thin to reflect the light, at which time a circle of an intenſe blackneſs appears at the top, which ſlowly dilates, ſometimes to three quarters of an inch in breadth, before the bubble breaks. Reckoning from the black central ſpot, the reflected colours are the ſame, in ſucceſſion and quality, as thoſe produced by the aforementioned plate of air; and the appearance of the bubble, if viewed by tranſmitted light, is ſimilar to that of the plate of air, in like circumſtances.

If we take very thin plates of talc, or Muſcovy glaſs, that exhibit theſe colours; then, by wetting the plates, the colours remain as before, but become more faint and languid, eſpecially when wetted on the under ſide. So that the thickneſs of any plate, requiſite to produce any colour, ſeems to depend only on the denſity of the plate, and not on the denſity of the incloſing medium. But the colours are more vivid, as their denſities are different.

If two pieces of plate-glaſs, or even common glaſs, be previouſly wiped, and then rubbed together, they will ſoon adhere, with a conſiderable degree of force, and exhibit various ranges of colours, much broader than thoſe obtained by lenſes. One of the moſt remarkable circumſtances attending this method of making the experiment, is the facility with which the colours may be removed, or even made to diſappear, by heats too low to ſeparate the glaſſes. A touch of the finger immediately cauſes the irregular rings of colours to contract towards their centre, in the part touched.

Theſe experiments render it evident, that the colours of bodies depend, in ſome degree, upon the thickneſs and denſity of the particles that compoſe them. Hence, if the denſity, or ſize of the particles, in the ſurface of a body, be changed, the colour is likewiſe changed. When the thickneſs of the particles

of a body is ſuch, that one ſort of light, or one ſort of colour, is reflected; another light, or other colours, will be tranſmitted; and therefore the body will appear of the firſt colour.

There is a certain determinate thickneſs which ſeems to be neceſſary in a plate of water, for example, in order to reflect a particular colour, and a different thickneſs to make it reflect any other colour; and in general, that a leſs thickneſs is neceſſary, to reflect the moſt refrangible rays, as violet and indigo, than thoſe which are leaſt refrangible, as the red and orange-coloured rays. The particles of bodies reflect rays of one colour, and tranſmit thoſe of another: and this is the ground of all their colours.

Sect. III. *Of the tranſient State into which a Ray of Light is put, in its Paſſage through any refracting Surface, which, in the Progreſs of the Ray, returns at equal Intervals; and diſpoſes the Ray, at every Return, to be tranſmitted, and, between the Returns, to be reflected to it.*

Sir I. Newton, in order to account for the intervals of the coloured rings in theſe thin plates, and alſo all other caſes of the reflection or tranſmiſſion of light, advances an hypotheſis; but, like a wiſe and cautious philoſopher, he profeſſes not to lay much ſtreſs upon it, though he ſeems not to entertain any ſuſpicion of its being fallacious. Indeed, it ſeems to be a kind of fair inference from the experiments we have been deſcribing. The hypotheſis is this: that every ray of light is, at its firſt emiſſion from the luminous body, put into *a tranſient ſtate or conſtitution*, which, in its progreſs, returns at equal intervals, diſpoſing it, at every return, to be eaſily tranſmitted into any refracting ſurface it may meet with; whereas in the intervals between theſe returns, it is diſpoſed to be eaſily reflected; ſo that, upon the arrival of a number of rays of light at the ſurface of every medium, thoſe of them in which they were diſpoſed to be tranſmitted eaſily, would paſs the interval between the two mediums; and thoſe which were in a contrary ſtate, would be reflected; on which account, ſome light is generally reflected, and ſome tranſmitted, at every different ſurface on which it falls. Thoſe ſtates, into which the rays of light are put, he calls *fits of eaſy reflection and tranſmiſſion*. This hypotheſis, however, is not without difficulties, and muſt, therefore, be received with caution, as it was propoſed, till it ſhall be either confirmed or confuted by experiment, and a new theory ſubſtituted in its ſtead.

When we are brought, as it were, to the confines of material nature, we muſt expect to meet with ſome confuſion and darkneſs in our explanations. There are barriers to our knowledge, which cannot be paſſed by any force of human faculties. Sir I. Newton, the legiſlator of philoſophers, expreſſed, under the form of conjectures or queſtions, thoſe things which he was unable ſatisfactorily to reſolve; avoiding raſh aſſertions, which are ſo fondly taken up by thoſe who wiſh to gain a momentary reputation.

Newton conjectured, that theſe fits of eaſy reflection and tranſmiſſion may be occaſioned by the vibrations of a *ſubtil fluid*, in which the ray paſſes; any ray being diſpoſed to be tranſmitted when the vibration coincides with it, and to be reflected when it is thereby counteracted. He alſo thought that theſe vibrations might be excited by the mutual action and re-action of light of bodies, and of this medium, at the inſtant of refraction and reflection. He therefore ſuppoſed *two* cauſes of this diſpoſition to be reflected or tranſmitted, when rays of light arrive at any new ſurface. One of them is the regular vibration of the ethereal medium, affecting them through the whole of their progreſs from the luminous body; and the other the tremulous motion, or irregular vibration of the ſame medium, at the ſurfaces of bodies, occaſioned by the action and re-action between thoſe bodies and light.

Thus, as ſtones, by falling into water, put the water into an undulating motion; and all bodies, by percuſſion, excite vibrations in the air; ſo the rays of light, by impinging on any refracting or reflecting ſurface, excite vibrations in the refracting or reflecting medium, and, by exciting theſe, agitate the ſolid parts of the refracting or reflecting body; and that the vibrations thus excited in this ſubtil refracting or reflecting medium are propagated much after the manner that vibrations are propagated in the air, cauſing ſound, and *moving faſter* than the rays, ſo as to overtake them; and that when any ray is in that part of the vibration which conſpires with its motion, it eaſily breaks through a refracting ſurface; but when it is in the contrary part of the vibration which impedes its motion, it is eaſily reflected; and, by conſequence, that every ray is ſucceſſively diſpoſed to be eaſily reflected, or eaſily tranſmitted by every vibration by which it is overtaken.

Sect. IV. *Of the Permanent Colours of Natural Bodies, and of the Analogy between them and the Colours of thin tranſparent Plates.*

It has already been ſtated, that the colours of natural bodies conſiſt in a diſpoſition to reflect one ſort of rays more copiouſly than another; and that other bodies are of a different colour, becauſe they reflect rays of a different kind. So that if light conſiſted only of one kind of rays, there could be only one colour in the world; nor would it be poſſible, by refractions and reflections, to produce a new one. Thus, in ſome bodies, all the rays are extinguiſhed but the red-making; and when they are reflected to our eyes, they excite in us the idea of red; and thence we ſay, that ſuch a piece of cloth, &c. is red; attributing that only to the cloth or wood, which more particularly ariſes from the light which dreſſes them in their various beauty. Thus the ruby abſorbs the green, the blue, and the violet; but reflects the red-making rays to our eye, with all their priſmatic luſtre. The amethyſt imbibes the ſtronger rays, and gives back the violet with milder brightneſs. The jonquil gives us only yellow, and the hyacinth its vivid blue. Every coloured object may be thus regarded as a partial divider of the rays, ſeparating one or more colours, and confounding all the others.

Thoſe ſurfaces of tranſparent bodies, which have the greateſt refracting power, reflect the greateſt quantity of light. In other words, bodies, by which the light is more refracted, do likewiſe more ſtrongly reflect it. Diamonds, which refract the light very ſtrongly, give it, in proportion, a ſtronger reflection: and hence proceed the vivacity of their colours, and their ſparkling effect.

We ſhall perceive the analogy between refraction and reflection, by conſidering that the moſt refractive medium totally reflects the rays of light, at certain degrees of incidence. But the truth of the propoſition further appears, by obſerving the tranſparent bodies, ſuch as air, water, oil, glaſs, Iſland cryſtal, white tranſparent arſenic, and diamond, have a ſtronger or weaker reflection, according to the greater or leſs refractive powers of the mediums that are contiguous to them. Thus at the confine of air and ſal gem, it is ſtronger than at the confine of air and water; and ſtill ſtronger between common air and glaſs; ſtill more ſo between air and a diamond. If any of theſe be immerſed in water, its reflection becomes weaker than before; and it is weaker ſtill, if it be immerſed in liquors of a greater refractive power. If water be divided into two parts, by any imaginary ſurface, there is no reflection at the confine of thoſe two parts; and for the ſame reaſon, there can be no ſenſible reflection in the confine of the two glaſſes of equal denſity. The reaſon, therefore, why all pellucid mediums have no ſenſible reflection but at their external ſurfaces, where they are contiguous to mediums of different denſities, is, that their contiguous parts have preciſely the ſame degree of denſity.

The leaſt parts of all bodies, though ſeemingly void of tranſparency, when viewed in the groſs, will be found, if taken ſeparately, to be, in ſome meaſure, tranſparent: and the opacity

arises from the multitude of reflections caused in their internal parts. This observation will be easily granted by those who have been conversant with microscopes; for there they are found to be, for the most part, transparent. Nothing seems more opake, and free from transparency, than the clothes we wear. Yet let us only examine one of the woollen hairs that go into its composition, with a microscope, and we shall find it to be nearly transparent. Gold in the mass lets no light pass through it; but if beaten out extremely thin, we shall then see that its parts are transparent, like other bodies. If held over a hole, in a darkened window, it will appear of a greenish hue. If gold be composed of transparent parts, we may surely conclude the same of other bodies; and, indeed, very few are to be found, in which, if reduced to sufficient thinness, and applied to the hole, a degree of transparency is not manifest.

It now becomes necessary, since light finds a free passage through the least particles, to inquire what renders them *opake*; and this, by Sir I. Newton, is attributed to the multitude of reflections and refractions which take place in its interior parts; there being, between the parts of opake or coloured bodies, a number of spaces, filled with mediums of a different density from that of the body, as water between the tinging corpuscles with which any liquor is impregnated; air between the aqueous globules that constitute clouds and mists, &c. These spaces cannot be traversed by light, without refracting or reflecting it in various ways, by which it is prevented from passing on in a straight line, which it would do if the parts were continuous, without any such interstices between them; for we have already learned, that reflections are only made at the superficies of mediums of different densities. The opacity of a body arises, therefore, from the discontinuity of its particles, and the different density of the intervening mediums, and the particles which compose them.

This idea of opacity is greatly confirmed, by considering that opake bodies become transparent by filling up the pores with any substance of nearly the same density with their parts. Thus when paper is wet with oil or water, or when linen cloth is dipped in water, oiled, or varnished, or the oculus mundi steeped in water, &c. they become more transparent than they were before: as filling the pores of an opake body makes it transparent, so, on the other hand, evacuating the pores of a transparent body, or separating its parts, renders it opake; as salts, or wet paper, by being dried; horn, by being scraped; glass, by being reduced to powder, or otherwise flawed; turpentine, by being stirred about with water, till they mix imperfectly; and water, by being formed into many small bubbles, either in the form of froth, or, by shaking it together with oil of turpentine, or some other convenient liquor, with which it will not combine.

It is plain then, that it is in homogeneity we are to seek for the cause of transparency. If there be many pores in a body, and these be filled with a matter differing much in density from the body itself, the light will meet with a thousand refractions and reflections in the internal parts, and will thus be utterly extinguished.

But the parts of bodies, and their interstices, must not be less than some definite size, to become opake and coloured. For the most opake bodies, if their parts be sufficiently divided, as metals, by being dissolved in acid menstrua, &c. become perfectly transparent. The black spot, near the point of contact of the two plates of glass, it has been observed, transmitted the whole light where the glasses did not absolutely touch; and the reflection at the thinnest part of the soap-bubble was so insensible as to make that part appear intensely black, by the want of reflected light.

It is on these grounds that water, salt, glass, stones, &c. are transparent; for, from many considerations, they seem to be as full of pores as other bodies are, yet their particles and pores are too small to cause reflection in their common surfaces.

The transparent parts of bodies, according to their several sizes, must reflect rays of one colour, and transmit those of others, on the same principles that thin plates or bubbles do reflect or transmit these rays; and this seems to be the ground of all their colours. That they do so is plain from various observations; and it is on these principles you may explain the variety of colours seen in some silks, on pigeons' necks, peacocks' tails, and the feathers of other finely coloured birds. If the eye be fixed on a pigeon's neck, and both be kept at rest, only one colour is observable: but if either moves, especially the latter, a different colour may be seen. Shady silks are woven, with threads of different colours; one arranged longitudinally, the other transversely; and as the greater or less proportion of either of these appears, so one or the other of the colours will prevail. Wet these double coloured objects, dip the variegated feather in water, or the changeable silk in oil, their reflections will be less vivid, and they will return but one uniform shade of colouring. The skin of the camelion is transparent, its ground being between a pale red and yellow, coloured with a number of small smooth protuberances of a cold blueish colour. It is endowed with a faculty of blowing up or contracting its skin at will. This causes the different colours, in appearance, to vary: it therefore sometimes appears reddish, at others blue: the yellow rays of the ground, occasionally mixing with the blue of the protuberances, produce the idea of green; and when placed on a red or yellow substance, its natural colours are unavoidably heightened.

From various phenomena it is evident, that a great proportion of the fainter coloured rays are stopped in their passage through the atmosphere, and are thence reflected upon other bodies; while the red and orange rays are transmitted to greater distances. This circumstance explains the blue shadows of bodies, the blue colour of the sky, and the red colour of the clouds, when the sun is near the horizon.

At particular times, when the sky is clear and serene, in the morning and the evening, the shadows cast from opake bodies have been observed to be tinged with blue and green. This circumstance naturally results from the minute particles of the atmosphere reflecting the delicate and most refrangible rays, the blue and violet, for instance, which occasions a predominance of these hues.

The blueness of the sky is accounted for on the same principles; namely, the copious reflection of the blue rays, by the atmosphere, which produces the effect of an arch of that colour, all around us. This is occasionally diversified by the greater density of the vapours, which reflect the stronger rays. The coloured clouds, in particular, which appear towards the morning and evening, when the sun is in or near the horizon, are to be attributed to the same cause. The rays of light traversing a vast extent of atmosphere; the fainter and more delicate rays, as the blue and violet, are detached by repeated reflections of the atmospheric particles; and the stronger rays, as the red, the orange, &c. are permitted to proceed, and reach the clouds, from whence they are reflected. Agreeable to this theory, we may observe, that the sun's horizontal light is sometimes so deeply tinctured with the red, that objects illuminated by it frequently appear of a bright orange, and even red. It is observable, that the clouds do not, in common, assume their brighter dyes till the sun is some minutes set, and that they pass from yellow to a flaming gold colour; and thence, by degrees, to red, which becomes deeper and deeper, till the sun leaves them altogether, till at length the disappearance of the sun leaves them of a leaden hue, by the reflection of the blue light from the air. A similar change of colour is observed on the snowy tops of the Alps; and the same may be seen, though less strongly, on the eastern and western fronts of white buildings. St. Paul's church, London, is a good object of this kind,

and is often, at ſun-ſet, tinged with a conſiderable degree of redneſs. What makes the ſame colours more rich and copious in the clouds, is their ſemi-tranſparency, joined with the obliquity of their poſition.

It is highly probable that it is the ſame coloured light, which being thrown, by the refraction of the atmoſphere, into the ſhadow of the earth, ſometimes gives the moon, in a total eclipſe, the obſcure, reddiſh colour of brick. For the ſame reaſon, the colour of the moon will vary in eclipſes, according to the extent of atmoſphere which the rays have to traverſe through.

SECT. V. *Mr. Delaval's Account of the permanent Colours of opake Bodies.*

THE doctrine of colours would be very incomplete, if we did not give ſome account of the ingenious obſervations of Mr. Delaval, extracted from a paper communicated by him to the Literary and Philoſophical Society of Mancheſter, and publiſhed in their ſecond volume of memoirs.

The author was led to this ſubject, from a perſuaſion of its *utility* to thoſe intereſting and elegant arts, whoſe object is the preparation and uſe of colouring ſubſtances: juſtly obſerving, that our views of experimental philoſophy ſhould not be confined to theory alone, but directed alſo to its practical application. For, in proportion as the principles of any ſcience are unknown or miſconceived, the advancement of the arts, and manufactures which depend on them, muſt, of courſe, be impeded; for, without thoſe guides, neither much addition, nor any improvement, is to be expected. But when ſcientific principles are diſcloſed to the artiſt, he is enabled to draw from thoſe original ſources an ample ſtore of uſeful inventions, by which this art is enriched; and thus, the ſpeculative ſciences, by their extenſion to practical purpoſes, become objects of great public importance.

The arts of colour-making and dyeing were, in very remote ages, carried to the height of perfection, in the countries of Phœnicia, Egypt, Paleſtine, India, &c. The inhabitants of thoſe countries excelled alſo in the art of imitating gems, and tingeing glaſs and enamel of various colours. The colours uſed in very ancient paintings, were as various as thoſe now in uſe, and greatly ſuperior both in beauty and durability. The paints uſed by Apelles were ſo bright, that he was obliged to glaze his pictures with a dark coloured varniſh, leſt the eye ſhould be offended by their brightneſs: and even theſe were inferior to what had been uſed among the ancient Egyptians. Notwithſtanding this perfection in dyeing and colours, we find the Grecians and Romans continually degrading the uſeful arts. We may conſider this as one of the moſt ſtriking characters that diſtinguiſh the philoſophy of the ancients from that of the moderns. The *ancients* being chiefly engaged in ſpeculations that might procure them reſpect, and attract applauſe, thought the *uſeful* arts unworthy their attention: whereas the *moderns* have cultivated and promoted the uſeful arts; and we find the Academy of Sciences of Paris attempting to ſhed the light of ſcience upon the arts, by publiſhing a deſcription of them, grounded on the elevated idea, that the induſtry of a nation cannot fail to be enlightened and increaſed by a free communication of all the proceſſes it uſes; and that the ſacrifices it makes by this publicity, will ever be amply compenſated by the advantages it procures.

The changes of colour in permanently coloured bodies, are produced by the ſame laws which take place in tranſparent colourleſs ſubſtances; and the experiments by which they can be inveſtigated, conſiſt of various methods of uniting the colouring particles into larger, or dividing them into ſmaller maſſes.

The great Newton made his experiments chiefly on tranſparent ſubſtances; and in the few places where he treats of others, acknowledges his deficiency of experiments. He makes the following remark on thoſe bodies which reflect one kind of light, and tranſmit another; viz. "that if theſe glaſſes or liquors were ſo thick and maſſy, that no light could get through them, he queſtions whether they would not, like other opake bodies, appear of one and the ſame colour, in all poſitions of the eye, though he could not yet affirm it from experience." It was an opinion of this great philoſopher, that all coloured matter reflects the rays of light; ſome reflecting copiouſly the more, others the leſs refrangible rays. He was likewiſe of opinion, that opake bodies reflect the light from their anterior ſurface, by ſome power of the body, evenly diffuſed over, and external to it. With reſpect to tranſparent coloured liquors, he ſays, that a tranſparent body, which looks of any colour by tranſmitted light, may alſo look of the ſame colour by reflected light, the light of that colour being reflected by the farther ſurface of that body, or by the air beyond it; and then the reflected colour will be diminiſhed, and perhaps ceaſe, by making the body very thick, and pitching it on the back ſide, to diminiſh the reflections of its farther ſurface, ſo that the light reflected from the tingeing particles may predominate. In ſuch caſe the reflected light will be apt to vary from that which was tranſmitted.

In order to inveſtigate the truth of theſe opinions, Mr. Delaval entered upon a courſe of experiments with tranſparent coloured liquors and glaſſes, as well as with opake and ſemi-tranſparent ſubſtances. From theſe he found, that in tranſparent coloured ſubſtances, the colouring matter *does not reflect any light*; and when, by intercepting the light which was tranſmitted, it is hindered from paſſing through ſuch ſubſtances, they do not vary from their former colour to any other, *but become entirely black.*

This incapacity of the colouring particles of tranſparent bodies to reflect light, being deduced from very numerous experiments, it may be conſidered as a general law. It appears the more extenſive, if we conſider that, for the moſt part, the tingeing particles of tranſparent ſubſtances are extracted from opake bodies; that the opake bodies owe their colour to theſe particles, as well as the tranſparent; and that by the loſs of them they are deprived of their colours.

For his experiments Mr. Delaval uſed ſmall phials of flint-glaſs, calculated for the purpoſe; the form, that of a parallelopiped; the height, excluſive of the neck, about 2 inches; the baſe about an inch ſquare, the neck two inches long. The bottom and three ſides of each of theſe phials was covered with a black varniſh; the cylindrical neck, and the anterior ſide, except at the edges, being left uncovered. He was careful to avoid any crevices in the varniſh, that no light might be admitted, except through the neck or anterior ſide of the phials. The phials ſhould be perfectly clean, and thoſe liquors that depoſit a ſediment ſhould not be put into them, but at the time when the experiments are to be made. The uncovered ſide likewiſe ſhould not be placed oppoſite to the window where the light is admitted, becauſe in that ſituation the light would be reflected from the fartheſt ſide of the phial: ſmooth black ſubſtances, reflecting light powerfully, are beſt ſituated when the uncovered ſide forms a right angle with the window.

Having taken all theſe precautions, he viewed a great number of ſolutions, both of coloured metallic ſalt, and of the tingeing matter of vegetables, obſerving that the colour by reflection was black, *whatever it might be* when viewed by tranſmitted light. If theſe colours are, however, ſpread thin upon a white ground, they appear of the ſame colour as when viewed by tranſmitted light; but on a black ground they afford no

colour, unlefs the black body be polifhed, in which cafe the reflection of light through it produces the fame effect as tranfmiffion.

The experiments made with coloured glaffes were, in many refpects, analogous to thofe with tranfparent coloured liquors. For thefe he made feveral parcels of colourlefs glafs, compofed of borax and white fand. The glafs was reduced to powder, and afterwards ground together with the ingredients, by which the colour was to be imparted; a method he found preferable to the ufual mode of tingeing glaffes, as they became little inferior in luftre to real gems.

The refult of all his experiments was, that when matter is of fuch thinnefs, and the tinge fo dilute, that light can be tranfmitted through it, the glaffes then appear vividly coloured; but when they are in large maffes, and the tingeing matter is more denfely diffufed through them, they appear black; for thefe, as well as the tranfparent liquors, fhew their colour only by tranfmiffion.

Having in this manner formed pieces of fuch glafs, two inches thick, he inclofed them in black cloth on all fides, except their anterior and farther furfaces. In this fituation each of them fhewed a vivid colour when light was tranfmitted through them; but when the pofterior furface was likewife covered with the cloth to prevent the tranfmiffion, no other colour but black was exhibited.

From thefe phenomena he drew the following inferences: 1. *That the colouring particles do not reflect any light.* 2. *That a medium, fuch as is defcribed by Sir I. Newton, is diffufed over both the anterior and pofterior furfaces of the plates, whereby objects are equally and regularly reflected as by a mirror.*

Mr. Delaval next confiders the colouring particles themfelves, pure and unmixed with other media. To procure maffes made up of fuch particles, feveral tranfparent coloured liquors were reduced to a folid confiftence by evaporation; by employing a gentle heat the colouring matter will not be injured, and may have its particles again feparated by water or other fluids, and tingeing them as before. In this ftate alfo the colouring particles reflect no light, and therefore appear uniformly black, whatever be the fubftance from which they may have been extracted.

He endeavours to prove by experiments on the colouring particles of opake bodies, that thefe colours are produced on the above-mentioned principles; that they feem black when very denfe, but fhew their proper tinge when fpread thin upon a white ground. The green of grafs and leaves of plants being obtained by digefting them in rectified fpirits of wine, and placed in one of the above-mentioned phials, the part in the neck tranfmitted the vivid green, but that contiguous to the uncovered fide of the phial was black. After the colour had been totally extracted, the leaves remained apparently unaltered as to figure or texture, but were entirely white, or of a white tinged with brown. Red, blue, and purple flowers were alfo digefted with fpirits of wine, all of which yielded their colouring matter to the fpirit, and became white when deprived of it. From moft of thefe flowers the fpirit, however, either acquired no tinge at all, or only a very faint one; but when acidulated it became red, and by the addition of an alkali became blue, purple, or green, according to the quantity of the alkali, and the nature of the infufion. In thefe ftates all of them, when viewed by tranfmitted light, or poured upon a white paper, fhewed their colours, but univerfally appeared black by reflection. Other experiments were tried with other flowers, but the final refult was the fame, *no colour by reflection.*

Linen, cotton, white paper, &c. may be tinged of any of thefe colours, by dipping them in the infufions; and the confideration of the manner in which the colours are imparted to linen, affords much infight into the manner in which natural colours are produced. It has been already obferved, that when the colouring matter of plants is extracted from them, the folid fibrous parts, thus divefted of their covering, difplay their natural *whitenefs.* White linen, paper, &c. are formed of fuch fibrous vegetable matter, which is bleached by diffolving and detaching the heterogeneous colouring particles: when thefe therefore are dyed or painted with vegetable colours, it is evident that they do not differ in their manner of acting on the rays of light from natural vegetable bodies: both yield their colours by tranfmitting through the tranfparent coloured matter the light which is reflected from the white ground.

This *white matter* ever exifts without any confiderable mixture in plants while they are in a ftate of vegetation, as cotton, white flowers, the pith, wood, feeds, roots, and other parts of feveral kinds of vegetables. When decayed leaves of trees have been long expofed to the atmofphere, their coloured juices are fometimes fo perfectly extracted that their fibres appear white.

Mr. Delaval has rendered afhes *intenfely white,* by carefully calcining them, and afterwards grinding with a fmall proportion of nitre, and expofing them to fuch a degree of heat as would caufe the nitre to deflagrate with the remaining quantity of phlogifton. Laftly, the afhes were digefted with the marine acid, in order to diffolve the ferruginous matter diffufed through them, and the remainder repeatedly wafhed in water. Hence it would appear, that the earth which forms the fubftanee of plants is white, and feparable from that fubftance which gives to each its peculiar colour; that whenever it is pure and unmixed, or diffufed through colourlefs media, it fhews its native whitenefs, and is the only vegetable matter endowed with a native whitenefs. This white matter may be difcovered by other means befides burning; thus rofes may be whitened by expofing them to burning fulphur, and the colour may be again reftored by the addition of an acid either mineral or vegetable.

Thus it appears that the colouring matter of the flowers is not difcharged or removed, but only diffolved by the phlogifton, and thereby divided into particles too minute to exhibit any colour. In this ftate, together with the vegetable juice in which they are diffufed, they form a colourlefs tranfparent covering, through which the white matter of the flowers is feen untinged. The colouring matter of plants confifts, according to Mr. Delaval, principally of inflammable matter, and their folubility in and union with phlogifton.

Dyed fubftances have their colour deftroyed by the rays of the fun. Thus dyed filk, and other fubftances of that kind, when expofed to the fun's light, are deprived of their colour in every part on which the rays are allowed to act; whilft thofe preferve their colours which are defended from the light. The colours, thus *impaired,* may be reftored, if acids are employed while the injury is recent.

All Mr. Delaval's experiments in fact fhew, that the colouring matter of plants does not exhibit any colour by reflection, but by tranfmiffion only; that their folid earthy fubftance is a white matter, and that it is this part that has the property of reflection; that the colours of vegetables are produced by the light reflected from this white, and tranfmitted from thence through the coloured coat or covering which is formed on its furface by the colouring particles; that whenever the colouring matter is either difcharged or divided by folution into particles too minute to exhibit any colour, the folid fubftance itfelf difplays that whitenefs which is its diftinguifhing characteriftic.

Having fettled this point, our author next proceeded to examine the coloured parts of animal fubftances, and found them exactly fimilar with regard to the manner in which the colour

is produced, to the vegetable fubftances already treated of. The tinctures and infufions of cochineal and kermes yield their colours when light is tranfmitted through them, but fhew none by reflection. On diluting frefh ox-gall with water, and examining it in the above-mentioned phials, the part of it viewed by tranfmitted light was yellow; but the anterior furface in the lower part of the phial was black, and reflected no colour. Flefh derives its colour entirely from the blood, and when deprived of it the fibres and veffels are perfectly white; as are likewife the membranes, tendons, and bones, when freed from their aqueous and volatile parts. The florid red colour of the flefh arifes from the light which is reflected from the white fibrous fubftance, and tranfmitted back through the red tranfparent covering, formed by the blood on every part of the furface of the body.

In like manner the red colour of the fhells of lobfters after boiling, is no more than a mere fuperficial covering fpread over the white calcareous earth of which the fhells are compofed, and may be removed from the furface by fcraping or filing. Before the application of heat this fuperficial covering is much denfer, infomuch that in fome parts of the fhell it appears quite black, being too thick to admit the paffage of the light to the fhell and back again; but where this tranfparent blue colour of the unboiled lobfter is thinner, it conftantly appears like a blue film. In like manner the colours of the eggs of certain birds are entirely fuperficial, and may be fcraped off, leaving the white calcareous earth expofed.

It is the fame with feathers, which owe their colours entirely to a very thin layer of fome tranfparent matter upon a white ground; this was afcertained by fcraping off the fuperficial colours from certain feathers, which were ftrong enough to bear the operation, and which feparated the coloured layers from the white ground on which they had been naturally fpread. The lateral fibres cannot have their colours feparated in this manner; but their texture, when viewed by a microfcope, feems to indicate that their colours are produced on them by no other means than thofe already related. In a word, he found that in all the animal fubjects he examined, the colours were produced by the tranfmiffion of light from a white ground through a tranfparent coloured medium.

The mineral kingdom abounds with coloured fubftances, belonging principally to two claffes, earths and metals. The former, when pure, are all white, and their colour arifes from phlogiftic or metallic mixtures. Calcareous earths, when indurated, conftitute marble, and may be tinged with various colours by means of metallic folutions, all which are fimilar in their nature to the dyes put upon filk, cotton, or linen, and invariably proceed from the fame caufe, the tranfmiffion of light through a very thin tranfparent medium. Flints are formed from filiceous earths, and owe their colour to the ftate of fire within them; when fufficiently heated, they are rendered white by the lofs of the inflammable matter which produced their colour; when impregnated with metals, they form agates, cornelians, jafper, and coloured cryftals. The coloured gems alfo receive their different hues from metals, and may be imitated by glaffes tinged with fuch inflammable or metallic matter as entered into the original fubftances, all exhibiting their various tints in the fame manner, by the tranfmiffion of light from a reflected white ground.

Mr. Delaval obferves, that even the colours of metals are produced in the fame manner. Gold exhibits a white light tinged with yellow; this is grounded on an experiment of Sir I. Newton, who fays, that gold in a white light appears of the fame colour as in the day-light, but that on intercepting a due quantity of yellow-making rays, it will appear white like filver, which fhews that its yellownefs arifes from an excefs of the intercepted rays, tingeing that whitenefs with their colour when they are let pafs through.

A folution of filver is pellucid and colourlefs; a folution of gold tranfmits yellow, but reflects no colour. This metal, when united to glafs, yields no colour by reflection, but only by tranfmiffion. All thefe circumftances feem to indicate, that the yellow colour of gold arifes from a yellow tranfparent matter, which is a conftituent part of that metal, and that is equally mixed with the white particles of the gold, and tranfmits the light reflected by them; in like manner as when filver is gilt, or foils are made by covering white metals with tranfparent colours. But thefe factitious coverings are only fuperficial, whereas the yellow matter of gold is diffufed throughout the whole fubftance of the metal, and appears to envelop and cover each of the white particles; the yellow matter bears to the white about the fame proportion that the yellow-making rays, which were intercepted, bear to all the other rays comprifed in the white light of the fun.

It has been fhewn by Sir I. Newton, that when the fpaces or interftices of bodies are replenifhed with media of different denfities, the bodies are opake; that thofe fuperficies of tranfparent bodies reflect the greateft quantity of light, which intercede media that differ moft in their refractive denfities; and that the reflections of thin tranfparent fubftances are confiderably ftronger than thofe made by the fame fubftances of a greater thicknefs. Hence the minute portion of air, or of the rarer medium, which occupies the pores or interftices of denfe bodies, is a minute white fubftance. This is manifeft in the whitenefs of froth, and of all pellucid colourlefs fubftances, fuch as glafs, cryftal, or falts reduced to powder, or otherwife flawed; for in all thefe inftances a white light is reflected from the air or rarer medium, which intercede the particles of the denfer fubftance, whofe interftices they poffefs.

Hence alfo we fee why white opake fubftances are rendered pellucid by being reduced to uniform maffes, whofe component parts are every where nearly of the fame denfity; for as all pellucid fubftances are rendered opake and white by the admixture of pellucid colourlefs media, of confiderably different denfities, they are again deprived of their opacity, by extracting thefe media, which keep their particles at a diftance from each other: thus froth and fnow, when refolved into water, lofe their whitenefs, and affume their former pellucid appearance. In like manner the opake white earths are by proper fluxes reduced to pellucid colourlefs glafs; becaufe all reflections are made at the furfaces of bodies differing in denfity from the ambient medium, and in the confines of equally denfe media there is no reflection.

As the calces of metals are capable of reflecting their colours by the intervention of air, fo, when mixed with oil in making paints, they always affume a darker colour, becaufe the excefs of the denfity of oil over air forms a fenfible difference, when comparatively confidered with refpect to the fpecific gravity of the rarer metals. From this caufe perceptibly lefs light is reflected from the moleculæ of oil than thofe of air, and confequently the mafs appears darker. The cafe is however different with fuch paints as are formed of the denfer metals, as vermilion, minium, &c. for though oil differs very confiderably from air in its fpecific denfity, yet it alfo differs very much in this refpect from the denfer metallic powders; and the moleculæ of oil, which divide their particles, act upon the light fo ftrongly, that the reflection of light occafioned by them cannot be diftinguifhed from thofe which are caufed by rarer media. Hence, when we mix vermilion or minium with oil, the colour is not fenfibly changed.

All thofe earths, which in their natural ftate are of a pure white, conftitute tranfparent colourlefs media when vitrified with proper fluxes, or when diffolved in colourlefs menftrua;

and the faline maffes, obtainable from their folutions, are tranfparent and colourlefs, while they retain the water which is neceffary to their cryftallization, and are not flawed or reduced to powder: but after their pores and interftices are opened in fuch a manner as to admit the air, they become white and opake by the admittance of that rare medium. The earthy particles, which form the folid parts of bodies, generally exceed each other in denfity; confequently thefe particles, when contiguous to the rare media already mentioned, muft reflect the rays of light with a force proportionate to their denfity. The reflective power of bodies does not depend merely upon their excefs of denfity, but upon their difference of denfity with refpect to the furrounding media. Tranfparent colourlefs particles, whofe denfity is greatly inferior to that of the media they come between, alfo powerfully reflect all forts of rays, and thereby become white; of this kind are the air, or other rare fluids, which occupy the interftices of liquors, and in general of all denfer media, where fuch rare particles find accefs.

Hence we may conclude, that white opake bodies are conftituted by the union or contiguity of two or more tranfparent colourlefs media, differing confiderably from each other in their reflective powers. Of thefe fubftances we have examples in frothy emulfions, or other imperfect combinations of pellucid liquors, as milk, fnow, calcined or pulverized falts, glafs or cryftal reduced to powder, white earths, paper, linen, and even thofe metals which are called white by mineralogifts: for thofe metals do not appear white unlefs their furfaces be rough; as in that cafe only there are interftices on their furface fufficient to admit the air, and thus make a reflection of a white and vivid light.

The polifhed furfaces of metallic mirrors reflect the incident rays equally and regularly according to their feveral angles of incidence, fo that the reflected rays do not interfere with each other, but remain feparate and unmixed, and therefore diftinctly exhibit their feveral colours. Hence it is evident, that white furfaces cannot act upon the light as mirrors, becaufe all the rays which are reflected from them are blended in a diforderly and promifcuous manner.

The foregoing phenomena give us fome infight into the nature and caufe of opacity, as they clearly fhew, that even the rareft tranfparent colourlefs fubftances, when their furfaces are adjacent to media differing greatly from them in refractive power, may thereby acquire a perfect opacity, and may affume a hue and refplendence fimilar to that of white metals; that the rarer pellucid fubftances cannot by the fight be diftinguifhed from the denfe opake metals; and this fimilarity to the furface of metals not only occurs, when from the roughnefs of their furfaces they refemble polifhed metals in whitenefs, but alfo when from their fmoothnefs they refemble the polifhed furface of metals.

It fhould feem, that metals confift entirely of tranfparent matter, and derive their apparent opacity and luftre folely from the copious reflection of light from their furfaces. The analogy between metals and tranfparent media, as far as concerns their optical properties, will appear plain from the following confiderations: 1. All metals diffolved in their proper menftrua are tranfparent. 2. By the union of two or more tranfparent media, fubftances are conftituted which are fimilar to metals in their opacity and luftre, as plumbago and marcafites. 3. The tranfparent fubftances of metals, as well as thofe of minerals, by their union with inflammable matter, acquire the ftrong reflective powers from which their luftre and opacity arife. 4. The furfaces of pellucid media, fuch as glafs or water, affume a metallic appearance, when by their fmoothnefs, difference of denfity with refpect to the contiguous media, or any other, they are difpofed copioufly to reflect the light.

It is plain from the foregoing confiderations, that opake fubftances are conftituted by the union or contiguity of tranfparent colourlefs media, differing from one another in their reflective powers; and that when the common furface, which comes between fuch media, is plane, equal, and fmooth, it reflects the incident rays equally and regularly as a mirror; but when their furface is rough and unequal, or divided into minute particles, it reflects the incident rays irregularly and promifcuoufly in different directions, and confequently appears white. When the interftitial vacuities of bodies are fo difpofed that the light can preferve its rectilinear courfe through them, fuch bodies appear luminous throughout, and are vifible in their internal fubftance; but when their conftitution is fuch as will not allow a free paffage to the light, they are then vifible only by thofe rays which are reflected from their furface, and their internal furface is cold and dark.

From a variety of confiderations it appears, that the chemical properties of bodies have a confiderable influence on their colour; for, doubtlefs, a force which acts powerfully in refracting the rays, muft likewife influence their reflection; and it is hardly to be doubted, but that the action of fire has a confiderable fhare in the production of colours: indeed its fhare in the operations of nature is fo confiderable, that it would be ftrange if it fhould be excluded from this more curious part.

Sir I. Newton found, on comparing the refractive power of different bodies, that inflammable fubftances poffefs it in a much greater degree than fuch as are not inflammable. From his obfervations on this fubject, he drew the wonderful conclufion, that the *diamond* contained a large quantity of *inflammable* matter; that *water* was an intermediate fubftance between inflammable and uninflammable bodies, and that it fupplied vegetables with the inflammable principle; which truths have been feen and demonftrated only in our own time.

Subftances that are not tranfparent in their ordinary ftate, may be rendered fo either by relaxing their parts with heat, fo that the light may pafs through them more eafily, or by giving fome new direction, together with an additional force, to the matter of light. Mr. Hawkfbee was very much furprifed to find, that the fealing-wax, and the pitch, within fide a glafs globe, became fo tranfparent when the glafs was whirled about and rubbed with the hand, that the fingers might be plainly feen on the other fide through the coating. Oil is condenfed, when cold, into a fort of globules impervious to the light; but when thefe globules are diffolved, and opened by the action of fire, the oil not only becomes tranfparent, but appears as bright and fhining as if the light were a natural part of its compofition.

We know, that many heterogeneous fluids grow dark and muddy with cold, but that they may be foon clarified again by the application of a moderate heat: red-port wine is fometimes as foul as if brick-duft was mixed with it, but will foon become bright and clear by the application of warmth.

Tranfparency is a quality given, by a wife ordination of Providence, to the fluid fubftance of water, which is fo neceffary to the life of all animals. Tranfparency renders glafs moft valuable; the value of gold is arbitrary, but the worth of glafs is intrinfic; its cleanlinefs and tranfparency recommend it to our ufe for the common purpofes of life, and render vifible the moft curious and fubtil proceffes of chemiftry and philofophy: in optics, it affifts the aged, and gives to man an infight into the wonders of the creation.

Before we take leave of this fubject, it may not be improper to make one further obfervation on colour, on account of the mifchievous inferences deduced from the Newtonian theory, by Voltaire and fome other infidel writers. Thefe men fuppofe that light and colour, as apprehended by the imagination, are only ideas in the mind, and not qualities that have any exiftence

of matter. Strange as this may feem, it has been univerfally received, and confidered by fome as one of the nobleft difcoveries of modern philofophy.

By colours all men, who have not been tutored in this fchool, underftand not a fenfation of the mind, which can have no exiftence when it is not perceived, but a quality and modification of bodies, which continues the fame whether it be feen or concealed. The fcarlet rofe is not lefs a fcarlet rofe when we fhut our eyes, and was fo at midnight when no eye faw it. The colour furely remains when the appearance ceafes; and it remains the fame even when the appearance changes; for when we view this fcarlet rofe through a pair of green fpectacles, the appearance is changed; but we do not conceive the colour in the rofe to be changed. To a perfon in a jaundice it has ftill another appearance, but he is eafily convinced the change is in his eye, and not in the colour of the object. We can, by a variety of optical experiments, change the appearance of figure and magnitude in a body, as well as that in colour; we can make one body appear to be ten. But no man believes the multiplying glafs really produces ten guineas out of one; in like manner, no one believes the coloured glafs changes the real colour of the object feen through it, when it alters the appearance of that colour.

Colour. therefore, is not a fenfation, but a fecondary quality of bodies, whereby in fair day-light they exhibit a certain and well underftood appearance; and there is a real permanent quality in bodies, to which the common ufe of this word agrees. Had modern philofophers given, as they ought to have done, the name of colour to the *caufe* inftead of to the effect, they would not have fet philofophy apparently in contradiction with common fenfe; for they muft then have affirmed with the vulgar, that colour is a property of bodies, and that there is nothing like it in the mind. Their language, as well as their fentiments, would have been perfectly agreeable to the common apprehenfions of mankind, and true philofophy would have joined hands with common fenfe.

Sect. VI. *Experiments.*

In the courfe of the foregoing remarks, it will no doubt occur to the reader occafionally, to refort to the treatife on Optics, given in a fubfequent part of this work. We fhall therefore dwell no longer on the fubject of Chromatics than is neceffary for defcribing a few *entertaining experiments*, in fome degree illuftrative of the fubject, and in conformity to the principles of Sir I. Newton, laid down in the former part of this treatife.

I. *Out of a fingle colourlefs Ray of Light to produce feven other Rays, which fhall paint, on a white Body, the feven primary Colours of Nature.*

Procure of an optician a large glafs prifm DEF, well polifhed, two of whofe fides muft contain an angle of about fixty-four degrees. (See Plate 80, fig. 1.) Make a room quite dark, and in the window fhutter AB, cut a round hole, about one-third of an inch in diameter, at C, through which a ray of light LI paffing, falls on the prifm DEF: by that it is refracted out of the direction IT, in which it would have proceeded into another GH; and, falling on the paper MNSX, will there form an oblong fpectrum PQ, whofe ends will be femicircular, and its fides ftraight; and if the diftance of the prifm from the paper be about eighteen feet, it will be ten inches long, and two inches wide. This fpectrum will exhibit all the primary colours: the rays between P and V, which are the moft refracted, will paint a deep violet; thofe between V and I, indigo; thofe between I and B, blue; thofe between B and G, green; thofe between G and Y, yellow; thofe between Y and O, orange; and thofe between O and R, being the leaft refracted, an intenfe red. The colours between thefe fpaces will not be every where equally intenfe, but will incline to the neighbouring colour: thus the part of the orange next to R, will incline to a red; that next to Y, to a yellow; and fo of the reft.

II. *From two or more of the primary Colours, to compofe others that fhall, in appearance, refemble thofe of the former.*

By mixing the two homogeneal colours red and yellow, an orange will be produced, fimilar in appearance to that in the feries of primary colours; but the light of the one being homogeneal, and that of the other heterogeneal, if the former be viewed through a prifm it will remain unaltered, but the other will be refolved into its component colours, red and yellow. In like manner, other contiguous homogeneal colours may compound new colours; as by mixing yellow and green, a colour between them is formed; and if blue be added, there will appear a green, that is the middle colour of thofe three. For the yellow and blue, if they are equal in quantity, will draw the intermediate green equally toward them, and keep it, as it were, in equilibrio, that it verge not more to the one than to the other. To this compound green there may be added fome red and violet; and yet the green will not immediately ceafe, but grow lefs vivid; till by adding more red and violet it will become more diluted; and at laft, by the prevalence of the added colours it will be overcome, and turned into fome anomalous colour.

If the fun's white, compofed of all kinds of rays, be added to any homogeneal colour, that colour will not vanifh, nor change its fpecies, but be diluted; and by adding more white, it will become continually more diluted. Laftly, if red and violet be mixed, there will be generated, according to their various proportions, various purples, fuch as are not like in appearance to the colour of any homogeneal light; and of thefe purples, mixed with blue and yellow, other new colours may be compofed.

III. *Out of three of the primary Colours, red, yellow, and blue, to produce all the other prifmatic Colours, and all that are intermediate to them.*

Provide three panes of glafs of about five inches fquare; and divide each of them, by parallel lines, into five equal parts as at fig. 2. Take three fheets of very thin paper; which you muft paint, lightly, one blue, another yellow, and the third red *. Then pafte on one of the glaffes five pieces of the red paper, one of which muft cover the whole glafs, the fecond only the four lower divifions, the third the three lower, the fourth the two loweft, and the fifth the laft divifion only. On the other glaffes five pieces of the blue and yellow papers muft be pafted in like manner. You muft alfo have a box of about fix inches long, and the fame depth and width as the glaffes; it muft be black on the one fide: let one end be quite open, and in the oppofite end there muft be a hole large enough to fee the glaffes completely. It muft alfo open at the top, that the glaffes may be placed in it conveniently.

When you have put any one of thefe glaffes in the box, and the open end is turned toward the fun, you will fee five diftinct fhades of the colour it contains. If you place the blue and yellow glaffes together, in a fimilar direction, you will fee five fhades of green diftinctly formed. When the blue and red glaffes are placed, a bright violet will be produced: and by the red and yellow, the feveral fhades of orange.

If, inftead of placing thefe glaffes in a fimilar pofition, you

* Water-colours muft be ufed for this purpofe: the blue may be Pruffian, the red, carmine; and the yellow, gamboge. Thefe colours muft be laid very light and even, on both fides of the paper.

place the fide AB of the yellow glafs againft the fide BD of the blue, (fee fig. 3.) you will fee all the various greens that are produced by nature *; if the blue and red glaffes be placed in that manner, you will have all the poffible varieties of purples, violets, &c. and laftly, if the red and orange glaffes be fo placed, there will be all the intermediate colours, as the marygold, aurora, &c.

IV. *By means of the three primary Colours, red, yellow, and blue, together with Light and Shade, to produce all the Gradations of the prifmatic Colours.*

On feven fquare panes of glafs pafte papers that are painted with the feven prifmatic colours, in the fame manner as in the laft experiment. The colours for the orange, green, indigo, and violet, may be made by mixing the other three. Then with biftre, of that fort prepared of *foot*, and well diluted, fhade a fheet of very thin paper, by laying it light on both its fides. With pieces of this paper cover four fifths of a glafs, of the fame fize with the others, by laying one piece on the four divifions, another on the three loweft, a third on the two loweft, and the fourth on the loweft divifion only, and leaving the top divifion quite uncovered. When one of the coloured glaffes is placed in the box, together with the glafs of fhades, fo that the fide AB of the one be applied to the fide DC of the other, as in fig. 3, the feveral gradations of colours will appear fhaded in the fame manner as the drapery judicioufly painted with that colour.

It is upon this principle that certain French artifts have proceeded in their endeavours to imitate, by defigns printed in colours, paintings in oil: which they do by four plates of the fame fize, on each of which is engraved the fame defign. One of thefe contains all the fhades that are to be reprefented, and which are painted either black or with a dark grey. One of the three other plates is coloured with blue, another with red, and the third with yellow; each of them being engraved in thofe parts only which are to reprefent that colour; and the engraving is either ftronger or weaker, in proportion to the tone of colour that is to be reprefented.

Thefe four plates are then paffed alternately under the prefs, and the mixture of their colours produces a print that bears no fmall refemblance to a painting. It muft be confeffed, however, that what has been hitherto done of this kind falls far fhort of that degree of perfection of which this art appears fufceptible. If they who engrave the beft in the manner of the crayon, were to apply themfelves to this art, there is reafon to expect they would produce far more finifhed pieces than we have hitherto feen.

V. *To make Figures appear of different Colours fucceffively.*

Make a hole in the window-fhutter of a dark room, through which a broad beam of light may pafs, that is to be refracted by the large glafs prifm ABC fig. 4. which may be made of pieces of mirrors cemented together, and filled with water. Provide another prifm DEF, made of three pieces of wood: through the middle of this there muft pafs an axis on which it is to revolve. This prifm muft be covered with white paper; and each of its fides cut through in feveral places, fo as to reprefent different figures, and thofe of each fide fhould likewife be different. The infide of this prifm is to be hollow, and made quite black, that it may not reflect any of the light that paffes through the fides into it. When this prifm is placed near to that of glafs, as in the figure, with one of its fides EF perpendicular to the ray of light, the figures on that fide will appear perfectly white: but when it comes into the pofition *g b*, the figures will appear yellow and red; and when it is in the pofition *k l*, they will appear blue and violet. As the prifm is turned round its axis, the other fides will have a fimilar appearance. If inftead of a prifm, a four or five fided figure be here ufed, the appearances will be ftill further diverfified.

This phenomenon arifes from the different refrangibility of the rays of light. For when the fide EF is in the pofition *g b*, it is more ftrongly illuminated by the leaft refrangible rays; and wherever they are predominant, the object will appear red or yellow. But when it is on the pofition *k l*, the more refrangible rays being then predominant, it will appear tinged with blue and violet.

VI. *The Solar Magic Lantern.*

Procure a box, of about a foot high, and eighteen inches wide, or fuch other fimilar dimenfions as you fhall think fit, and about three inches deep. Two of the oppofite fides of this box muft be quite open; and in each of the other fides let there be a groove, wide enough to pafs a ftiff paper or pafteboard. This box muft be faftened againft a window on which the fun's rays fall direct. The reft of the window fhould be clofed up, that no light may enter. Provide feveral fheets of ftiff paper, which muft be blacked on one fide. On thefe papers cut out fuch figures as you fhall think proper; and placing them alternately in the grooves of the box, with their blacked fides towards you, look at them through a large and clear glafs prifm: and if the light be ftrong, they will appear to be painted with the moft lively colours in nature. If you cut on one of thefe papers the form of the rainbow, about three quarters of an inch wide, you will have a lively reprefentation of that in the atmofphere.

This experiment may be further diverfified, by pafting very thin papers, lightly painted with different colours, over fome of the parts that are cut out: which will appear to change their colours when viewed through the prifm, and to ftand out from the paper, at different diftances, according to the different degrees of refrangibility of the colours with which they are painted. For greater convenience, the prifm may be placed in a ftand on a table, at the height of your eye, and made to turn round on an axis, that when you have got an agreeable profpect, you may fix it in that pofition.

VII. *The Prifmatic Camera Obfcura.*

Make two holes F *f*, fig. 5. in the fhutter of a dark chamber, near to each other; and againft each hole place a prifm ABC, and *a b c*, in a perpendicular direction, that their fpectrums NM may be caft on the paper in a horizontal line, and coincide with each other; the red and violet of the one being in the fame part with thofe of the other. The paper fhould be placed at fuch a diftance from the prifms that the fpectrum may be fufficiently dilated. Provide feveral papers nearly of the fame dimenfions with the fpectrum: crofs thefe papers, and draw lines parallel to the divifions of the colours. In thefe divifions cut out fuch figures as you fhall find will have an agreeable effect, as flowers, trees, animals, &c. When you have placed one of thefe papers in its proper pofition, hang a black cloth or paper behind it, that none of the rays that pafs through may be reflected and confufe the phenomenon. The figures cut on the paper will then appear ftrongly illuminated with all the original colours of nature. If while one of the prifms remains at reft, the other be revolved on its axis, the continual

* In the firft pofition of the glaffes, the quantity of blue and yellow being equal, the fame fort of green was conftantly vifible; but by thus inverting the glaffes, the quantity of the colours being conftantly unequal, a very pleafing variety of tints is produced.

alteration of the colours will afford a pleafing variety; which may be further increafed by turning the prifm round in different directions. When the prifms are fo placed that the two fpectrums become coincident in an inverted order of their colours, the red end of one falling on the violet end of the other; if they be then viewed through a third prifm DH, held parallel to their length, they will no longer appear coincident, but in the form of two diftinct fpectrums, *pt* and *nm* (fig. 6.), croffing one another in the middle, like the letter X: the red of one fpectrum and the violet of the other, which were coincident at NM, being parted from each other by a greater refraction of the violet to *p* and *m*, than that of the red to *n* and *t*. This experiment may be further diverfified by adding two other prifms, that fhall form a fpectrum in the fame line, and contiguous to the other; by which not only the variety of figures, but the viciffitude of colours, will be confiderably augmented.

VIII. *The diatonic Scale of Colours.*

THE illuftrious Newton, in the courfe of his inveftigations of the properties of light, difcovered that the length of the fpaces which the feven primary colours poffefs in the fpectrum, exactly correfponds to thofe of chords that found the feven notes in the diatonic fcale of mufic. This is fhewn by the following experiment: On a paper in a dark chamber, let a ray of light be largely refracted into the fpectrum AFTMGP fig. 7. and mark the precife boundaries of the feveral colours, as *a*, *b*, *c*, &c. Draw lines from thofe points perpendicular to the oppofite fide, and you will find that the fpaces M *r f* F, by which the red is bounded; *r g e f*, by which the orange is bounded; *q p e d*, by which the yellow is bounded, &c. will be in exact proportion to the divifions of a mufical chord for the notes of an octave; that is, as the intervals of thefe numbers $1, \frac{8}{9}, \frac{5}{6}, \frac{3}{4}, \frac{2}{3}, \frac{3}{5}, \frac{9}{16}, \frac{1}{2}$.

IX. *Colorific Mufic.*

FATHER CASTEL, a Frenchman, in a curious book he has publifhed on chromatics, fuppofes the note *ut* to anfwer to blue in the prifmatic colours; the note *re* to yellow, and *mi* to red. The other tones he refers to the intermediate colours; from whence he conftructs the following gamut of colorific mufic:

Ut, *Blue*—Ut fharp, *Sea-green*—Re, *Bright-green*—Re-fharp, *Olive green*,—Mi, *Yellow*—Fa, *Aurora*—Fa fharp, *Orange*—Sol, *Red*—Sol fharp, *Crimfon*—La, *Violet*—La fharp, *Blue Violet*—Si, *Sky blue*.

This gamut, according to his plan, is to be continued in the fame manner for the following octave; except that the colours are to be more vivid. He fuppofes that thefe colours, by ftriking the eye in the fame fucceffion as the founds (to which he makes them analogous) do the ear, and in the fame order of time, they will produce correfpondent fenfations of pleafure in the mind. It is on thefe general principles, which F. Caftel has elucidated in his treatife, that he has endeavoured, though with little fuccefs, to eftablifh his ocular harpfichord.

The conftruction of this inftrument, as here explained, will fhow that the effects produced by colours by no means anfwer thofe of founds, and that the principal relation there is between them confifts in the duration of the time that they refpectively affect the fenfes.

Between two circles of pafteboard, of ten inches diameter, AB and CD fig. 8, inclofe a hollow pafteboard cylinder E, 18 inches long. Divide this cylinder into fpaces half an inch wide, by a fpiral line that runs round from the top to the bottom, and divide its furface into fix equal parts by parallel lines, drawn between its two extremities; as is expreffed in the figure. Let the circle AB, at top, be open; and let that at bottom, CD, be clofed, and fupported by an axis or fcrew, of half an inch diameter, which muft turn freely in a nut placed at the box we fhall prefently defcribe. To the axis juft mentioned adjuft a wooden wheel G, of two inches and a half in diameter, and that has 12 or 15 teeth, which take the endlefs fcrew H. Let this cylinder be inclofed in a box ILMN (fig. 9.) whofe bafe is fquare, and at the bottom there is a nut, in which the axis F turns. Obferve that the endlefs fcrew H fhould come out of the box, that it may receive the handle O, by which the cylinder is to be turned.

This box being clofed all round, place over it a tin covering A, which will be perforated in different parts; from this cover there muft hang three or four lights, fo placed that they may ftrongly illuminate the infide of the cylinder. In one fide of this box (which fhould be covered with pafteboard) cut eight apertures *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, fig. 9. of half an inch wide, and $\frac{1}{3}$ of an inch high; they muft be directly over each other, and the diftance between them muft be exactly two inches. It is by thefe openings, which here correfpond to the mufical notes, that the various colours analogous to them are to appear; and which being placed on the pafteboard cylinder, as we have fhown, are reflected by means of the lights placed within it.

It is eafy to conceive, that when the handle O is turned, the cylinder in confequence rifing half an inch, if it be turned five times round, it will fucceffively fhow, at the openings made in the fide of the box, all thofe that are in the cylinder itfelf, and which are ranged according to the direction of the inclined lines drawn on it. It is therefore according to the duration of the notes which are to be expreffed, that the apertures on the cylinder are to be cut. Obferve, that the fpace between two of the parallel lines drawn vertically on the cylinder, is equal to one meafure of time; therefore, for every turn of the cylinder, there are fix meafures, and thirty meafures for the air that is to be played by this inftrument. The feveral apertures being made in the fide of the cylinder, in conformity to the notes of the tune that is to be expreffed, they are to be covered with double pieces of very thin paper, painted on both fides with the colours that are to reprefent the mufical notes.

This experiment might be executed in a different maner, and with much greater extent; but as the entertainment would not equal the trouble and expence, we have thought it fufficient to give the above piece, by which the reader will be enabled to judge how far the analogy thus whimfically fuppofed by Father Caftel really exifts.

CHRONIC, or CHRONICAL, among phyficians, an appellation given to difeafes that continue a long time: in contradiftinction to thofe that foon terminate, and are called *acute*. Thus they fpeak of *chronic* rheumatifm, *chronic* inflammation, &c.

CHRONICLE, in matters of literature, a fpecies or kind of hiftory difpofed according to the order of time, and agreeing in moft refpects with annals. See ANNALS.

Books of CHRONICLES, a canonical writing of the Old Teftament. It is uncertain which were written firft, *The Books of Kings*, or *The Chronicles*, fince they each refer to the other. However it be, the latter is often more full and comprehenfive than the former. Whence the Greek interpreters call thefe two books Παραλειπομενα, *Supplements, Additions*, becaufe they contain fome circumftances which are omitted in the other hiftorical books. The Jews make but one book of the Chronicles, under the title of *Dibre-Haiamim*, i. e. *Journals* or *Annals*. Ezra is generally believed to be the author of thefe books. It is certain they were written after the end of the Babylonifh captivity and the firft year of the reign of Cyrus, of whom mention is made in the laft chapter of the fecond book.

The *Chronicles*, or *Paraleipomena*, are an abridgement of all the facred hiftory, from the beginning of the Jewifh nation to their firft return from the captivity, taken out of thofe books of the Bible which we ftill have, and out of other annals which the author had then by him. The defign of the writer was to give the Jews a feries of their hiftory. The firft book relates to the rife and propagation of the people of Ifrael from Adam, and gives a punctual and exact account of the reign of David. The fecond book fets down the progrefs and end of the kingdom of Judah, to the very year of their return from the Babylonifh captivity.

CHRONOGRAM, a fpecies of falfe wit, confifting in this, that a certain date or epocha is expreffed by numeral letters of one or more verfes; fuch is that which makes the motto of a medal ftruck by Guftavus Adolphus in 1632: ChrIftUs DVX; ergo trIVMphVs.

CHRONOLOGY,

AS a fcience, treats of time, the method of meafuring its parts, and adapting thefe, when diftinguifhed by proper marks and characters, to paft tranfactions, for the illuftration of hiftory. It therefore confifts of two parts: the firft treats of the proper meafurement of time, and the adjuftment of its feveral divifions; the fecond, of fixing the dates of the various events recorded in hiftory, and ranging them according to the feveral divifions of time, in the order in which they happened.

Chronology, comparatively fpeaking, is but of modern date. The ancient poets appear to have been entirely unacquainted with it; and Homer, the moft celebrated of them all, mentions nothing like a formal kalendar in any part of his writings. In the moft early periods, the only meafurement of time was by the feafons, the revolutions of the fun and moon: and many ages muft have elapfed before the mode of computation by dating events came into general ufe. Several centuries intervened between the era of the olympic games and the firft hiftorians; and feveral more between thefe and the firft authors of chronology. When time firft began to be reckoned, we find its meafures very indeterminate; and this circumftance renders the hiftorians of the early periods remarkably uncertain. Even after the invention of dates and eras, we find the ancient hiftorians very inattentive to them, and inaccurate in their computations. Frequently their eras and years were reckoned differently without their being fenfible of it, or at leaft without giving the reader any information concerning it; a circumftance which has rendered the fragments of their works now remaining, of very little ufe to pofterity. The Chaldean and Egyptian writers are generally acknowledged to be fabulous; and Strabo acquaints us, that Diodorus Siculus, and the other early hiftorians of Greece, were ill informed and credulous. Hence the difagreement among the ancient hiftorians, and the extreme confufion and contradiction we meet with on comparing their works.

From thefe obfervations it is obvious how neceffary a proper fyftem of chronology muft be for the right underftanding of hiftory, and likewife how very difficult it muft be to eftablifh fuch a fyftem. In this, however, feveral learned men have excelled, and their fyftems have been founded, 1. On aftronomical obfervations, particularly of the eclipfes of the fun and moon, combined with the calculations of the eras and years of different nations. 2. The teftimonies of credible authors. 3. Thofe epochs in hiftory which are fo well attefted and determined, that they have never been controverted. 4. Ancient medals, coins, monuments, and infcriptions. None of thefe, however, can be fufficiently intelligible without an explanation of the firft part, which, we have already obferved, confiders the divifion of time, and of which therefore we fhall treat in the firft place.

The moft obvious divifion of time is derived from the apparent revolutions of the celeftial bodies, particularly of the fun, which, by the viciffitudes of day and night, becomes evident to the moft barbarous and ignorant nations. Strictly fpeaking, the word *day* fignifies only that portion of time during which the fun diffufes light on any part of the earth; but in the moft comprehenfible fenfe, it includes the night alfo, and is called by chronologers a *civil* day: by aftronomers a *natural*, and fometimes an *artificial* day.

By a civil day is meant the interval betwixt the fun's departure from any given point in the heavens and next return to the fame, with as much more as anfwers to its diurnal motion eaftward, which is at the rate of 59 minutes and 8 feconds of a degree, or 3 minutes and 57 feconds of time. It is alfo called a *folar* day, and is longer than a *fidereal* one, infomuch that if the former be divided into 24 equal parts or hours, the latter will confift only of 23 hours 56 minutes. The apparent inequality of the fun's motion, likewife, arifing from the obliquity of the ecliptic, produces another inequality in the length of the days: and hence the difference betwixt real and apparent time, fo that the apparent motion of the fun cannot always be a true meafure of duration. Thofe inequalities, however, are capable of being reduced to a general ftandard, which furnifhes an exact meafure throughout the year; whence arifes the difference between mean and apparent time, as is explained under the article ASTRONOMY.

There have been very confiderable differences among nations with regard to the beginning and ending of their days. The beginning of the day was counted from fun-rife by the Babylonians, Syrians, Perfians, and Indians. The civil day of the Jews was begun from fun-rife, and their facred one from funfet; the latter mode of computation being followed by the Athenians, Arabs, ancient Gauls, and other European nations. According to fome, the Egyptians began their day at fun-fet, while others are of opinion that they computed from noon or from fun-rife: and Pliny informs us that they computed their civil day from one midnight to another. It is probable, however, that they had different modes of computation in different provinces or cities. The Aufonians, the moft ancient inhabitants of Italy, computed the day from midnight; and the aftronomers of Cathay and Oighur in the Eaft Indies reckoned in the fame manner. This mode of computation was adopted by Hipparchus, Copernicus, and other aftronomers, and is now in common ufe among ourfelves. The *aftronomical* day, however, as it is called, on account of its being ufed in aftronomical calculations, commences at noon, and ends at the fame time the following day. The Mahometans reckon from one twilight to another; and in Italy they practife a ftrange method of computation, the civil day commencing at fome indeterminate point after funfet; whence it happens, that the time of noon varies with the feafon of the year. At the fummer folftice, the clock ftrikes 16 at noon, and 19 at the time of the winter folftice. Thus alfo the length of each day differs by feveral minutes from that immediately preceding or following it.

The fubdivifions of the day have not been lefs various than the computations of the day itfelf. The moft obvious divifion, and which could at no time, nor in any age, be miftaken, was that of morning and evening. In procefs of time the two in-

termediate points of noon and midnight were determined; and this diviſion into quarters was in uſe long before the invention of hours. From this ſubdiviſion probably aroſe the method uſed by the Jews and Romans of dividing the day and night into four vigils or watches. The firſt began at ſun-riſing, or ſix in the morning; the ſecond at nine; the third at twelve; and the fourth at three in the afternoon. In like manner alſo the night was divided into four parts. At what time the more minute ſubdiviſion of the day into hours firſt commenced is uncertain. It does not appear from the writings of Moſes that he was acquainted with it, as he mentions only the morning, mid-day, evening, and ſun-ſet.

The eaſtern nations divide the day and night in a very ſingular manner; the origin of which is not eaſily diſcovered. The Chineſe have five watches in the night, which are announced by a certain number of ſtrokes on a bell or drum. They begin by giving one ſtroke, which is anſwered by another; and this is repeated at the diſtance of a minute or two, until the ſecond watch begin, which is announced by two ſtrokes; and ſo on throughout the reſt of the watches. By the ancient Tartars, Indians, and Perſians, the day was divided into eight parts, each of which contained ſeven hours and a half. The Indians on the coaſt of Malabar divide the day into ſix parts, called *najika*; each of theſe ſix parts is ſubdivided into 60 others, called *venaigas*; the venaiga into 6 *birpes*; the birpe into 10 *kenikans*; the kenikan into four *mattires*; the mattire into eight *kannimas* or *caignodes*; which diviſions, according to our mode of computation, ſtand as follow:

Najika,	Venaiga,	Birpe,	Kenikan,	Mattire,	Caignode.
24 min.	24 ſec.	4 ſec.	$\frac{2}{5}$ ſec.	$\frac{1}{10}$ ſec.	$\frac{1}{80}$ ſec.

The day of the Chineſe is begun at midnight, and ends with the midnight following. It is divided into twelve hours, each diſtinguiſhed by a particular name and figure. They alſo divide the natural day into 100 parts, and each of theſe into 100 minutes; ſo that the whole contains 10,000 minutes. In the northern parts of Europe, where only two ſeaſons are reckoned in the year, the diviſions of the day and night are conſiderably larger than with us; 24 hours being moſtly divided into eight parts.

The modern diviſions of the hour in uſe among us are into minutes, ſeconds, fourths, &c. each being a ſixtieth part of the former ſubdiviſion. By the Chaldæans, Jews, and Arabians, the hour is divided into 1080 ſcruples; ſo that one hour contains 60 minutes, and one minute 18 ſcruples. The ancient Perſians and Arabs were likewiſe acquainted with this diviſion; but the Jews are ſo fond of it, that they pretend to have received it in a ſupernatural manner.

The diviſion of the day being aſcertained, it ſoon became an object to indicate in a public manner the expiration of any particular hour or diviſion; as without ſome general knowledge of this kind, it would be in a great meaſure impoſſible to carry on buſineſs. The methods of announcing this have been likewiſe very different. Among the Egyptians it was cuſtomary for the prieſts to proclaim the hours like watchmen among us. The ſame method was followed at Rome; nor was there any other method of knowing the hours until the year 293 B. C. when Papirius Curſor firſt ſet up a ſun-dial in the capitol. A ſimilar method is practiſed among the Turks, whoſe prieſts proclaim from the top of their moſques, the cock-crowing, day-break, mid-day, three o'clock in the afternoon, and twilight, being their appointed times of worſhip.

As this method of proclaiming the hour could not but be very inconvenient, as well as imperfect, the introduction of an inſtrument which every one could have in his poſſeſſion, and which might anſwer the ſame purpoſe, muſt have been conſidered as a valuable acquiſition. One of the firſt of theſe was the *clepſydra* or water-clock. See CLEPSYDRA. Various kinds of theſe were in uſe among the Egyptians at a very early period. The clepſydra, however, was ſucceeded by the gnomon or ſun-dial, which at firſt was no more than a ſtile erected perpendicularly to the horizon; and it was a long time before the principles of it came to be thoroughly underſtood. The invention is with great probability attributed to the Babylonians.

It was not till long after the invention of dials that mankind began to form any idea of clocks; nor is it well known at what period they were firſt invented. A clock was ſent by pope Paul I. to Pepin king of France, which at that time was ſuppoſed to be the only one in the world. A very curious one was alſo ſent to Charles the Great from the khalif Haroun Alraſchid, which the hiſtorians of the time ſpeak of with ſurpriſe and admiration: but the greateſt improvement was that of Mr. Huygens, who added the pendulum to it. Still, however, the inſtruments for dividing time are inaccurate for nice purpoſes; becauſe of the expanſion of the materials by heat, and their contraction by cold, which cauſe a very perceptible alteration in the going of an inſtrument in the ſame place at different times of the year, and much more if carried from one climate to another.

Various methods have been contrived to correct this; which indeed can be done very effectually at land by a certain conſtruction of the pendulum; but at ſea, where a pendulum cannot be uſed, the inaccuracy is of much greater conſequence: nor was it thought poſſible to correct the errors ariſing from theſe cauſes in any tolerable degree, until the late invention of Mr. Harriſon's time-piece, which may be conſidered as making perhaps as near an approach to perfection as poſſible.

We now proceed to the larger diviſions of time; which more properly belong to chronology, and which muſt be kept on record, as no inſtrument can be made to point them out. Of theſe the diviſion into weeks of ſeven days is one of the moſt ancient, and probably took place from the creation of the world. Some indeed are of opinion, that the week was invented ſome time after for the more convenient notation of time; but whatever may be in this, we are certain that it is of the higheſt antiquity, and even the moſt rude and barbarous nations have made uſe of it. It is ſingular indeed that the Greeks, notwithſtanding their learning, ſhould have been ignorant of this diviſion; and M. Goguet informs us, that they were almoſt the only nation who were ſo. By them the month of 30 days was divided into three times 10, and the days of it named accordingly. Thus the 15th day of the month was called the *ſecond fifth*, or fifth of the ſecond tenth; and the 24th was called the *third fourth*, or the fourth day of the third tenth. This method was in uſe in the days of Heſiod, and it was not until ſeveral ages had elapſed, that the uſe of weeks was received into Greece from the Egyptians. The inhabitants of Cathay, in the northern part of China, were likewiſe unacquainted with the week of ſeven days, but divided the year into ſix parts of 60 days each. They had alſo a cycle of 15 days, which they uſed as a week. The week was likewiſe unknown to the ancient Perſians and to the Mexicans; the former having a different name for every day of the month, and the latter making uſe of a cycle of 13 days. By almoſt all other nations the week of ſeven days was made choice of.

It is remarkable, that one day in the week has always been held ſacred by every nation. Thus Saturday was conſecrated to pious purpoſes among the Jews, Friday by the Turks, Tueſday by the Africans of Guinea, and Sunday by the Chriſtians. Hence alſo the origin of *Feriæ* or holidays, frequently made uſe of in ſyſtems of chronology; and which roſe from the following circumſtance. In the church of Rome the old eccleſiaſtical year began with Eaſter-week; all the days of which were called *Feriæ* or *Feriati*, that is, holy, or ſacred days; and in proceſs of time the days of the other weeks came to be diſtinguiſhed by the ſame appellation, for the two following reaſons: 1. Becauſe every day ought to be holy in the eſtimation of a chriſtian. 2. Becauſe all

days are holy to ecclefiaftics, whofe time ought to be entirely devoted to religious worfhip.—The term *week* is fometimes ufed to fignify feven years, not only in the prophetical writings, but likewife by profane authors; thus Varro, in his book infcribed *Hebdomades*, informs us, that he had then entered the 12th week of his years.

The divifion of time into *months* appears to have been, if not coeval with the creation, at leaft in ufe before the flood. As this divifion is naturally pointed out by the revolution of the moon, the months of all nations were originally lunar; until after fome confiderable advances had been made in fcience, the revolutions of that luminary were compared with the fun, and thus the limits of the month fixed with greater accuracy. The divifion of the year into 12 months, as being founded on the number of full revolutions of the moon in that time, has alfo been very general; though Sir John Chardin informs us, that the Perfians divided the year into 24 months; and the Mexicans into 18 months of 20 days each. The months generally contained 30 days, or 29 and 30 days alternately; though this rule was far from being without exception. The months of the Latins confifted of 16, 18, 22, or 36 days; and Romulus gave his people a year of 10 months and 304 days. The Kamtfchatkadales divide the year into 10 months; reckoning the time proper for labour to be nine months, and the winter feafon, when they are obliged to remain inactive, only as one month.

It has been a very ancient cuftom to give names to the different months of the year, though this appears to have been more modern than the departure of the Ifraelites out of Egypt, as they would otherwife undoubtedly have carried it with them; but for a confiderable time after their fettlement in Canaan, they diftinguifhed the months only by the names firft, fecond, &c. After their return from the Babylonifh captivity, they adopted the names given to the months by the Chaldeans. Other nations adopted various names, and arranged the months themfelves according to their fancy. From this laft circumftance arifes the variety in the dates of the months; for as the year has been reckoned from different figns in the ecliptic, neither the number nor the quantity of months has been the fame, and their fituation has likewife been altered by the intercalations neceffary to be made. Thefe intercalations were requifite on account of the excefs of the folar above the lunar year; and the months compofed of intercalary days are likewife called *embolifmal*. Thefe embolifmal months are either *natural* or *civil*. By the former, the folar and lunar years are adjufted to one another; and the latter arifes from the defect of the civil year itfelf. The *Adar* of the Jews, which always confifts of 30 days, is an example of a natural embolifmal month.

The Romans divided their months into kalends, nones, and ides. The firft was derived from an old word *calo*, "to call"; becaufe, at every new moon, one of the lower clafs of priefts affembled the people, and called over, or announced, as many days as intervened betwixt that and the nones, in order to notify the difference of times and the return of feftivals. The 2d, 3d, 4th, 5th, 6th, and 7th of March, May, July, and October, were the nones of thefe months; but in the other months were the 2d, 3d, 4th, and 5th days only. Thus the 5th of January was its nones; the 4th was *pridie nonarum*; the 3d *tertio nonarum*, &c. The ides contained eight days in every month, and were nine days diftant from the nones. Thus the 15th day of the four months already mentioned was the ides of them; but in the others the 13th was accounted as fuch; the 12th was *pridie iduum*, and the 11th *tertio iduum*. The ides were fucceeded by the kalends; the 14th of January, for inftance, being the 19th kalend of February; the 15th was the 18th kalend; and fo on till the 31ft of January, which was *pridie kalendarum*; and February 1ft was the kalends. With the European nations the month is either aftronomical or civil. The former is meafured by the motion of the heavenly bodies; the civil confifts of a certain number of days fpecified by the laws, or by the civil inftitutions of any nation or fociety. The aftronomical months, being for the moft part regulated by the motions of the fun and moon, are thus divided into folar and lunar, of which the former is alfo fometimes called *civil*. The aftonomical folar month is the time which the fun takes up in paffing through a fign of the ecliptic. The lunar month is periodical, fynodical, fidereal, and civil. The fynodical lunar month is in the time that paffes between any conjunction following. It includes the motion of the fun eaftward during that time; fo that a mean lunation confifts of 29d. 12h. 44′ 2″ 8921. The fidereal lunar month is the time of the mean revolution of the moon with regard to the fixed ftars. As the equinoctial points go backwards about 4′, in the fpace of a lunar month, the moon muft, in confequence of this retroceffion, arrive at the equinox fooner than at any fixed ftar, and confequently the mean fidereal revolution muft be longer than the mean periodical one. The latter confifts of 27d. 7h. 43′ 4″ 6840. The civil lunar month is computed from the moon, to anfwer the ordinary purpofes of life; and as it would have been inconvenient, in the computation of lunar months, to have reckoned odd parts of days, they have been compofed of 30 days, or of 29 and 30 alternately, as the neareft round numbers. When the month is reckoned from the firft appearance of the moon after her conjunction, it is called the *month of illumination*. The Arabs, Turks, and other nations, who ufe the era of the Hegira, follow this method of computation. As the twelve lunar months, however, are 11 days lefs than a folar year, Julius Cæfar ordained that the month fhould be reckoned from the courfe of the fun, and not of the moon; and that they fhould confift of 30 and 31 days alternately, February only excepted, which was to confift of 28 commonly, and of 29 in leap-years.

But the higheft natural divifion of time is into *years*. At firft, it is probable that the courfe of the fun through the ecliptic would not be obferved, but that all nations would meafure their time by the revolutions of the moon. We are certain, at leaft, that the Egyptian year confifted originally of a fingle lunation; though at length it included two or three months, and was determined by the ftated returns of the feafons. As the eaftern nations, however, particularly the Egyptians, Chaldeans, and Indians, applied themfelves in very early periods to aftronomy, they found, by comparing the motion of the fun and moon together, that one revolution of the former included nearly 12 of the latter. Hence a year of 12 lunations was formed, in every one of which were reckoned 30 days; and hence alfo the divifion of the ecliptic into 360 degrees. The lunifolar year, confifting of 360 days, was in ufe long before any regular intercalations were made; and hiftorians inform us, that the year of all nations was lunifolar. Herodotus relates, that the Egyptians firft divided the year into 12 parts by the affiftance of the ftars, and that every part confifted of 30 days. The Thebans corrected this year by adding five intercalary days to it. The old Chaldean year was alfo reformed by the Medes and Perfians; and fome of the Chinefe miffionaries have informed us, that the lunifolar year was alfo corrected in China; and that the folar year was afcertained in that country to very confiderable exactnefs. The Latin year, before Numa's correction of it, confifted of 360 days, of which 304 were divided into ten months; to which were added two private months not mentioned in the kalendar.

The imperfection of this method of computing time is now very evident. The lunifolar year was about 5¼ days fhorter than the true folar year, and as much longer than the lunar. Hence the months could not long correfpond with the feafons; and even in fo fhort a time as 34 years, the winter months would have changed places with thofe of the fummer. From this rapid va-

riation, Mr. Playfair takes notice that a paſſage in Herodotus, by which the learned have been exceedingly puzzled, may receive a ſatisfactory ſolution, *viz.* that "in the time of the Egyptian kings, the ſun had twice ariſen in the place where it had formerly ſet, and twice ſet where it had ariſen." By this he ſuppoſes it is meant, "that the beginning of the year had twice gone through all the ſigns of the ecliptic; and that the ſun had riſen and ſet twice in every day and month in the year." This, which ſome have taken for a proof of moſt extravagant antiquity, he further obſerves, might have happened in 138 years only; as in that period there would be a difference of nearly two years between the ſolar and lunar year. Such evident imperfections would produce a reformation every where; and accordingly we find that there was no nation which did not adopt the method of adding a few intercalary days at certain intervals. We are ignorant, however, of the perſon who was the firſt inventor of this method.

The Egyptian ſolar year being almoſt ſix hours ſhorter than the true one, this inaccuracy, in proceſs of time, produced another revolution; ſome circumſtances attending which ſerve to fix the date of the diſcovery of the length of the year, and which, from the above deſcription of the golden circle, we may ſuppoſe to have been made during the reign of Oſymandyas. The inundation of the Nile was annually announced by the heliacal riſing of Sirius, to which the reformers of the kalendar adjuſted the beginning of the year, ſuppoſing that it would remain immoveable. In a number of years, however, it appeared that their ſuppoſitions in this were ill-founded. By reaſon of the inequality above mentioned, the heliacal riſing of Sirius gradually advanced nearly at the rate of one day in four years; ſo that in 1461 years it completed a revolution, by riſing on every ſucceeding day of the year, and returning to the point originally fixed for the beginning of the year. This period, equal to 1460 Julian years, was termed the *great Egyptian year*, or *canicular cycle*. From the accounts we have of the time that the canicular cycle was renewed, the time of its original commencement may be gathered with tolerable certainty. This happened, according to Cenſorinus, in the 138th year of the Chriſtian era. Reckoning backward therefore from this time for 1460 years, we come to the year B. C. 1322, when the ſun was in Cancer, about 14 or 15 days after the ſummer ſolſtice, which happened on July 5th. The Egyptians uſed no intercalation till the time of Auguſtus, when the corrected Julian year was received at Alexandria by his order; but even this order was obeyed only by the Greeks and Romans who reſided in that city; the ſuperſtitious natives refuſing to make any addition to the length of a year which had been ſo long eſtabliſhed among them. We are not informed at what preciſe period the true year was obſerved to conſiſt of nearly ſix hours more than 365 days.

The year of the ancient Jews was luniſolar; and we are informed by tradition, that Abraham preſerved in his family, and tranſmitted to poſterity, the Chaldean form of the year, conſiſting of 360 days; which remained the ſame without any correction until the date of the era of Nabonaſſar. The ſolar year was adopted among them after their return from the Babyloniſh captivity; but when ſubjected to the ſucceſſors of Alexander in Syria, they were obliged to admit the lunar year into their kalendar. In order to adjuſt this year to the courſe of the ſun, they added at certain periods a month Adar, formerly mentioned, and called it *Ve Adar*. They compoſed alſo a cycle of 19 years, in ſeven of which they inſerted the intercalary month. This correction was intended to regulate the months in ſuch a manner, as to bring the 15th of Niſan to the equinoctial point; and likewiſe the courſes of the ſeaſons and feaſts in ſuch a manner, that the corn might be ripe at the paſſover, as the law required.

It would be waſte of time to give any farther accounts of the years made uſe of by different nations, all of which are reſolved at laſt into the luniſolar; it will be ſufficient, therefore, to mention the improvements in the kalendar made by the two great reformers of it, Julius Cæſar, and Pope Gregory XIII. As the inſtitution of the Roman year by Romulus was evidently very imperfect, Numa, on his advancement to the throne, undertook to reform it. With a deſign to make a complete lunar year of it, he added 50 days to the 304 of Romulus; and from every one of his months, which conſiſted of 31 and 30 days, he borrowed one day. Of theſe additional days he compoſed two months; calling the one January, and the other February. Various other corrections and adjuſtments were made. But when Julius Cæſar obtained the ſovereignty of Rome, he found that the months had conſiderably receded from the ſeaſons to which Numa had adjuſted them. To bring them forward to their places, he formed a year of 15 months, or 445 days; which, on account of its length, and the deſign with which it was formed, has been called the *year of confuſion*. It terminated on the firſt of January 45 B. C. and from this period the civil year and months were regulated by the courſe of the ſun. The year of Numa being ten days ſhorter than the ſolar year, two days were added by Julius to every one of the months of January, Auguſt, and December; and one to April, June, September, and November. He ordained likewiſe, that an intercalary day ſhould be added every fourth year to the month of February, by reckoning the 24th day, or ſixth of the kalends of March, twice over. Hence this year was ſtyled *biſſextile*, and alſo *leap year*, from its leaping a day more than a common year.

Modern Chronologiſts have adopted the Julian year as being a meaſure of time extremely ſimple and ſufficiently accurate. It is ſtill, however, ſomewhat imperfect; for as the true ſolar year conſiſts of 365d. 5h. 48′ 45½″, it appears that in 131 years after the Julian correction, the ſun muſt have arrived one day too ſoon at the equinoctial point. During Cæſar's reign the vernal equinox had been obſerved by Soſigenes on the 25th of March; but by the time of the Nicene council it had gone backward to the 21ſt. The cauſe of this error was not then known; but in 1582, when the equinox happened on the 11th of March, it was thought proper to give the kalendar its laſt correction. Pope Gregory XIII. having invited to Rome a conſiderable number of mathematicians and aſtronomers, employed ten years in the examination of their ſeveral formulæ, and at laſt gave the preference to that of Aloſia and Antonius Lelius, who were brothers. Ten days were now cut off in the month of October, and the 4th of that month was reckoned the 15th. To prevent the ſeaſons from receding in the time to come, he ordained that one day ſhould be added every fourth or biſſextile year as before; and that the 1600th year of the Chriſtian era, and every fourth century thereafter, ſhould be a biſſextile or leap year. One day therefore is to be intercalated in the years 2000, 2400, 2800, &c. but in the other centuries, as 1700, 1800, 1900, 2100, &c. it is to be ſuppreſſed, and theſe are to be reckoned as common years. Even this correction, however, is not abſolutely exact; but the error muſt be very inconſiderable, and ſcarce amounting to a day and a half in 5000 years.

The commencement of the year has been determined by the date of ſome memorable event or occurrence, ſuch as the creation of the world, the univerſal deluge, a conjunction of planets, the incarnation of our Saviour, &c. and of courſe has been referred to different points in the ecliptic. The Chaldean and the Egyptian years were dated from the autumnal equinox. The eccleſiaſtical year of the Jews began in the ſpring; but, in civil affairs, they retained the epoch of the Egyptian year. The ancient Chineſe reckoned from the new moon neareſt to the middle of Aquarius; but, according to ſome recent accounts, the beginning of their year was transferred (B. C. 1740) to the new moon neareſt to the winter ſolſtice. This likewiſe is the

date of the Japanefe year. Diemfchid, or Gemfchid, king of Perfia, obferved, on the day of his public entry into Perfepolis, that the fun entered into Aries. In commemoration of this fortunate event and coincidence, he ordained the beginning of the year to be removed from the autumnal to the vernal equinox. This epoch was denominated *Neuraz*, viz. new-day; and is ftill celebrated with great pomp and feftivity. The ancient Swedifh year commenced at the winter folftice, or rather at the time of the fun's appearance in the horizon, after an abfence of about 40 days. The feaft of this epoch was folemnized on the 20th day after the folftice. Some of the Grecian ftates computed from the vernal, fome from the autumnal equinox, and others from the fummer tropic. The year of Romulus commenced in March, and that of Numa in January. The Turks and Arabs date the year from the 16th of July: and the American Indians reckon from the firft appearance of the new moon of the vernal equinox. The church of Rome has fixed new year's day on the Sunday that correfponds with the full moon of the fame feafon. The Venetians, Florentines, and Pifans in Italy, and the inhabitants of Treves in Germany, begin the year at the vernal equinox. The ancient clergy reckoned from the 25th of March; and this method was obferved in Britain, until the introduction of the new ftyle (A. D. 1752); after which our year commenced on the 1ft day of January.

Befides thefe natural divifions of time arifing immediately from the revolutions of the heavenly bodies, there are others formed from fome of the lefs obvious confequences of thefe revolutions, which are called *cycles*, from the Greek κυκλ⊗, *a circle*. The moft remarkable of thefe are the following:

1. The *cycle of the fun* is a revolution of 28 years, in which time the days of the months return again to the fame days of the week; the fun's place to the fame figns and degrees of the ecliptic on the fame month and days, fo as not to differ one degree in 100 years; and the leap-years begin the fame courfe over again with refpect to the days of the week on which the days of the month fall. The *cycle of the moon*, commonly called the *golden number*, is a revolution of 19 years; in which time, the conjunctions, oppofitions, and other afpects of the moon, are within an hour and a half of being the fame as they were on the fame days of the months 19 years before. The *indiction* is a revolution of 15 years, ufed only by the Romans for indicating the times of certain payments made by the fubjects to the republic. It was eftablifhed by Conftantine, A. D. 312.

The year of our Saviour's birth, according to the vulgar era, was the 9th year of the folar cycle, the firft year of the lunar cycle; and the 312th year after his birth was the firft year after the Roman indiction. Therefore, to find the year of the folar cycle, add 9 to any given year of Chrift, and divide the fum by 28, the quotient is the number of cycles elapfed fince his birth, and the remainder is the cycle for the given year: If nothing remains, the cycle is 28. To find the lunar cycle, add one to the given year of Chrift, and divide the fum by 19; the quotient is the number of cycles elapfed in the interval, and the remainder is the cycle for the given year: If nothing remains, the cycle is 19. Laftly, fubftract 312 from the given year of Chrift, and divide the remainder by 15; and what remains after this divifion is the indiction for the given year: If nothing remains, the indiction is 15.

Although the above deficiency in the lunar circle of an hour and a half every 19 years be but fmall, yet in time it becomes fo fenfible as to make a whole natural day in 310 years. So that, although the cycle be of ufe, when the golden numbers are rightly placed againft the days of the month in the kalendar, as in the Common Prayer Books for finding the days of the mean conjunctions or oppofitions of the fun and moon, and confequently the time of Eafter; it will only ferve for 310 years, old ftyle. For as the new and full moons anticipate a day in that time, the golden numbers ought to be placed one day earlier in the kalendar for the next 310 years to come. Thefe numbers were rightly placed againft the days of the new moon in the kalendar, by the council of Nice, A. D. 325; but the anticipation, which has been neglected ever fince, is now grown almoft into 5 days. And therefore all the golden numbers ought now to be placed 5 days higher in the kalendar for the old ftyle, than they were at the time of the faid council; or 6 days lower for the new ftyle, becaufe at prefent it differs 11 days from the old.

In the firft of the following tables, the golden numbers under the months ftand againft the days of new moon in the left-hand column, for the new ftyle; adapted chiefly to the fecond year after leap-year, as being the neareft mean for all the four; and will ferve till the year 1900. Therefore, to find the day of new moon in any month of a given year till that time, look for the golden number of that year under the defired month, and againft it you have the day of new moon in the left hand column. Thus, fuppofe it were required to find the day of new moon in September 1789; the golden number for that year is 4, which look for under December, and right againft it, in the left-hand column, you will find 17, which is the day of new moon in that month. *N. B.* If all the golden numbers, except 17 and 6, were fet one day lower in the table, it would ferve from the beginning of the year 1900 till the end of the year 2199. The fecond table which is fubjoined fhews the golden number for 4000 years after the birth of Chrift, by looking for the even hundreds of any given year at the left-hand, and for the reft to make up that year at the head of the table; and where the columns meet, you have the golden number (which is the fame both in old and new ftyle) for the given year. Thus, fuppofe the golden number was wanted for the year 1789; look for 1700 at the left-hand of the table, and for 89 at the top of it; then gliding your eye downward from 89 to over againft 1700, you will find 4, which is the golden number for that year. But becaufe the lunar cycle of 19 years fometimes includes five leap-years, and at other times only four, this table will fometimes vary a day from the truth in leap-years after February. And it is impoffible to have one more correct, unlefs we extend it to four times 19 or 76 years: in which there are 19 leap-years without a remainder. But even then to have it of perpetual ufe, it muft be adapted to the old ftyle; becaufe, in every centurial year not divifible by 4, the regular courfe of leap-years is interrupted in the new; as will be the cafe in the year 1800.

The *cycle of Eafter*, alfo called the *Dionyfian period*, is a revolution of 532 years, found by multiplying the folar cycle 28 by the lunar cycle 19. If the new moons did not anticipate upon this cycle, Eafter-day would always be the Sunday next after the firft full moon which follows the 21ft of March. But, on account of the above anticipation, to which no proper regard was had before the late alteration of the ftyle, the ecclefiaftic Eafter has feveral times been a week different from the true Eafter within this laft century: which inconvenience is now remedied by making the table, which ufed to find Eafter for ever, in the Common Prayer Book, of no longer ufe than the lunar difference from the new ftyle will admit of. The earlieft Eafter poffible is the 22d of March, the lateft the 25th of April. Within thefe limits are 35 days, and the number belonging to each of them is called the *number of direction*; becaufe thereby the time of Eafter is found for any given year.

In our almanacks, the firft feven letters of the alphabet are commonly placed to fhew on what days of the week the days of the months fall throughout the year. And becaufe one of thofe feven letters muft neceffarily ftand againft Sunday, it is printed in a capital form, and called the *dominical letter*; the

other fix being inferted in fmall characters, to denote the other fix days of the week. Now, fince a common Julian year contains 365 days, if this number be divided by 7 (the number of days in a week) there will remain one day. If there had been no remainder, it is plain the year would conftantly begin on the fame day of the week: but fince one remains, it is plain, that the year muft begin and end on the fame day of the week; and therefore the next year will begin on the day following. Hence, when January begins on Sunday, A is the dominical or Sunday letter for that year: Then, becaufe the next year begins on Monday, the Sunday will fall on the feventh day, to which is annexed the feventh letter G, which therefore will be the domical letter for all that year: and as the third year will begin on Tuefday, the Sunday will fall on the fixth day; therefore F will be the Sunday letter for that year. Whence it is evident, that the Sunday letters will go annually in retrograde order thus, G, F, E, D, C, B, A. And, in the courfe of feven years, if they were all common ones, the fame days of the week and dominical letters would return to the fame days of the months. But becaufe there are 366 days in a leap-year, if the number be divided by 7, there will remain two days over and above the 52 weeks of which the year confifts. And, therefore, if the leap-year begins on Sunday, it will end on Monday; and the year will begin on Tuefday, the firft Sunday whereof muft fall on the fixth of January, to which is annexed the letter F, and not G, as in common years. By this means, the leap-year returning every fourth year, the order of the dominical letters is interrupted; and the feries cannot return to its firft ftate till after four times feven, or 28 years; and then the fame days of the months return in order to the fame days of the week as before.

TABLE I.

Days	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sep.*	*Oct.*	*Nov.*	*Dec.*
1	9		9	17	17	6				11		19
2		17			6	14	14	3	11		19	
3	17	6	17	6			3	11		19	8	8
4	6		6	14	14	3			19	8		16
5		14			3	11	11	19	8		16	
6	14	3	14	3			19			16	5	5
7	3		3	11	11	19		8	16			13
8		11			19	8	8	16	5	5	13	
9	11	19	11	19						13		2
10			19	1	8	16	16	5	13		2	10
11	19	8					5	13	2	2	10	
12	8	16	8	16	16	5				10		18
13					5	13	13	2	10		18	7
14	16	5	16	5			2	10	18	18	7	
15	5		5	13	13	2				7		15
16		13			2	10	10	18	7		15	
17	13	2	13	2			8	7		15	4	4
18	2		2	10	10	18			15			12
19		10			18	7	7	15	4	4	12	
20	10	18	10	18			15			12	1	1
21	18		18	7	7	15		4	12			9
22		7			15	4	4	12	1	1	9	
23	7	15	7	15			12			9	17	17
24			15	4	4	12		1	9			6
25	15	4			12		1	9	17	17	6	
26	4		4	12	1	1				6		15
27		12		1	9	9	9	17	6		14	
28	12	1	12				17	6	14	14	3	3
29	1		1	9		17				3		11
30					17	6	6	14	3		11	
31	9		9				14	3		11		19

TABLE II.

TABLE, *fhewing the Golden Number (which is the fame both in the Old and New Style), from the Chriftian Era to A. D. 4000.*

Hundreds of Years.			Years lefs than an hundred.																		
			0 19 38 57 76 95	1 20 39 58 77 96	2 21 40 59 78 97	3 22 41 60 79 98	4 23 42 61 80 99	5 24 43 62 81	6 25 44 63 82	7 26 45 64 83	8 27 46 65 84	9 28 47 66 85	10 29 48 67 86	11 30 49 68 87	12 31 50 69 88	13 32 51 70 89	14 33 52 71 90	15 34 53 72 91	16 35 54 73 92	17 36 55 74 93	18 37 56 75 94
0	1900	3800	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
100	2000	3900	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5
200	2100	4000	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10
300	2200	&c.	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
400	2300	—	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1
500	2400	—	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6
600	2500	—	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11
700	2600	—	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
800	2700	—	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2
900	2800	—	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7
1000	2900	—	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12
1100	3000	—	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1200	3100	—	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3
1300	3200	—	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8
1400	3300	—	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13
1500	3400	—	19	1	2	3	4	4	6	7	8	9	10	11	12	13	14	15	16	17	18
1600	3500	—	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4
1700	3600	—	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9
1800	3700	—	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14

From the multiplication of the folar cycle of 28 years into the lunar cycle of 19 years, and the Roman indiction of 15 years, arifes the great Julian period, confifting of 7980 years, which had its beginning 764 years before Strauchius's fuppofed year of the creation (for no later could all the three cycles begin together), and it is not yet completed: and therefore it includes all other cycles, periods, and eras. There is but one year in the whole period that has the fame numbers for the three cycles of which it is made up: and therefore, if hiftorians had remarked in their writings the cycles of each year, there had been no difpute about the time of any action recorded by them.

The Dionyfian or vulgar era of Chrift's birth was about the end of the year of the Julian period 4713; and confequently the firft year of his age, according to that account, was the 4714th year of the faid period. Therefore, if to the current year of Chrift we add 4713, the fum will be the year of the Julian period. So the year 1789 will be found to be the 6502d year of that period. Or, to find the year of the Julian period anfwering to any given year before the firft year of Chrift, fubtract the number of that given year from 4714, and the remainder will be the year of the Julian period. Thus, the year 585 before the firft year of Chrift (which was the 584th before his birth) was the 4129th year of the faid period. Laftly, to find the cycles of the fun, moon, and indiction for any given year of this period, divide the given year by 28, 19, and 15; the three remainders will be the cycles fought, and the quotients the numbers of cycles run fince the beginning of the period. So in the above 4714th year of the Julian period, the cycle of the fun was 10, the cycle of the moon 2, and the cycle of the indiction 4; the folar circle having run through 168 courfes, the lunar 248, and the indiction 314.

The vulgar era of Chrift's birth was never fettled till the year 527, when Dionyfius Exiguus, a Roman abbot, fixed it to the end of the 4713th year of the Julian period, which was four years too late; for our Saviour was born before the death of Herod, who fought to kill him as foon as he heard of his birth. And according to the teftimony of Jofephus (b. xvii. ch. 8.), there was an eclipfe of the moon in the time of Herod's laft illnefs; which eclipfe appears by our aftronomical tables to have been in the year of the Julian period 4710, March 13, at 3 hours paft midnight, at Jerufalem. Now, as our Saviour muft have been born fome months before Herod's death, fince in the interval he was carried into Egypt, the lateft time in which we can fix the true era of his birth is about the end of the 4709th year of the Julian period.

As there are certain fixed points in the heavens from which aftronomers begin their computations, fo there are certain points of time from which hiftorians begin to reckon; and thefe points or roots of time are called *eras* or *epochs*. The moft remarkable eras are, thofe of the Creation, the Greek Olympiads, the building of Rome, the era of Nabonaffar, the death of Alexander, the birth of Chrift, the Arabian Hegira, and the Perfian Jefdegird; all which, together with feveral others of lefs note, have their beginnings fixed by chronologers to the years of the Julian period, to the age of the world at thofe times, and to the years before and after the year of Chrift's birth.

The various divifions of time having been thus far noticed, we now proceed to confider the fecond part of chronology, viz. that which immediately relates to hiftory, and which has the four following foundations: 1. Aftronomical obfervations, particularly of eclipfes. 2. The teftimonies of credible authors. 3. Epochs in hiftory univerfally allowed to be true. 4. Ancient medals, coins, monuments, and infcriptions. We fhall confider thefe four principal parts in the order they here ftand.

I. It is not without great reafon that the eclipfes of the fun and moon, and the afpects of the other planets, have been called public and celeftial characters of the times, as their calculations afford chronologers infallible proofs of the precife epochs in which a great number of the moft fignal events in hiftory have occurred. So that in chronological matters we cannot make any great progrefs, if we are ignorant of the ufe of aftronomic tables, and the calculation of eclipfes. The ancients regarded the latter as prognoftics of the fall of empires, of the lofs of battles, of the death of monarchs, &c. And it is to this fuperftition, to this wretched ignorance, that we happily owe the vaft labour that hiftorians have taken to record fo great a number of them. The moft able chronologers have collected them with ftill greater labour. Calvifius, for example, founds his chronology on 144 eclipfes of the fun, and 127 of the moon, that he fays he had calculated. The grand conjunction of the two fuperior planets, Saturn and Jupiter, which, according to Kepler, occurs once in 806 years in the fame point of the zodiac, and which has happened only eight times fince the creation (the laft time in the month of December 1603), may alfo furnifh chronology with inconteftable proofs. The fame may be faid of the tranfit of Venus over the fun, which has been obferved in our days, and all the other uncommon pofitions of the planets. But among thefe celeftial and natural characters of time, there are alfo fome that are named *civil* or *artificial*, and which, neverthelefs, depend on aftronomical calculation.

Such are the folar and lunar cycles; the Roman indiction; the feaft of Eafter; the biffextile year; the jubilees; the fabbatic years; the combats and Olympic games of the Greeks; and hegira of the Mahometans, &c. And to thefe may be added the periods, eras, epochs, and years of different nations, ancient and modern. We fhall only remark on this head that the period or era of the Jews commences with the creation of the world; that of the ancient Romans with the foundation of the city of Rome; that of the Greeks at the eftablifhment of the Olympic games; that of Nebuchadnezzar, with the advancement of the firft king of Babylon to the throne; the Yezdegerdic years, with the laft king of the Perfians of that name; the hegira of the Turks, with the flight of Mahomet from Mecca to Medina, &c. The year of the birth of Chrift was the 4713th year of the Julian period, according to the common method of reckoning. Aftronomical chronology teaches us to calculate the precife year of the Julian period in which each of thefe epochs happened.

II. The *teftimony of authors* is another principal part of hiftoric chronology. Though no man whatever has a right to pretend to infallibility, or to be regarded as a facred oracle, it would, however, be making a very unjuft judgment of mankind, to treat them all as dupes or impoftors; and it would be an injury offered to public integrity, were we to doubt the veracity of authors univerfally efteemed, and of facts that are in themfelves well worthy of belief. It would be even a kind of infatuation to doubt that there have been fuch cities as Athens, Sparta, Rome, Carthage, &c. or that Xerxes reigned in Perfia, and Auguftus in Rome: whether Hannibal ever was in Italy; or that the emperor Conftantine built Conftantinople, &c. The unanimous teftimony of the moft refpectable hiftorians will not admit any doubt of thefe matters. When an hiftorian is allowed to be completely able to judge of an event, and to have no intent of deceiving by his relation, his teftimony is irrecufable.

But to avoid the danger of adopting error for truth, and to be fatisfied of a fact that appears doubtful in hiftory, we may make ufe of the four following rules, as they are founded in reafon. 1. We ought to pay a particular regard to the teftimonies of thofe who wrote at the fame time the events happened, and that have not been contradicted by any cotemporary author of known authority. Who can doubt, for example, of the truth of the facts related by Admiral Anfon, in the hiftory of his voyage round the world? The admiral faw all the facts there mentioned with his own eyes, and publifhed his book when two hundred companions of his voyage were ftill living in London, and could have contradicted him immediately, if he had given any falfe or exaggerated relations. 2. After the cotemporary authors, we fhould give more credit to thofe who lived near the time the events happened than thofe who lived at a diftance. 3. Thofe doubtful hiftories, which are related by authors that are but little known, can have no weight, if they are at vari-

ance with reaſon, or eſtabliſhed tradition. 4. We muſt diſtruſt the truth of a hiſtory that is related by modern authors, when they do not agree among themſelves in ſeveral circumſtances, nor with ancient hiſtorians, who are to be regarded as original ſources. We ſhould eſpecially doubt the truth of thoſe brilliant portraits, that are drawn at pleaſure by ſuch as never knew the perſons they are intended for, and even made ſeveral centuries after their deceaſe.

The moſt pure and moſt fruitful ſource of ancient hiſtory is doubtleſs to be found in the Holy Bible; ſince we may, by its aid, form an almoſt entire ſeries of events down to the birth of Chriſt, or the time of Auguſtus, which comprehends a ſpace of about 4000 years, ſome ſmall interruptions excepted, and which are eaſily ſupplied by profane hiſtory.

III. The *epochs* form the third principal part of chronology. Theſe are thoſe fixed points in hiſtory that have never been conteſted, and of which there can, in fact, be no doubt. Chronologers fix on the events that are to ſerve as epochs, in a manner quite arbitrary; but this is of little conſequence, provided the dates of theſe epochs agree, and that there is no contradiction in the facts themſelves. When we come to treat expreſsly on hiſtory, we ſhall mention, in our progreſs, all the principal epochs.

IV. *Medals*, *monuments*, and *inſcriptions* form the fourth and laſt principal part of chronology. It is ſcarce more than 150 years ſince cloſe application has been made to the ſtudy of theſe; and we owe to the celebrated Spanheim the greateſt obligations, for the progreſs that is made in this method: his excellent work, *De præſtantia et uſu numiſmatum antiquorum*, has ſhewn the great advantages of it; and it is evident that theſe monuments are the moſt authentic witneſſes that can be produced. It is by the aid of medals that M. Vaillant has compoſed his judicious hiſtory of the kings of Syria, from the time of Alexander the Great to that of Pompey: they have been, moreover, of the greateſt ſervice in elucidating all ancient hiſtory, eſpecially that of the Romans; and even ſometimes that of the middle ages. Their uſe is more fully ſpoken of in the article MEDALS. What we here ſay of medals, is to be underſtood equally, in its full force, of ancient inſcriptions, and of all other authentic monuments that have come down to the preſent period. It will readily be allowed that theſe four parts of chronology are excellent guides to conduct us through the thick darkneſs of antiquity. Notwithſtanding, we are free to confeſs, that theſe guides are by no means infallible, nor the proofs that they afford abſolute demonſtrations. In fact, with regard to hiſtory in general, and ancient hiſtory in particular, ſomething muſt be always left to conjecture and hiſtoric faith. It would, indeed, be criminally uncandid not to acknowledge that ſeveral writers of the greateſt reputation have made powerful objections againſt the certainty of chronology. We forbear, however, to enumerate them in this place. The wiſdom of Providence has ſo diſpoſed all things, that there remain ſufficient lights to enable us nearly to connect the ſeries of events: for in the firſt 3000 years of the world, where profane hiſtory is defective, we have the chronology of the Bible to direct us; and after that period, where we find more obſcurity in the chronology of the holy ſcriptures, we have, on the other hand, greater lights from profane authors. It is at this period that begins the time which Varro calls *hiſtoric*: as, ſince the time of the Olympiads, the truth of ſuch events as have happened ſhines clear in hiſtory. Chronology, therefore, draws its principal lights from hiſtory; and, in return, ſerves it as a guide. Referring the reader, therefore, to the article HISTORY, and the *Chart* thereto annexed, we ſhall conclude with laying before our readers the following

CHRONOLOGICAL TABLE *of Remarkable Events, Diſcoveries, and Inventions, from the Creation to the preſent Year.*

Bef. Chriſt.

4008 The creation of the world, and of Adam and Eve.

4007 The birth of Cain, the firſt who was born of a woman.

3017 Enoch, for his piety, tranſlated to heaven.

2352 The old world was deſtroyed by a deluge which continued 377 days.

2247 The tower of Babel is built about this time by Noah's poſterity, upon which God miraculouſly confounds their language, and thus diſperſes them into the different nations.

2207 About this time, Noah is, with great probability, ſuppoſed to have parted from his rebellious offspring, and to have led a colony of ſome of the more tractable into the eaſt, and there either he or one of his ſucceſſors to have founded the ancient Chineſe monarchy.

2234 The celeſtial obſervations are begun at Babylon, the city which firſt gave birth to learning and the ſciences.

2188 Miſraim, the ſon of Ham, founds the kingdom of Egypt, which laſted 1663 years, down to the conqueſt of Cambyſes, in 525 before Chriſt.

2059 Ninus, the ſon of Belus, founds the kingdom of Aſſyria, which laſted above 1000 years, and out of its ruins were formed the Aſſyrians of Babylon, thoſe of Nineveh, and the kingdom of the Medes.

1985 The covenant of God made with Abram, when he leaves Haran to go into Canaan, which begins the 430 years of ſojourning.

1961 The cities of Sodom and Gomorra are deſtroyed for their wickedneſs by fire from heaven.

1856 The kingdom of Argos, in Greece, begins under Inachus.

1822 Memnon, the Egyptian, invents letters.

1715 Prometheus firſt ſtruck fire from flints.

1635 Joſeph died in Egypt.

1574 Aaron born in Egypt, 1490, appointed by God firſt high-prieſt of the Iſraelites.

1571 Moſes, brother to Aaron, born in Egypt, and adopted by Pharaoh's daughter, who educates him in all the learning of the Egyptians.

1556 Cecrops brings a colony of Saites from Egypt into Attica, and begins the kingdom of Athens in Greece.

1555 Moſes performs many miracles in Egypt, and departs from that kingdom, together with 600,000 Iſraelites, beſides children, which completed the 430 years of ſojourning. They miraculouſly paſs through the Red Sea, and come to the deſert Sinai, where Moſes receives from God, and delivers to the people, the Ten Commandments, and the other laws, and ſets up the tabernacle, and in it the ark of the covenant.

1546 Scamander comes from Crete into Phrygia, and begins the kingdom of Troy.

1515 The Iſraelites, after ſojourning in the Wilderneſs forty years, are led under Joſhua into the land of Canaan, where they fix themſelves, after having ſubdued the natives; and the period of the ſabbatical year commences.

1503 The deluge of Deucalion.

1496 The council of Amphictyons eſtabliſhed at Thermopylæ.

1493 Cadmus carried the Phenician letters into Greece, and built the citadel of Thebes.

1490 Sparta built by Lacedemon.

1485 The firſt ſhip that appeared in Greece was brought from Egypt by Danaus, who arrived at Rhodes, and brought with him his fifty daughters.

1480 Troy built by Dardanus.

1452 The Pentateuch, or five firſt books of Moſes, are written

Bef. Christ.

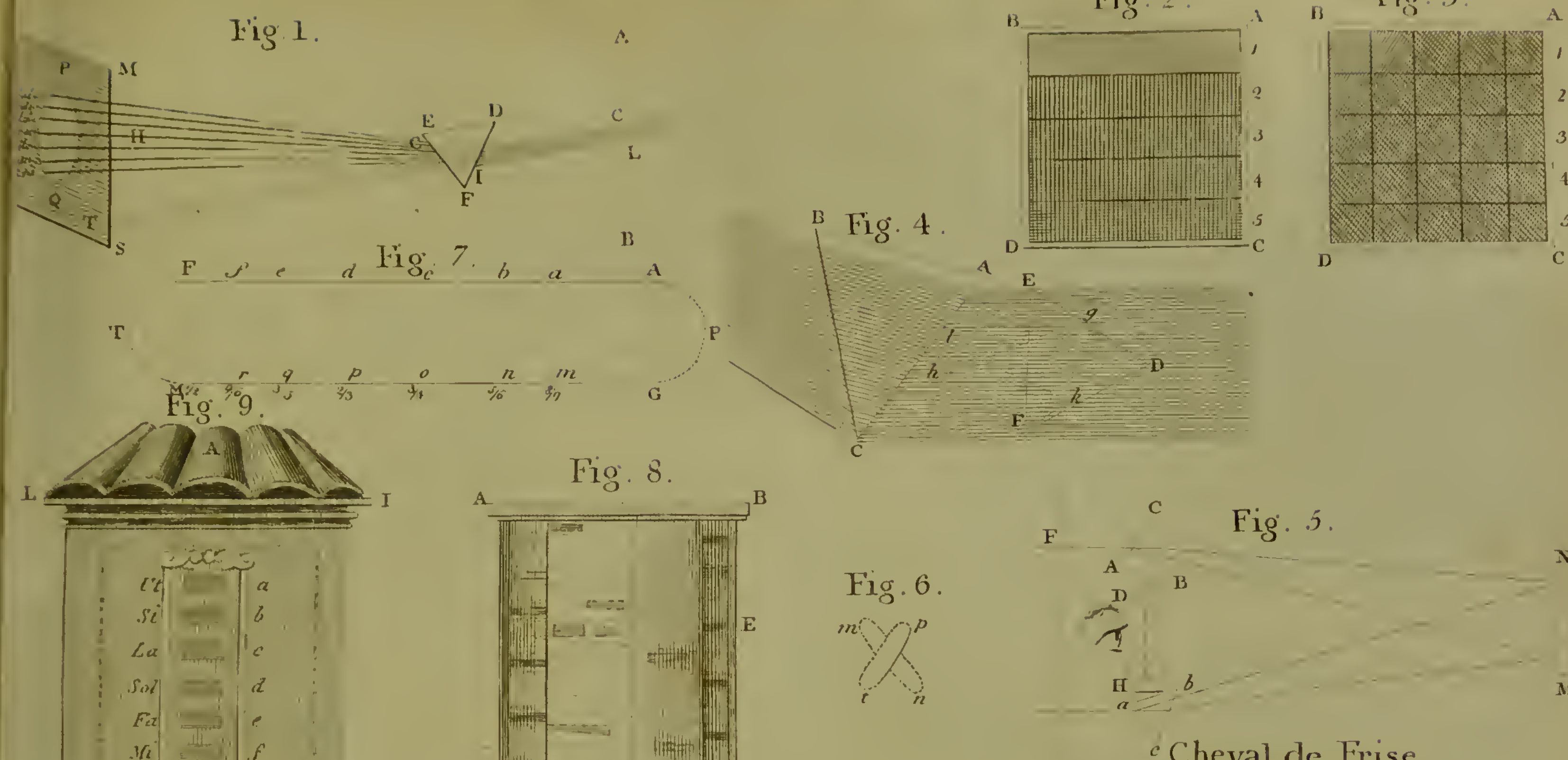
in the land of Moab, where he died the year following, aged 110.

1406 Iron is found in Greece, from the accidental burning of the woods.
1344 The kingdom of Mycenæ begins.
1326 The Isthmian games instituted at Corinth.
1325 The Egyptian canicular year began July 20th.
1307 The Olympic games instituted by Pelops.
1300 The Lupercalia instituted.
1294 The first colony came from Italy into Sicily.
1264 The second colony came from Italy into Sicily.
1252 The city of Tyre built.
1243 A colony of Arcadians conducted by Evander into Italy.
1233 Carthage founded by the Tyrians.
1225 The Argonautic expedition.
1204 The rape of Helen by Paris, which gave rise to the Trojan war, ending with the destruction of the city in 1184.
1176 Salamis in Cyprus built by Teucer.
1152 Ascanius builds Alba Longa.
1130 The kingdom of Sicyon ended.
1124 Thebes built by the Bœotians.
1115 The mariner's compass known in China.
1104 The expedition of the Heraclidæ into Peloponnesus; the migration of the Dorians thither; and the end of the kingdom of Mycenæ.
1102 The kingdom of Sparta commenced.
1070 The kingdom of Athens ended.
1051 David besieged and took Jerusalem.
1044 Migration of the Ionian colonies.
1008 The temple is solemnly dedicated by Solomon.
996 Solomon prepared a fleet on the Red Sea to send to Ophir.
986 Samos and Attica in Africa built.
979 The kingdom of Israel divided.
974 Jerusalem taken and plundered by Shishak king of Egypt.
911 The prophet Elijah flourished.
894 Money first made of gold and silver at Argos.
884 Olympic games restored by Iphitus and Lycurgus.
873 The art of sculpture in marble found out.
869 Scales and measures invented by Phidon.
864 The city of Carthage, in Africa, enlarged by queen Dido.
821 Nineveh taken by Arbaces.
814 The kingdom of Macedon begins.
801 The city of Capua in Campania built.
799 The kingdom of Lydia began.
786 The ships called *Triremes* invented by the Corinthians.
779 The race of kings in Corinth ended.
776 The era of the Olympiads began.
760 The Ephori established at Sparta.
758 Syracuse built by Archias of Corinth.
754 The government of Athens changed.
753 Era of the building of Rome in Italy by Romulus, first king of the Romans.
747 The era of Nabonassar commenced on the 26th of February the first day of Thoth.
746 The government of Corinth changed into a republic.
743 The war between the Messenians and Spartans.
724 Mycenæ reduced by the Spartans.
723 A colony of the Messenians settled at Rhegium in Italy.
720 Samaria taken, after three years siege, and the kingdom of Israel finished by Salmanazer king of Assyria, who carries the ten tribes into captivity.—The first eclipse of the moon on record.
713 Gela in Sicily built.
703 Corcyra, now Corfu, founded by the Corinthians.
702 Ecbatana in Media built by Deioces.
685 The second Messenian war under Aristomenes.

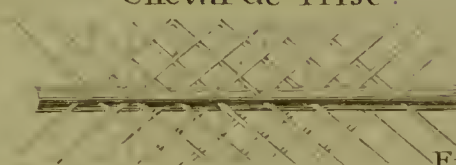
Bef. Christ.

670 Byzantium (now Constantinople) built by a colony of Athenians.
666 The city of Alba destroyed.
648 Cyrene in Africa founded.
634 Cyaxares besieges Nineveh, but is obliged to raise the siege by an incursion of the Scythians, who remained masters of Asia for 28 years.
624 Draco published his inhuman laws at Athens.
610 Pharaoh Necho attempted to make a canal from the Nile to the Red Sea, but was not able to accomplish it.
607 By order of the same monarch, some Phenicians sailed from the Red Sea round Africa, and returned by the Mediterranean.
606 The first captivity of the Jews by Nebuchadnezzar.--Nineveh destroyed by Cyaxares.
600 Thales, of Miletus, travels into Egypt, consults the priests of Memphis, acquires the knowledge of geometry, astronomy, and philosophy; returns to Greece, calculates eclipses, gives general notions of the universe, and maintains that an only Supreme Intelligence regulates all its motions.—Maps, globes, and the signs of the zodiac, invented by Anaximander, the pupil of Thales.
598 Jehoiakin, king of Judah, is carried away captive, by Nebuchadnezzar, to Babylon.
594 Solon made Archon at Athens.
591 The Pythian games instituted in Greece, and tragedy first acted.
588 The first irruption of the Gauls in Italy.
586 The city of Jerusalem taken, after a siege of 18 months.
582 The last captivity of the Jews by Nebuchadnezzar.
581 The Isthmian games restored.
580 Money first coined at Rome.
571 Tyre taken by Nebuchadnezzar after a siege of 13 years.
566 The first census at Rome, when the number of citizens was found to be 84,000.
562 The first comedy at Athens acted upon a moveable scaffold.
559 Cyrus the first king of Persia.
538 The kingdom of Babylon finished; that city being taken by Cyrus, who in 536 gives an edict for the return of the Jews.
534 The foundation of the temple laid by the Jews.
526 Learning is greatly encouraged at Athens, and a public library first founded.
520 The second edict to rebuild Jerusalem.
515 The second temple of Jerusalem is finished under Darius.
510 Hippias banished from Athens.
509 Tarquin, the seventh and last king of the Romans, expelled, and Rome governed by two consuls, and other republican magistrates, till the battle of Pharsalia, being a space of 461 years.
508 The first alliance between the Romans and Carthaginians.
507 The second census at Rome, 130,000 citizens.
504 Sardis taken and burnt by the Athenians, which caused the Persian invasion of Greece.
498 The first dictator appointed at Rome.
497 The Saturnalia instituted at Rome.—The number of citizens 150,700.
493 Tribunes created at Rome; or, in 488.
490 The battle of Marathon, September 28.
486 Æschylus, the Greek poet, first gains the prize of tragedy.
483 Questors created at Rome.
481 Xerxes, king of Persia, begins his expedition against Greece.
480 The defence of Thermopylæ by Leonidas, and the sea-fight at Salamis.
476 The number of Roman citizens reduced to 103,000.
469 The third Messenian war.
466 The number of Roman citizens increased to 124,214.

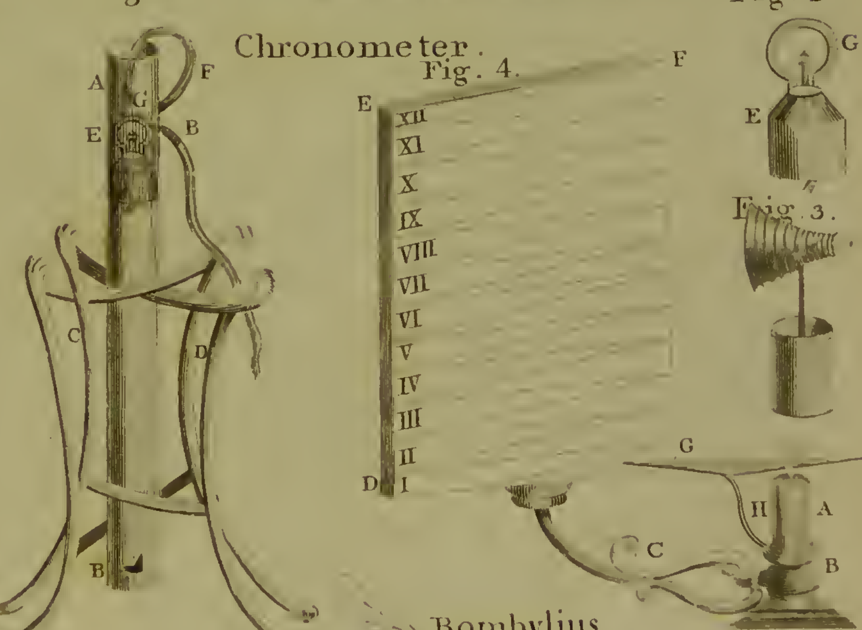
CHROMATICS



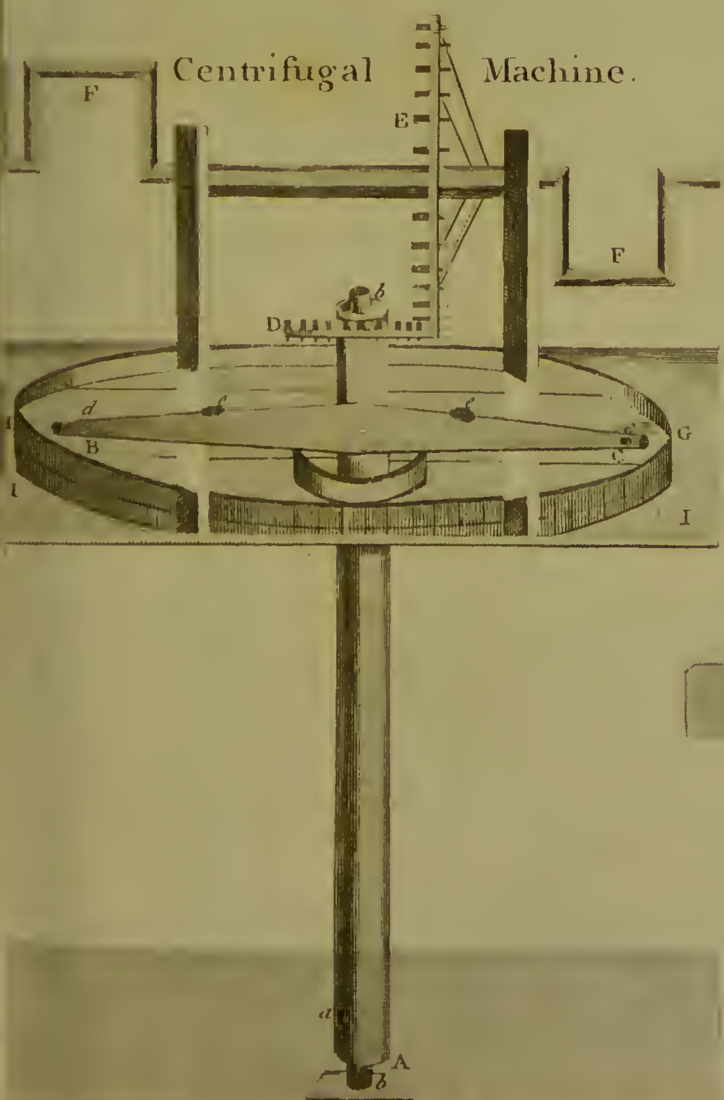
Cheval de Frise.



Chronometer.



Centrifugal Machine.



Bombylius

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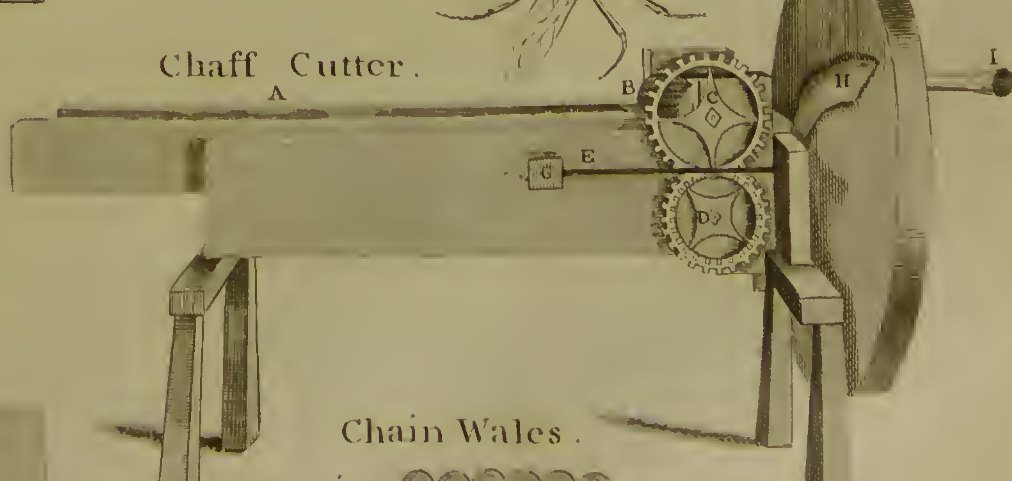

Chain Wales.

Bef. Chriſt.

458 Ezra is ſent from Babylon to Jeruſalem, with the captive Jews and the veſſels of gold and ſilver, &c. being ſeventy weeks of years, or 490 years before the crucifixion of our Saviour

456 The Ludi Seculares firſt celebrated at Rome.

454 The Romans ſend to Athens for Solon's laws.

451 The Decemvirs created at Rome, and the laws of the twelve tables compiled and ratified.

449 The Decemvirs baniſhed.

445 Military tribunes, with conſular power, created at Rome.

443 Cenſors created at Rome.

441 The battering ram invented by Artemones.

432 The Metonic cycle began July 15th.

431 The Peloponneſian war began, and laſted 27 years.

430 The hiſtory of the Old Teſtament finiſhes about this time. —A plague over the known world.—Malachi the laſt of the prophets.

405 The Athenians entirely defeated by Lyſander, which occaſions the loſs of the city, and ruin of the Athenian power.

401 The retreat of the 10,000 Greeks under Xenophon. The 30 tyrants expelled from Athens, and democratic government reſtored.

400 Socrates, the founder of moral philoſophy among the Greeks, believes the immortality of the ſoul, a ſtate of rewards and puniſhments; for which, and other ſublime doctrines, he is put to death by the Athenians, who ſoon after repent, and erect to his memory a ſtatue of braſs.

399 The feaſt of Lectiſternium inſtituted. Catapultæ invented by Dionyſius.

394 The Corinthian war begun.

390 Rome built by the Gauls.

387 The peace of Antalcidas between the Greeks and Perſians. —The number of Roman citizens amounted to 152,583.

384 Dionyſius begins the Punic war.

379 The Bœotian war commences.

377 A general conſpiracy of the Greek ſtates againſt the Lacedemonians.

373 A great earthquake at Peloponneſus.

371 The Lacedemonians defeated by Epaminondas at Leuctra.

367 Prætors eſtabliſhed in Rome. The Licinian law paſſed.

363 Epaminondas killed at the battle of Mantinea.

359 The obliquity of the ecliptic obſerved to be $23^\circ\ 49'\ 10''$.

359 The Social war began.

357 Dionyſius expelled from Syracuſe.—A tranſit of the moon over Mars took place.

356 The ſacred war begun in Greece.—Birth of Alexander the Great.

343 Dionyſius II. expelled from Syracuſe.—Commencement of the Syracuſan era.

338 Philip of Macedon gains the battle of Chæronæa, and thus attains to the ſovereignty of Greece.

335 Thebes taken and raſed by Alexander the Great.

334 The Perſians defeated at Granicus, May 22.

333 They are again defeated at Iſſus in Cilicia, October.

332 Alexander takes Tyre and marches to Jeruſalem.

331 Alexandria built.—Darius entirely defeated at Arbela.

330 Alexander takes Babylon, and the principal cities of the Perſian empire.—The Calippi period commences.

328 Alexander paſſes Mount Caucaſus, and marches into India.

327 He defeats Porus, an Indian Prince, and founds ſeveral cities.

326 The famous ſedition of Corcyra.

324 His family exterminated, and his dominions parted by his officers.

323 Alexander the Great dies at Babylon.

315 Rhodes almoſt deſtroyed by an inundation.

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311 The Appian way, aqueducts, &c. conſtructed at Rome.

308 The cities of Greece recovered their liberties for a ſhort time.

307 Antioch, Seleucia, Laodicea, and other cities, founded by Seleucus.

301 Antigonus defeated and killed at Ipſus.

299 The firſt barbers came from Sicily to Rome.

294 The number of effective men in Rome amounts to 270,000.

293 The firſt ſun-dial erected at Rome by Papirius Curſor.

285 Dionyſius, of Alexandria, began his aſtronomical era on Monday June 26, being the firſt who found the exact ſolar year to conſiſt of 365 days 5 hours and 49 minutes. —The watch tower of Pharos at Alexandria built.— Ptolemy Philadelphus, king of Egypt, employs 72 interpreters to tranſlate the Old Teſtament into the Greek language, which is called the *Septuagint*.

284 The foundation of the Achæan republic laid.

283 The college and library founded at Alexandria.

282 The Tarentine war begins.

280 Pyrrhus invades Italy.

279 A cenſus at Rome: the number of citizens 278,222.

269 The firſt coining of ſilver at Rome.

265 The number of Roman citizens augmented to 292,224.

264 The firſt Punic war begins, and continues 23 years.—The chronology of the Arundelian marbles compoſed.

262 A tranſit of mercury over the bull's horn; the planet being in 23° ♉, and the ſun in $29^\circ\ 0'$ ♈.

260 Provincial queſtors eſtabliſhed at Rome.—The Romans firſt concern themſelves in naval affairs, and defeat the Carthaginians at ſea.

255 Regulus, the Roman conſul, defeated and taken priſoner by the Carthaginians under Xantippus.

252 A cenſus at Rome: the number of citizens 297,897.

247 Another cenſus: the number of citizens 251,212.

246 The records of China deſtroyed.

241 Concluſion of the firſt Punic war.

240 Comedies firſt acted at Rome.

237 Hamilcar, the Carthaginian, cauſes his ſon Hannibal, at nine years old, to ſwear eternal enmity to the Romans.

236 The Tartars expelled from China.

235 Rome at peace with other nations.—The temple of Janus ſhut.

231 Corſica and Sardinia ſubdued by the Romans.—The firſt divorce at Rome.

230 The obliquity of the ecliptic obſerved by Eratoſthenes to be $23^\circ\ 51'\ 20''$.

224 The Coloſſus at Rhodes overturned by an earthquake.

219 The art of ſurgery introduced at Rome.

218 Commencement of the ſecond Punic war.—Hannibal paſſes the Alps, and invades Italy.

216 The Romans defeated at Cannæ, May 21ſt.

214 Syracuſe beſieged by Marcellus.

209 A cenſus at Rome: the number of citizens 227,107.

208 Aſdrubal invades Italy; but is defeated and killed.

206 Gold firſt coined at Rome.

202 Hannibal defeated by Scipio at Zama.

201 Concluſion of the ſecond Punic war.

194 Sparta and Hither Spain ſubdued by the Romans.

192 A cenſus at Rome: the number of citizens 243,704.

191 Antiochus defeated by the Romans at Thermopylæ.

190 The firſt Roman army enters Aſia, and from the ſpoils of Antiochus brings the Aſiatic luxury firſt to Rome.

188 The Spartans obliged to renounce the inſtitutions of Lycurgus.

179 A cenſus at Rome: the number of citizens 273,244.

173 The Jewiſh high-prieſthood ſold by Antiochus Epiphanes.

170 Paper invented in China—The temple of Jeruſalem plundered by Antiochus.

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169 A cenfus at Rome: the number of citizens 212,805.
168 Macedon reduced to the form of a Roman province—The firft library erected at Rome.
165 The temple of Jerufalem purified by Judas Maccabeus.
164 A cenfus at Rome: the number of citizens 327,032.
162 Hipparchus began his aftronomical obfervations at Rhodes.
161 Philofophers and rhetoricians banifhed from Rome.
150 The third Punic war commenced.
146 Corinth deftroyed—Carthage, the rival to Rome, rafed to the ground by the Romans—A remarkable comet appeared in Greece.
143 Hipparchus began his new cycle of the moon, confifting of 111,035 days.
141 The Numantine war commenced.
135 The hiftory of the Apocrypha ends.
133 Numantia deftroyed by Scipio.
124 A cenfus at Rome: the number of citizens 390,736.
105 The Cimbri and Teutones defeated by the Romans.
102 The Teutones and Ambrones defeated by Marius.
88 Rome befieged by the chiefs of the Marian faction.
82 Sylla created perpetual dictator at Rome.
69 A cenfus at Rome: the number of citizens 450,000.
66 Catiline's confpiracy.
55 Julius Cæfar's firft expedition into Britain—Craffus defeated and killed by the Parthians.
51 Gaul reduced to a Roman province.
50 A cenfus at Rome: the number of citizens 320,000.
48 The battle of Pharfalia, between Cæfar and Pompey, in which the latter was beaten—The Alexandrian library, confifting of 400,000 valuable books, accidentally burnt.
45 The war of Africa, in which Cato kills himfelf—The folar year introduced by Cæfar.
44 Cæfar, after having fought fifty pitched battles, and flain 1,192,000 men, is killed in the fenate-houfe by confpirators.
42 The republicans defeated at Philippi.
31 The battle of Actium fought, in which Mark Anthony and Cleopatra are totally defeated by Octavius, nephew to Julius Cæfar.
30 Alexandria, in Egypt, is taken by Octavius; upon which Anthony and Cleopatra put themfelves to death, and Egypt is reduced to a Roman province.
29 A cenfus at Rome: the number of citizens 4,101,017.
27 Octavius, by a decree of the fenate, obtains the title of Auguftus Cæfar, and an abfolute exemption from the laws, and is properly the firft Roman emperor—The pantheon at Rome built.
19 Rome at the height of its glory—The temple of Jerufalem rebuilt by Herod—Agrippa conftructed the magnificent aqueducts at Rome.
8 A cenfus at Rome: the number of citizens 4,233,000.
5 The temple of Janus fhut by Auguftus, as an emblem of univerfal peace, and JESUS CHRIST born, on Monday, December 25.

A. D. 1 The vulgar Chriftian era commenced from January 1, the Saviour of the world being then five years of age.
8 Jefus Chrift difputes with the doctors in the temple.
14 A cenfus at Rome: 4,037,000 citizens.
16 Mathematicians and magicians expelled from Rome.
17 Twelve cities in Afia deftroyed by an earthquake.
21 Pilate made governor of Judea.
29 Jefus baptifed in Jordan by John.
33 He is crucified at Jerufalem.
35 St. Paul converted.
39 St. Matthew writes his gofpel—Pontius Pilate kills himfelf—A conjunction of Saturn, Jupiter, and Mars.

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40 The name of Chriftians firft given at Antioch to the followers of Chrift.
43 Claudius Cæfar's expedition into Britain.
44 St. Mark writes his gofpel.
50 London is founded by the Romans: 368, furrounded by ditto with a wall, fome parts of which are ftill obfervable.
51 Caractacus, the Britifh king, is carried in chains to Rome.
52 The council of the apoftles at Jerufalem.
55 St. Luke writes his gofpel.
56 Rotterdam built.
59 The emperor Nero puts his mother and brothers to death—Nero perfecutes the Druids in Britain.
60 Chriftianity introduced into Britain.
61 Boadicea, the Britifh queen, defeats the Romans; but is conquered foon after by Suetonius, governor of Britain.
62 St. Paul is fent in bonds to Rome—writes his epiftles between 51 and 66.
63 The Acts of the Apoftles written—A great earthquake in Afia.
64 Rome fet on fire, and burned for fix days; upon which began (under Nero) the firft perfecution againft the Chriftians.
65 Many prodigies feen about Jerufalem.
66 St. Peter and St. Paul put to death.
70 While the factious Jews are deftroying one another with mutual fury, Titus the Roman general takes Jerufalem, which is rafed to the ground, and the plough made to pafs over it.
73 The philofophers banifhed from Rome by Vefpafian.
79 The cities of Pompeii and Herculaneum deftroyed by an eruption of Vefuvius.
80 The Capitol and Pantheon at Rome deftroyed by fire.
83 The philofophers expelled Rome by Domitian.
85 Julius Agricola, governor of South-Britain, to protect the civilized Britons from the incurfions of the Caledonians, builds a line of forts between the rivers Forth and Clyde; defeats the Caledonians under Galgacus on the Grampian hills; and firft fails round Britain, which he difcovers to be an ifland.
86 The Capitoline games inftituted by Domitian.
88 The fecular games celebrated at Rome.
93 The empire of the Huns in Tartary deftroyed by the Chinefe—The Evangelift John banifhed to Patmos.
94 The fecond pefecution of the Chriftians under Domitian.
96 St. John the Evangelift wrote his Revelation—his Gofpel in 97.
103 Dacia reduced to a Roman province.
105 A great earthquake in Afia and Greece.
107 The third perfecution of the Chriftians under Trajan.
114 Armenia reduced to a Roman province—A great earthquake in China.
115 Affyria fubdued by Trajan—An infurrection of the Jews, who murder 200,000 Greeks and Romans—A violent earthquake at Antioch.
120 Nicomedia and other cities fwallowed up by an earthquake.
121 The Caledonians reconquer from the Romans all the fouthern parts of Scotland; upon which the emperor Adrian builds a wall between Newcaftle and Carlifle; but this alfo proving ineffectual, Pollius Urbicus, the Roman general, about the year 134, repairs Agricola's forts, which he joins by a wall four yards thick.
130 Jerufalem rebuilt by Adrian.
132 The fecond Jewifh war commenced.
135 The fecond Jewifh war ends, when they were all banifhed Judea.
139 Juftin writes his firft apology for the Chriftians.
141 A number of herefies appear about this time.
146 The worfhip of Serapis introduced at Rome.

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152 The emperor Antoninus Pius ftops the perfecution againft the Chriftians—An inundation of the Tiber, and an earthquake at Rhodes.

163 The fourth perfecution of the Chriftians, under Marcus Aurelius Antoninus.

166 The Romans fent ambaffadors to China.

168 A plague over the known world.

188 The Capitol at Rome deftroyed by lightning.

191 A great part of Rome deftroyed by fire.

203 The fifth perfecution of the Chriftians, under Severus.

205 An earthquake in Wales.

209 Severus's wall in Britain built.

218 Two comets appeared at Rome. The courfe of the moft remarkable from eaft to weft.

222 About this time the Roman empire begins to decline. The Barbarians begin their irruptions, and the Goths have annual tribute not to moleft the empire.

225 Mathematicians allowed to teach publicly at Rome.

236 The fixth perfecution of the Chriftians, under Maximin.

241 The Franks firft mentioned in hiftory.

250 The feventh perfecution, under Decius.

252 A dreadful peftilence broke out in Ethiopia, and fpread over the world—The eighth perfecution, under Gallus.

253 Europe ravaged by the Scythians and Goths.

258 The ninth perfecution, under Valerian.

260 Valerian is taken prifoner by Sapor, king of Perfia, and flayed alive—The Scythians ravaged the Roman empire—The temple of Diana at Ephefus burnt.

261 A great plague throughout the Roman empire.

262 Earthquakes in Europe, Afia, and Africa, and three days of darknefs.

273 The Romans took Palmyra.

274 Silk firft brought from India; the manufactory of it introduced into Europe by fome monks, 551; firft worn by the clergy in England, 1534.

276 Wines firft made in Britain.

277 The Franks fettled in Gaul.

284 The Dioclefian era commenced Auguft 29th, or September 17th.

287 Caraufius proclaimed emperor of Britain.

289 A great comet vifible in Mefopotamia for 29 days.

291 Two emperors and two Cæfars march to defend the four quarters of the empire.

297 Alexandria deftroyed by Dioclefian.

303 The tenth perfecution, under Dioclefian.

306 Conftantine the Great begins his reign.

308 Cardinals firft ordained.

312 Peftilence all over the Eaft—The cycle of the induction began.

313 The tenth perfecution ends by an edict of Conftantine, who favours the Chriftians, and gives full liberty to their religion.

314 Three bifhops, or fathers, are fent from Britain to affift at the council of Arles.

315 Crucifixion abolifhed.

321 Obfervation of Sunday enjoined.

323 The firft general council at Nice, when 318 fathers attended, againft Arius, the founder of Arianifm, where was compofed the famous Nicene Creed, which we attribute to them.

328 Conftantine removes the feat of empire from Rome to Byzantium, which is hereafter called Conftantinople.

330 A dreadful perfecution of the Chriftians in Perfia, which lafts 40 years.

331 Conftantine orders all the heathen temples to be deftroyed.

334 300,000 Samaritans revolted from their mafters.

341 The gofpel propagated in Ethiopia by Foumentius.

344 Neocæfarea ruined by an earthquake.

351 The Heathens firft called Pagans.

358 An hundred and fifty cities in Afia and Greece overturned by an earthquake.

360 The firft monaftery founded near Poictiers in France, by Martin.

363 The Roman empeor Julian, furnamed the Apoftate, endeavours in vain to rebuild the temple of Jerufalem.

364 The Roman empire is divided into the Eaftern (Conftantinople the capital) and Weftern (of which Rome continued to be the capital), each being now under the government of different emperors.

373 The Bible tranflated into the Gothic language.

376 The Goths fettled in Thrace.

379 The cycle of Theophilus commenced.

390 A fiery column feen in the air for 30 days.

400 Bells invented by bifhop Paulinus, of Campagnia.

401 Europe over-run by the Goths under Alaric.

404 Another irruption of the Goths—The kingdom of Caledonia revives under Fergus.

406 Third irruption of the Goths—The Vandals, Alans, and Suevi, fpread into France and Spain, by a conceffion of Honorius, emperor of the weft.

408 The Chriftian religion propagated in Perfia.

409 Rome taken and plundered by the Goths, Auguft 24th.

412 The Vandals begin their kingdom in Spain.

413 The kingdom of Burgundy begun in Alface.

414 The kingdom of Thoulonfe founded by the Vifigoths.

417 The Alans extirpated by the Goths.

419 Many cities in Paleftine deftroyed by an earthquake.

420 The kingdom of France begins upon the Lower Rhine, under Pharamond.

421 The Salique law promulgated.

426 The Romans, reduced to extremities at home, withdraw their troops from Britain, and never return; advifing the Britons to arm in their own defence, and truft to their own valour.

432 The gofpel preached in Ireland by St. Patrick.

444 All Europe ravaged by the Huns.

446 The Britons, now left to themfelves, are greatly haraffed by the Scots and Picts, upon which they once more make their complaint to the Romans (which they intitle, *The groans of the Britons)*, but receive no affiftance from that quarter.

447 Attila (furnamed the Scourge of God) with his Huns ravages the Roman empire.

449 Vortigern, King of the Britons, invites the Saxons into Britain againft the Scots and Picts.

452 The city of Venice founded.

455 The Saxons having repulfed the Scots and Picts, invite over more of their countrymen, and begin to eftablifh themfelves in Kent, under Hengift.

476 The weftern empire is finifhed, 523 years after the battle of Pharfalia; upon the ruins of which feveral new ftates arife in Italy and other parts, confifting of Goths, Vandals, Huns, and other barbarians, under whom literature is extinguifhed, and the works of the learned are deftroyed.

480 A great earthquake at Conftantinople, which lafted 40 days.

493 Italy reduced by Theodoric king of the Goths.

496 Clovis, king of France, baptized, and Chriftianity begins in that kingdom.

506 The Jewifh talmud publifhed.

508 Prince Arthur begins his reign over the Britons.

510 Paris made the capital of the French dominions.

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515 Conftantinople befieged by Vitalianus, whofe fleet is burnt by a fpeculum of brafs made by Proclus.

516 The computing of time by the Chriftian era is introduced by Dionyfius the monk.

517 Five years drought and famine in Paleftine.

519 A bearded comet appears.

529 The codex of Juftinian, the eaftern emperor, is publifhed.

534 The kingdom of the Vandals in Africa comes to an end, after having continued 105 years.

536 The manufacture of filk introduced at Conftantinople by two Indian monks.

540 Antioch deftroyed by the Perfians.

541 Bafilius the laft conful elected at Rome.

542 Antioch rebuilt.

543 An earthquake all over the world.

550 An earthquake in Paleftine and Syria—The kingdom of Poland founded.

551 An earthquake in Greece, attended with a great commotion in the fea.

553 The empire of the Goths in Italy deftroyed by Narfas—A great earthquake at Conftantinople.

557 Another violent earthquake at Conftantinople, Rome, and other places—A terrible plague through Europe, Afia, and Africa, which continued near fifty years.

568 The Lombards founded a kingdom in Italy.

569 The Turks firft mentioned in hiftory—The exarchate of Ravenna begins.

575 The firft monarchy founded in Bavaria.

580 Antioch deftroyed by an earthquake.

581 Latin ceafed to be fpoken about this time in Italy.

584 The origin of fiefs in France.

588 The city of Paris deftroyed by fire.

589 Rome overflowed by the Tiber.

593 The Gafcons eftablifhed themfelves in the country called by their name.

596 John of Conftantinople affumes the title of univerfal bifhop.

597 Auguftine the monk comes into England with forty monks.

599 A dreadful peftilence in Africa.

604 St. Paul's church in London founded.

605 The ufe of bells introduced into churches.

606 Here begins the power of the popes, by the conceffions of Phocas, emperor of the Eaft.

622 Mahomet, the falfe prophet, flies from Mecca to Medina in Arabia, in the 44th year of his age, and 10th of his miniftry, when he laid the foundation of the Saracen empire, and from whom the Mahometan princes to this day claim their defcent. His followers compute their time from this era, which in Arabic is called *hegira*, i. e. "the Flight."

628 An academy founded at Canterbury.

632 The era of Jefdegird commenced June 16th.

637 Jerufalem is taken by the Saracens, or followers of Mahomet.

641 Alexandria in Egypt is taken by ditto, and the grand library there burnt by order of Omar, their caliph or prince.

643 The temple of Jerufalem converted into a Mahometan mofque.

653 The Saracens now extend their conquefts on every fide, and retaliate the barbarities of the Goths and Vandals upon their pofterity—They take Rhodes, and deftroy the famous Coloffus—England invaded by the Danes.

660 Organs firft ufed in churches.

663 Glafs invented by a bifhop, and brought into England by a Benedictine monk.

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669 Sicily invaded, and Syracufe deftroyed by the Saracens.

685 The Britons, after a brave ftruggle of near 150 years, are totally expelled by the Saxons, and driven into Wales and Cornwall.

698 The Saracens take Carthage, and expel the Romans from Africa.

700 Cracow built, and the firft prince of Poland elected.

704 The firft province given to the Pope.

713 The Saracens conquer Spain.

714 France governed by Charles Martel.

718 The kingdom of the Afturias in Spain founded by Pelagio.

719 Chriftianity promulgated in Germany.

726 The controverfy about images begins, and occafions many infurrections in the eaftern empire.

727 Tax of Peter's pence begun by Ina king of Weffex.

732 Charles Martel defeats the Saracens near Tours.

735 Inftitution of the office of Pope's Nuncio.

746 Three years peftilence in Europe and Afia.

748 The computing of years from the birth of Chrift began to be ufed in hiftory.

749 The race of Abbas become caliphs of the Saracens, and encourage learning—The empire of the Saracens divided into three.

752 The exarchate of Ravenna abolifhed by Aftolphus king of the Lombards.

755 Commencement of the Pope's temporal dominion.

762 The city of Bagdad upon the Tigris is made the capital for the caliphs of the houfe of Abbas—Burials, which formerly ufed to be in highways, permitted in towns.

792 An academy founded in Paris.

794 The Huns extirpated by Charlemagne.

797 Seventeen days of unufual darknefs.

800 Charlemagne, king of France, begins the empire of Germany, afterwards called the Weftern empire; gives the prefent names to the winds and months; endeavours to reftore learning in Europe, but mankind are not yet difpofed for it, being folely engroffed in military enterprifes.

801 A great earthquake in France, Germany, and Italy.

807 Jan. 31, Jupiter eclipfed by the moon. March 17, a large fpot feen on the fun for eight days.

808 The firft defcent of the Normans on France.

825 The obliquity of the ecliptic obferved by Benimula to be 23° 55′.

826 Harold, king of Denmark, dethroned by his fubjects for being a Chriftian—The kingdoms of Navarre and Arragon founded.

832 Painters banifhed out of the eaftern empire.

836 The Flemings trade to Scotland for fifh.

840 The Scots and Picts have a decifive battle, in which the former prevail, and both kingdoms are united by Kenneth, which begins the fecond period of the Scottifh hiftory.

842 Germany feparated from the empire of the Franks.

856 An earthquake over the greateft part of the known world.

861 Ruric the firft prince of Ruffia began to reign.

864 The Danes began their ravages in England.

867 Chriftianity propagated in Bulgaria.

868 Egypt becomes independent on the caliphs of Bagdad.

872 Bells and clocks firft ufed in Conftantinople.

873 France diftreffed by locufts and peftilence.

874 Iceland peopled by the Norwegians—Scotland invaded by the Danes.

875 A bearded comet appears in France.

878 Alfred the Great, after fubduing the Danifh invaders (againft whom he fought 56 battles by fea and land),

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compofes his body of laws; divides England into counties, hundreds, tythings; in 890 erects county-courts, having founded the univerfity of Oxford in 886.

880 The obliquity of the ecliptic obferved by Albategni to be 23° 35′.

889 The Hungarians fettled near the Danube.

891 The firft land-tax in England.

895 The monaftery of Cluny founded.

905 A very remarkable comet appeared in China—Rome taken by the Normans.

911 The obliquity of the ecliptie obferved by Thebit to be 23° 33′ 30″.

912 The Normans eftablifh themfelves in Normandy.

913 The Danes become mafters of England.

915 The univerfity of Cambridge founded.

923 Fiefs eftablifhed in France.

925 Sigefroi elected firft marquis of Brandenburg.

928 The marquifate of Mifnia eftablifhed.

937 The Saracen empire is divided by ufurpation into feven kingdoms.

941 Arithmetic brought into Europe.

961 Candia recovered from the Saracens.

967 Antioch recovered from the Saracens.

969 The race of Abbas extinguifhed in Egypt.

975 Pope Boniface VII. is depofed and banifhed for his crimes.

977 Greece, Macedon, and Thrace, ravaged by the Bulgarians for ten years—The Bohemians fubdued by Otho.

979 The coronation oath firft ufed in England; and Juries firft inftituted there.

985 The Danes under Sueno invaded England and Scotland.

987 The Carlovingian race in France ended.

991 The figures in arithmetic are brought into Europe by the Saracens from Arabia; letters of the alphabet were hitherto ufed.

993 A great eruption of Mount Vefuvius.

995 England invaded by the Danes and Norwegians.

996 Otho III. makes the empire of Germany elective.

999 Boleflaus, the firft king of Poland—The obliquity of the ecliptic obferved by Aboul Wafi and Abu Hamed to be 23° 35′.

1000 Paper made of cotton rags was in ufe: that of linen rags in 1170: the manufacture introduced into England at Deptford, 1588.

1002 The emperor Henry affumed the title of king of the Romans.

1005 All the old churches rebuilt about this time in a new ftyle of architecture.

1006 A plague in Europe for three years.

1007 A great eruption of Vefuvius—The obliquity of the ecliptic obferved by Albatrunius to be 23° 35′.

1014 Sueno the Dane becomes mafter of England—Sept. 28. Almoft all Flanders laid under water by a ftorm.

1015 Children forbidden by law to be fold by their parents in England.

1017 Rain of the colour of blood for three days in Aquitain.

1022 A new fpecies of mufic invented by Aretin.

1035 Togrul-Beg, or Tangrolipix, the Turkifh fultan, eftablifhes himfelf in Korafan—The Kingdoms of Caftile and Arragon begun.

1040 The Danes, after feveral engagements with various fuccefs, are about this time driven out of Scotland, and never again return in a hoftile manner—Smyrna deftroyed by an earthquake.

1041 The Saxon line reftored under Edward the Confeffor.

1043 The Turks become formidable and take poffeffion of Perfia—The Ruffians come from Scythia, and land in Thrace.

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1054 Leo IX. the firft pope that kept up an army.

1055 The Turks take Bagdad, and overturn the empire of the Saracens.

1057 Malcolm III. king of Scotland, kills the tyrant Macbeth at Dunfinane, and marries the princefs Margaret, fifter to Edgar Atheling.

1061 Surnames appointed to be taken in Scotland by a parliament held in Forfar.

1065 The Turks take Jerufalem from the Saracens.

1066 The conqueft of England by William (furnamed the Baftard) duke of Normandy, in the battle of Haftings, where Harold is flain.

1070 The feudal law introduced into England.

1075 Henry IV. emperor of Germany, and the pope, quarrel about the nomination of the German bifhops. Henry, in penance, walks barefooted to the pope near the end of January.

1076 Juftices of the peace firft appointed in England—An earthquake in England—Afia Minor, having been two years under the power of Solyman, is from this time called Turkey.

1080 Doomfday book began to be compiled by order of William, from a furvey of all the eftates in England, and finifhed in 1086—The tower of London built by ditto, to curb his Englifh fubjects; numbers of whom fly to Scotland, where they introduce the Saxon or Englifh language, are protected by Malcolm, and have lands given them.

1086 The order of Carthufians eftablifhed by Bruno.

1090 The dynafty of Bathineens or Affaffins begins in Irak, and continues for 117 years.

1091 The Saracens in Spain, being hard preffed by the Spaniards, call to their affiftance Jofeph king of Morocco; by which the Moors get poffeffion of all the Saracen dominions in Spain.

1096 The firft crufade to the Holy Land is begun under feveral Chriftian princes, to drive the infidels from Jerufalem.

1098 The order of St. Benedict inftituted.

1099 Jerufalem taken by the crufaders; Godfrey elected king of it; and the order of knights of St. John inftituted.

1110 Edgar Atheling, the laft of the Saxon princes, dies in England, where he had been permitted to refide as a fubject—Learning revived at Cambridge—Writing-paper made of cotton commonly ufed about this time.

1118 The order of the Knights Templers inftituted, to defend the Sepulchre at Jerufalem, and to protect Chriftian ftrangers.

1119 Bohemia erected into a kingdom.

1132 The kingdom of Portugal began.

1137 The pandect of Juftinian found in the ruins of Amalphi.

1141 The factions of the Guelphs and Gibellines prevailed about this time.

1143 The Koran tranflated into Latin.

1144 The Peripatetic philofophy introduced into Germany.

1151 The canon law collected by Gratian, a monk of Bologna.

1154 Chriftianity introduced into Finland.

1156 The city of Mofcow in Ruffia founded.

1160 The order of the Carmelites inftituted.

1163 London bridge, confifting of 19 fmall arches, firft built of ftone.

1164 The Teutonic order of religious knights begins in Germany.

1171 The dynafty of Fatemites ended in Egypt; the fovereigns of this country henceforth called Sultans.

1172 Henry II. king of England (and firft of the Plantage-

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nets), takes poſſeſſion of Ireland; which from that period has been governed by an Engliſh viceroy, or lord lieutenant.

1176 England is divided by Henry into ſix circuits, and juſtice is diſpenſed by itinerant judges.

1179 The univerſity of Padua founded.

1180 Glaſs windows began to be uſed in private houſes in England.

1181 The laws of England are digeſted about this time by Glanville.

1182 Pope Alexander III. compelled the kings of England and France to hold the ſtirrups of his ſaddle when he mounted his horſe.

1183 7000 Albigenſes maſſacred by the inhabitants of Berry.

1186 A conjunction of all the planets at ſun-riſe, September 16. The Sun in 30° ♍; Jupiter in $2^\circ\ 3'$ ♎; Venus in $3^\circ\ 49'$; Saturn in $8^\circ\ 6'$; Mercury in $4^\circ\ 10'$; Mars, $9^\circ\ 8'$; tail of the Dragon, $18^\circ\ 23'$ ♎.

1187 Jeruſalem taken by Saladin.

1192 The battle of Aſcalon, in Judea, in which Richard, king of England, defeats Saladin's army, conſiſting of 300,000 combatants.

1194 *Dieu et mon Droit*, firſt uſed as a motto by Richard, on a victory over the French.

1195 Denmark and Norway laid waſte by a dreadful tempeſt.

1198 Inſtitution of the order of the Holy Trinity.

1200 Chimnies were not known in England—Surnames now began to be uſed; firſt among the nobility—Univerſity of Salamanca in Spain founded.

1204 Conſtantinople taken by the French and Venetians—The Inquiſition eſtabliſhed—The empire of Trebizond eſtabliſhed.

1208 London incorporated, and its firſt charter obtained for electing the Lord Mayor, and other magiſtrates, from king John—The order of *Fratres Minores* eſtabliſhed—The Pope excommunicates King John.

1209 The works of Ariſtotle imported from Conſtantinople into Europe—The ſilk manufacture imported from Greece into Venice.

1210 The works of Ariſtotle burnt at Paris—The Emperor Otho excommunicated by the pope—Violent perſecution of the Albigenſes.

1215 Magna Charta ſigned by king John and the barons of England—Court of common pleas eſtabliſhed—Orders of the Dominicans and Knights Hoſpitallers founded—The doctrine of tranſubſtantiation introduced.

1216 King Alexander and the whole kingdom of Scotland excommunicated by the pope's legate.

1220 Aſtronomy and geography brought into Europe by the Moors.

1222 A great earthquake happened in Germany.

1223 A comet of extraordinary magnitude appeared in Denmark.

1226 A league formed againſt the Albigenſes by the French king and many prelates and lords.

1227 The Tartars under Gingis-Khan emerge from the northern parts of Aſia, over-run all the Saracen empire, and carry death and deſolation wherever they march.

1228 The univerſity of Thoulouſe founded.

1230 The kingdom of Denmark ſuffered by peſtilence.—The kingdoms of Leon and Caſtile united.—Pruſſia ſubdued by the Teutonic knights.—Univerſity of Naples founded.

1231 The Almageſt of Ptolemy tranſlated into Latin.

1233 The Inquiſition, begun in 1204, is now truſted to the Dominicans.—The houſes of London, and other cities in England, France, and Germany, ſtill thatched with ſtraw.

1238 The univerſity of Vienna founded.

1239 A writing of this year's date on paper made of rags ſtill extant.

1241 The hanſeatic league formed.—Tin mines diſcovered in Germany.

1245 A clear red ſtar, like Mars, appears in Capricorn.

1250 Painting revived in Florence by Cimabue.

1251 Wales ſubdued, and Magna Charta confirmed.

1353 The famous aſtronomical tables are compoſed by Alonſo, king of Caſtile.

1256 The order of the Auguſtines eſtabliſhed.

1258 The Tartars take Bagdad, which finiſhes the empire of the Saracens.

1260 The ſect of Flagellantes appeared in Italy.

1263 Acho king of Norway invades Scotland with 160 ſail, and lands 20,000 men at the mouth of the Clyde; but they are cut to pieces by Alexander III. who recovers the weſtern iſles.

1264 The commons of England firſt ſummoned to parliament about this time.

1268 The Tartars invade China.

1269 The Hamburgh company incorporated in England.—The obliqnity of the ecliptic obſerved by Cozah Naſirodni to be $23^\circ\ 30'$.—Weſtminſter abbey rebuilt and conſecrated in the preſence of Henry III.

1272 The academy of Florence founded.

1273 The empire of the preſent Auſtrian family begins in Germany.—The obliquity of the ecliptic obſerved by Checuking in China to be $23^\circ\ 33'\ 39''$.

1274 The firſt commercial treaty betwixt England and Flanders.

1279 King Edward renounces his right to Normandy.—The mortmain act paſſed in England.

1282 Lewellyn, prince of Wales, defeated and killed by Edward I. who unites that principality to England.—A great peſtilence in Denmark.—8000 French murdered at the Sicilian veſpers.—Academy della Cruſca founded.

1284 Edward II. born at Caernarvon, is the firſt prince of Wales.

1285 Alexander III. king of Scotland, dies, and that kingdom is diſputed by twelve candidates, who ſubmit their claims to the arbitration of Edward king of England; which lays the foundation of a long and deſolating war between both nations.

1290 The univerſity of Liſbon founded.

1291 Ptolemais taken by the Turks.—End of the cruſades.

1293 There is a regular ſucceſſion of Engliſh parliaments from this year, being the 22d of Edward I.

1294 Parliaments eſtabliſhed in Paris.

1298 The preſent Turkiſh empire begins in Bithynia under Ottoman.—Tallow candles ſo great a luxury, that ſplinters of wood were uſed for lights.—Wine ſold by apothecaries as a cordial.—The Scots defeated by the Engliſh at Falkirk.

1299 An earthquake in Germany—Spectacles invented by a monk of Piſa—The year of Jubilee inſtituted by Boniface VIII.

1302 The mariner's compaſs invented, or improved, by Giovia of Naples—The univerſity of Avignon founded.

1307 The beginning of the Swiſs cantons—Coal firſt uſed in England.

1308 The popes remove to Avignon in France for 70 years.

1310 Lincoln's inn ſociety eſtabliſhed—The knights of St. John take poſſeſſion of the iſle of Rhodes.

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1314 The battle of Bannockburn, between Edward II. and Robert Bruce, which eftablifhes the latter on the throne of Scotland—The cardinals fet fire to the conclave, and feparate—A vacancy in the papal chair for two years.

1315 Germany afflicted with famine and peftilence.

1319 The univerfity of Dublin founded.

1320 Gold firft coined in Chriftendom; 1344, ditto in England—An earthquake in England.

1323 A great eruption of Mount Ætna.

1325 The firft treaty of commerce betwixt England and Venice.

1330 Gunpowder invented by a monk of Cologne.

1332 The pope accufed of herefy.

1336 Two Brabant weavers fettle at York, which, fays Edward III. "may prove of great benefit to us and our fubjects."

1337 The firft comet whofe courfe is defcribed with an aftronomical exactnefs—Europe infefted by locufts.

1340 Heralds' college inftituted in England—Copper money firft ufed in Scotland and Ireland.

1344 The firft creation to titles by patent ufed by Edward III.

1345 Edward III. had four pieces of cannon, which gained him the battle of Creffy.

1347 The battle of Durham, in which David, king of Scots, is taken prifoner.

1349 The order of the Garter inftituted in England by Edward III. altered in 1557, and confifts of 26 knights.

1352 The Turks firft enter Europe.

1353 Afia and Africa defolated by locufts.

1354 The money in Scotland till now the fame as in England.

1356 The battle of Poictiers, in which king John of France and his fon are taken prifoners by Edward the Black Prince.

1357 Coals firft brought to London.

1358 Arms of England and France firft quartered by Edward III.—Univerfity of Cologne founded—Tamerlane began to reign in Perfia.

1362 The law pleadings in England changed from French to Englifh as a favour of Edward III. to his people—The military order of Janizaries eftablifhed among the Turks.

1365 The univerfities of Vienna and Geneva founded.

1369 John Wickliffe, an Englifhman, begins to call in queftion the doctrines of the church of Rome about this time, whofe followers are called Lollards.

1370 The office of grand vizir eftablifhed.

1377 Inundation of the fea in Flanders.

1378 Greenland difcovered by a Venetian.

1381 Bills of exchange firft ufed in England.

1384 The firft act of navigation in England; no goods to be exported or imported by Englifhmen in foreign bottoms.

1386 A company of linen weavers from the Netherlands eftablifhed in London—Windfor caftle built by Edward III.

1387 The firft Lord High Admiral of England inftituted.

1388 The battle of Otterburn between Hotfpur and the earl of Douglas—Bombs invented at Venloo.

1391 Cards invented in France for the king's amufement.

1399 Weftminfter abbey rebuilt and enlarged—Weftminfter-hall ditto—Order of the Bath inftituted at the coronation of Henry IV. renewed in 1725, confifting of 38 knights.

1402 Tamerlane defeats and takes prifoner Bajazet the Turkifh fultan.

1405 The Canary iflands difcovered by Bathencourt a Norman.

1410 Guildhall, London, built—Painting in oil-colours invented at Bruges by John Van-eyck.

1411 The univerfity of St. Andrews in Scotland founded.

1412 Algebra brought from Arabia into Europe.

1415 The battle of Agincourt gained over the French by Henry V. of England.

1420 The ifland of Madeira difcovered by the Portuguefe.

1421 The revenue of England amounted to 55,754l.

1428 The fiege of Orleans, the firft blow to the Englifh power in France.

1431 A great earthquake at Lifbon.

1432 Great inundations in Germany.

1437 The obliquity of the ecliptic obferved by Ulug Beg to be 23° 30′ 17″.

1440 Printing invented by L. Kofter at Haerlem in Holland; brought into England by W. Caxton, a mercer of London, 1471.

1446 The Vatican library founded at Rome—The fea breaks in at Dort in Holland, and drowns 100,000 people.

1453 Conftantinople taken by the Turks, which ends the eaftern empire, 1123 years from its dedication by Conftantine the Great, and 2206 years from the foundation of Rome.

1454 The univerfity of Glafgow in Scotland founded.

1457 Glafs firft manufactured in England.

1460 Engraving and etching on copper invented—The obliquity of the ecliptic obferved by Purbachius and Regiomontanus to be 23° 26′.

1473 The ftudy of the Greek language introduced into France.

1477 The univerfity of Aberdeen in Scotland founded.

1479 Union of the kingdoms of Arragon and Caftile.

1482 The coaft of Guinea difcovered by the Portuguefe—A court of Inquifition erected in Seville.

1485 Richard III. king of England, and laft of the Plantagenets, is defeated and killed at the battle of Bofworth, by Henry (Tudor) VII. which puts an end to the civil wars between the houfes of York and Lancafter, after a conteft of 30 years, and the lofs of 100,000 men.

1487 Henry eftablifhes fifty yeomen of the guards, the firft ftanding army.

1489 Maps and fea charts firft brought to England by Barth. Columbus.

1490 William Groceyn introduces the ftudy of the Greek language into England—The Moors, hitherto a formidable enemy to the native Spaniards, are entirely fubdued by Ferdinand, and become fubjects to that prince on certain conditions, which are ill obferved by the Spaniards, whofe clergy ufe the Inquifition in all its tortures; and in 1609, near one million of the Moors were driven from Spain to the oppofite coaft of Africa, from whence they originally came.

1492 America firft difcovered by Columbus, a Genoefe, in the fervice of Spain—The Moors expelled from Granada, which they had poffeffed upwards of 800 years.

1495 The venereal difeafe introduced into Europe.

1496 The Jews and Moors banifhed out of Portugal.

1497 The Portuguefe firft fail to the Eaft Indies by the Cape of Good Hope—South America difcovered by Americus Vefpufius, from whom it has its name.

1499 North America difcovered, for Henry VII. by Cabot a Venetian.

1500 Maximilian divides the empire of Germany into fix circles, and adds four more in 1512—Brazil difcovered by the Portuguefe—Florida difcovered by John Cabot, an Englifhman—Painting in chiaro obfcuro difcovered—A great plague in England.

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1505 Shillings firft coined in England.

1507 The ifland of Madagafcar difcovered by the Portuguefe.

1509 Gard-ning introduced into England from the Netherlands, from whence vegetables were imported.

1510 The obliquity of the ecliptic obferved by Wernenus to be 23° 28′ 30″.

1513 The battle of Flowden, in which James IV. king of Scotland is killed, with the flower of his nobility.

1514 Cannon balls made of ftone ftill in ufe.

1515 The firft Polyglot Bible printed at Alcala—The kingdom of Navarre annexed to that of Caftile by Ferdinand.

1516 The kingdom of Algiers feized by Barbaroffa.

1517 Martin Luther began the reformation—Egypt is conquered by the Turks—The kingdom of the Mamalukes in Egypt overthrown by the Turks.

1518 Difcovery of New Spain, and the Straits of Magellan.

1521 Henry VIII. for his writings in favour of popery, receives the title of Defender of the Faith from his Holinefs.

1522 Rhodes taken by the Turks—The firft voyage round the world performed by a fhip of Magellan's fquadron.

1526 The Inquifition eftablifhed at Portugal—Lutheranifm eftablifhed in Germany.

1527 Rome taken and plundered by the Imperial army.

1528 Popery abolifhed in Sweden.

1529 The name of Proteftant takes its rife from the reformers protefting againft the church of Rome, at the diet of Spires in Germany.

1530 Union of the Proteftants at Smallcalde, December 22d—Secretary of State's office eftablifhed in England.

1531 A great earthquake happened at Lifbon.

1532 The Court of Seffion inftituted in Scotland.

1533 Infurrection of the Anabaptifts in Weftphalia.

1534 The reformation takes place in England, under Henry VIII.—Barbaroffa feized on the kingdom of Tunis.

1535 The Reformation introduced into Ireland—The fociety of Jefuits formed.

1539 The firft Englifh edition of the Bible authorifed; the prefent tranflation finifhed in 1611—About this time cannon began to be ufed in fhips—Six hundred and forty-five religious houfes fuppreffed in England and Wales.

1540 The variation of the compafs difcovered by Sebaftian Cabot—The obliquity of the ecliptic obferved by Copernicus to be 23° 28′ 8″—Society of the Jefuits eftablifhed, September 27.

1543 Silk ftockings firft worn by the French king; firft worn in England by queen Elizabeth, 1561; the fteel frame for weaving invented by the Rev. Mr. Lee, of St. John's College, Cambridge, 1589—Pins firft ufed in England, before which time the ladies ufed fkewers—Iron guns and mortars made in England.

1544 Good lands let in England at one fhilling per acre.

1545 The famous council of Trent begins, and continues 18 years.

1547 Firft law in England eftablifhing the intereft of money at 10 per cent.

1548 The Reformation gained ground in Poland.

1549 Lords lieutenants of counties inftituted in England.

1550 Horfe guards inftituted in England—About this time the bank of Venice was eftablifhed.

1552 Books of geography and aftronomy deftroyed under an idea of their being infected with magic—The book of Common Prayer eftablifhed in England by law.

1554 The kingdom of Aftracan conquered by Ruffia.

1555 The Ruffian company eftablifhed in England.

1558 Queen Elizabeth begins her reign.

1560 The Reformation in Scotland completed by John Knox.

1561 Livonia ceded to Poland.

1563 Knives firft made in England.

1565 Revolt of the Low Countries—Malata attacked by the Turks.

1566 The 39 articles of the church of England eftablifhed.

1568 Queen Mary imprifoned in England—Liberty of exercifing the reformed religion granted to the Low Countries.

1569 Royal Exchange firft built.

1571 The ifland of Cyprus taken by the Turks—They are defeated at Lepanto.

1572 The great maffacre of the Proteftants at Paris—A new ftar in Caffiopæia obferved by Cornelius Gemma. It appeared in November, and difappeared in March.

1576 The Proteftant religion tolerated in France, and this followed by a civil war.

1578 The firft treaty of alliance betwixt England and the States General, January 7th.

1579 The Dutch fhake off the Spanifh yoke, and the republic of Holland begins—Englifh Eaft-India company incorporated: eftablifhed 1600—Turkey company in England incorporated.

1580 Sir Francis Drake returns from his voyage round the world, being the firft Englifh circumnavigator.—Parochial regifters firft appointed in England—The kingdom of Portugal feized by Philip of Spain.

1581 Copper money firft ufed in France.

1582 Pope Gregory introduces the New Style in Italy; the 5th of October being counted 15.

1583 Tobacco firft brought from Virginia into England—The firft propofal of fettling a colony in America.

1587 Mary queen of Scots beheaded by order of Elizabeth, after 18 years imprifonment.

1588 The Spanifh Armada deftroyed by Drake, and other Englifh admirals—Henry IV. paffes the edict of Nantes, tolerating the Proteftants—Duelling with fmall fwords introduced into England.

1589 Coaches firft introduced into England; hackney act 1693; increafed to 1000 in 1770.

1590 Band of penfioners inftituted in England—Telefcopes invented by Janfen, a fpectacle-maker in Germany.

1591 Trinity college, Dublin, founded.

1593 A great plague in London.

1594 The Jefuits expelled from France—The obliquity of the ecliptic obferved by Byrgius to be 23° 30′.

1595 The fame obferved by Tycho-Brahe to be 23° 29′ 25″.

1586 A great earthquake at Japan.

1597 Watches firft brought into England from Germany.

1598 The edict of Nantes by Henry IV. of France.

1602 Decimal arithmetic invented at Bruges.

1603 Queen Elizabeth (the laft of the Tudors) dies, and nominates James VI. of Scotland as her fucceffor; which unites both kingdoms under the name of Great Britain.

1605 The Gunpowder-plot difcovered at Weftminfter; being a project to blow up the king and both houfes of Parliament.

1606 The Oath of allegiance firft adminiftered in England.

1608 Colonies fent from England to Virginia.

1609 The independence of the United States acknowledged by Spain.

1610 Galileo, of Florence, firft difcovers the fatellites about the planet Jupiter, by the telefcope, lately invented in Germany—Henry IV. is murdered at Paris by Ravaillac,

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a prieft—Thermometers invented by Diebel a Dutchman.

1611 Baronets firft created in England by James I. May 22—An earthquake at Conftantinople; 200,000 perfons died there of the plague.

1612 The north-weft paffage to China attempted in vain by the Englifh.

1614 Napier of Marchefton, in Scotland, invented logarithms—Sir Hugh Middleton brought the new river to London, from Ware.

1616 The firft permanent fettlement in Virginia.

1619 W. Harvey, an Englifhman, difcovers the circulation of the blood.

1620 The broad-filk manufacture from raw filk introduced into England—Barbadoes difcovered by Sir William Courteen—Navarre united to France—Copper-money firft introduced in England.

1621 New-England planted by the Puritans—The two parties of Whigs and Tories formed in England.

1622 The Palatinate reduced by the Imperialifts.

1623 The knights of Nova Scotia inftituted.

1624 Maffacre of the Englifh at Amboyna.

1625 King James died, and was fucceeded by his fon, Charles I.—The ifland of Barbadoes, the firft Englifh fettlement in the Weft Indies, is planted.

1631 The tranfit of Mercury over the fun's difk, firft obferved by Gaffendi—A great eruption of Vefuvius.

1632 The battle of Lutzen, in which Guftavus Adolphus, king of Sweden, and head of the Proteftants in Germany, is killed.

1633 Galileo condemned by the Inquifition at Rome—Louifiana difcovered by the French.

1635 Province of Maryland planted by Lord Baltimore—Regular pofts eftablifhed from London to Scotland, Ireland, &c.

1636 A tranfit of Mercury over the fun's difk obferved by Caffini.

1639 A tranfit of Venus over the fun's difk, firft obferved by Mr. Horrox, November 24th O. S. 3 h. 15′ P. M.

1640 King Charles difobliges his Scottifh fubjects; on which their army, under general Lefley, enters England, and takes Newcaftle, being encouraged by the malcontents in England—The maffacre in Ireland, when 40,000 Englifh Proteftants were killed—The independency of Portugal recovered by John Duke of Braganza.

1642 King Charles impeaches five refractory members, which begins the civil wars in England.

1643 Excife on beer, ale, &c. firft impofed by parliament—Barometers invented by Torricelli.

1648 A new ftar obferved in the tail of the Whale by Fabricius.

1649 Charles I. beheaded by Cromwell at Whitehall, January 30, aged 49—Pendulums firft applied to clocks by Huygens.

1651 The fect called *Quakers* appeared in England.

1652 The Dutch colony at the Cape of Good Hope eftablifhed.

1653 Cromwell affumes the protectorate—The air-pump invented by Otto Guericke of Magdeburg.

1655 The Englifh, under Admiral Penn, take Jamaica from the Spaniards—One of Saturn's fatellites obferved by Huygens.

1658 Cromwell dies, and is fucceeded in the protectorate by his fon Richard.

1660 King Charles II. is reftored by Monk, commander of the army, after an exile of 12 years in France and Holland—The people of Denmark, being oppreffed by the nobles, furrender their privileges to Frederic III. who becomes abfolute.

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1661 The obliquity of the ecliptic obferved by Hevelius to be 23° 29′ 7″.

1662 The Royal Society of London eftablifhed by Charles II.

1663 Carolina planted: 1728, divided into two feparate governments—Pruffia declared independent of Poland.

1664 The New Netherlands in North America conquered from the Swedes and Dutch by the Englifh.

1665 A plague in London, which carried off 68,000 people—The magic lantern invented by Kircher.

1666 The great fire of London began Sept. 2, and continued three days, in which were deftroyed 13,000 houfes and 430 ftreets—Tea firft ufed in England.

1667 The peace of Breda, which confirmed to the Englifh the New Netherlands, now Pennfylvania, New York, and New Jerfey, in North America.

1668 The peace of Aix la Chapelle—St. James's Park planted and made a thoroughfare for public ufe by Charles II.

1669 The ifland of Candia taken by the Turks.

1670 The Englifh Hudfon's Bay company incorporated—The obliquity of the ecliptic obferved by Mengoli to be 23° 28′ 24″.

1672 Louis XIV. over-runs great part of Holland, when the Dutch open their fluices, and retire to their fettlements in the Eaft Indies—African company eftablifhed—The obliquity of the ecliptic obferved by Richer to be 23° 28′ 54″.

1677 The micrometer invented by Kircher.

1678 The peace of Nimeguen—The habeas corpus act paffed—A ftrange darknefs at noon-day, Jan. 12.

1680 A comet, which continued vifible from Nov. 3 to March 9—William Penn, a Quaker, received a charter for planting Pennfylvania.

1683 India ftock fold from 360 to 500 *per cent.*

1685 Charles II. dies, aged 55, and is fucceeded by his brother James II.—The Duke of Monmouth, natural fon to Charles II. rebels, but is defeated at Sedgemore, and beheaded—The edict of Nantes revoked by Louis XIV. and the Proteftants perfecuted.

1686 The Newtonian philofophy promulgated.

1687 The palace of Verfailles finifhed by Louis XIV.

1688 The revolution in England begins Nov. 5—King James abdicates, and retires to France, December 23—King William and Queen Mary proclaimed February 13—Vifcount Dundee holds out for James in Scotland, but is killed at the battle of Killycrankie; upon which the Highlanders difperfe—Smyrna deftroyed by an earthquake.

1689 The land-tax and toleration acts paffed in England—William Fuller, who pretended to prove the Prince of Wales fpurious, was voted by the commons to be an impoftor—Several bifhops deprived for not taking the oaths to William—Epifcopacy abolifhed in Scotland.

1690 The battle of the Boyne, gained by William againft James, in Ireland.

1691 The war in Ireland finifhed by the furrender of Limerick to William—The obliquity of the ecliptic obferved by Flamftead to be 23° 28′ 32″.

1692 The Englifh and Dutch fleets, commanded by Admiral Ruffel, defeat the French fleet off La Hogue—The maffacre of Glencoe in Scotland, Jan. 31, O. S.—Earthquakes in England and Jamaica, Sept. 8—Hanover made an electorate of the empire.

1693 Bayonets firft ufed by the French in the battle of Turin—Bank of England eftablifhed by King William—The firft public lottery drawn.

1694 Death of Queen Mary, at the age of 33—Stamp-duties inftituted in England.

1697 The peace of Ryfwick.

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1699 The Scots fettled a colony at the ifthmus of Darien in America, and called it *Caledonia.*

1700 Charles XII. of Sweden begins his reign.

1701 King James II. dies at St. Germains in his 68th year—Pruffia erected into a kingdom—Society for the propagation of the gofpel in foreign parts eftablifhed.

1702 King William dies, aged 50, and is fucceeded by Queen Anne, daughter to James II. who, with the Emperor and States General, renews the war againft France and Spain—The French fent colonies to the Miffiffippi.

1703 The obliquity of the ecliptic obferved by Bianchini to be 23° 28′ 25″.

1704 Gibraltar taken from the Spaniards by Admiral Rooke—The battle of Blenheim won by the Duke of Marlborough and allies againft the French—The Court of Exchequer in England inftituted.

1706 The treaty of Union betwixt England and Scotland figned July 22—The battle of Ramillies won by Marlborough and the allies.

1707 The firft Britifh Parliament—The allies defeated at Almanza.

1708 Minorca taken from the Spaniards by General Stanhope—The battle of Oudenarde won by Marlborough and the allies.

1709 Peter the Great, czar of Mofcovy, defeats Charles XII. at Poltowa, who flies to Turkey—The battle of Malplaquet won by Marlborough and the allies.

1710 Queen Anne changes the whig miniftry—St. Paul's cathedral in London, rebuilt by Sir Chriftopher Wren in 37 years, at one million expence, by a duty on coals—The Englifh South-fea company began.

1713 The peace of Utrecht, whereby Newfoundland, Nova Scotia, New Britain, and Hudfon's Bay in North America, were yielded to Great Britain; Gibraltar and Minorca in Europe were alfo confirmed to the faid crown by this treaty.

1714 Queen Anne dies at the age of 50, and is fucceeded by George I.—Intereft reduced to five *per cent.*

1715 Louis XIV. dies, and is fucceeded by his great-grandfon Louis XV.—The rebellion in Scotland begins in September, under the earl of Mar, in favour of the Pretender. The action of Sheriffmuir, and the furrender of Prefton, both in November, when the rebels difperfe—The obliquity of the ecliptic obferved by Louville to be 23° 28′ 24″.

1716 The Pretender married the princefs Sobiefka, granddaughter of John Sobiefki, late king of Poland—An act paffed for feptennial parliaments.

1718 Sardinia erected into a kingdom, and given to the duke of Savoy.

1719 The Miffiffippi fcheme at its height in France—Lombe's filk-throwing machine, containing 26,586 wheels, erected at Derby.

1720 The fouth-fea fcheme in England begun April 7, was at its height at the end of June, and quite funk about September 29—A great earthquake in China.

1724 An earthquake in Denmark.

1727 King George dies, in the 68th year of his age; and is fucceeded by his only fon, George II.—Inoculation firft tried on criminals—Ruffia, formerly a dukedom, is now eftablifhed as an empire—The aberration of the fixed ftars difcovered by Dr. Bradley.

1732 Kouli Khan ufurps the Perfian throne, and conquers the Mogul empire—The fettlement of Georgia in North America begun.

1733 The Jefuits expelled from Paraguay.

1736 A tranfit of Mercury obferved by Caffini.

1737 A dreadful hurricane at the mouth of the Ganges, Oct. 10.

1738 Weftminfter-bridge, confifting of 15 arches, begun; finifhed in 1750, at the expence of 389,000l.—The order of St. Januarius eftablifhed at Naples.

1739 Letters of marque iffued out in Britain againft Spain, July 31; and war declared, October 23—The empire of Indoftan ruined by Kouli Khan—An intenfe froft in Britain.

1743 The battle of Dettingen won by the Englifh and allies in favour of the queen of Hungary—A dreadful plague in Sicily.

1744 War declared againft France—Commodore Anfon returns from his voyage round the world.

1745 The allies lofe the battle at Fontenoy—The rebellion breaks out in Scotland, and the Pretender's army defeated by the duke of Cumberland at Culloden, April 16, 1746.

1746 Britifh Linen Company erected—Lima deftroyed by an earthquake.

1747 Kouli Khan murdered.

1748 The peace of Aix-la-Chapelle, by which a reftitution of all places taken during the war was to be made on all fides.

1749 The intereft on the Britifh funds reduced to 3 *per cent.*—Britifh herring fifhery incorporated—The colony of Nova Scotia founded.

1750 Earthquake in England.

1751 Frederic prince of Wales, father to his prefent majefty, died—Antiquarian Society at London incorporated.

1752 The new ftyle introduced into Great-Britain; the 3d of September being counted the 14th.

1753 The Britifh Mufeum erected at Montague-houfe—Society of arts, manufactures, and commerce, inftituted in London.

1754 A dreadful eruption of mount Ætna—A great earthquake at Conftantinople, Cairo, &c. Sept. 2d.

1755 Quito in Peru deftroyed by an earthquake, April 28th—Lifbon deftroyed by an earthquake, Nov. 1ft.

1756 146 Englifhmen confined in the black hole at Calcutta in the Eaft Indies, and 123 found dead next morning—Marine fociety eftablifhed at London—The king of Pruffia commenced hoftilities in the month of Auguft in Saxony. Defeats the Auftrians at Loo.

1757 Damien attempted to affaffinate the French king—The king of Pruffia invades Bohemia. Defeats the Auftrians at Reichenberg, April 21ft, and at Prague, May 6th. Repulfed by Count Daun at Kolin, June 18th—The allies defeated by the French at Haftenbeck, July 26th—Convention of Clofter-Seven, Sept. 8th—The king of Pruffia defeats the French and Auftrians at Rofbach, Nov. 5. The Pruffians defeated near Breflaw, Nov. 22d. The Auftrians defeated at Liffa, Dec. 5th.

1758 Senegal taken by the Britifh, May 1ft. They take Louifbourg, July 27th—The king of Pruffia defeats the Ruffians at Zorndorf, Auguft 25th. Is defeated by Count Daun at Hoch-Kirchen, Oct. 14th—Goree taken by Commodore Keppel, Dec. 29th—Attempt to affaffinate the king of Portugal, Dec. 3d.

1759 General Wolfe killed in the battle of Quebec, which is gained by the Britifh—The French defeated by Prince Ferdinand at Bergen, April 13th—Guadaloupe taken by the Britifh, May 1ft—King of Pruffia defeated by the Ruffians at Cunerfdorf, Auguft 12th—The French fleet defeated by Admiral Hawke, Nov. 20th—Balbec and Tripoli deftroyed by an earthquake, Dec. 5th.

1760 King George II. dies Oct. 25th, in his 77th year, and is

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succeeded by his prefent majefty, who, on the 22d September 1761, married the princefs Charlotte of Mecklenburgh Strelitz—Blackfriars bridge, confifting of 9 arches, begun; finifhed 1770, at the expence of 152,840l.

1761 A tranfit of Venus over the fun, June 6th—Earthquakes in Syria, Oct. 13th—The king of Pruffia defeats the Auftrians at Torgau, Nov. 3d—Pondicherry taken by Col. Coote, Jan 15th—Belleifle furrendered to the Britifh, Feb. 4th.

1762 War declared againft Spain—Peter III. emperor of Ruffia, depofed, imprifoned, and murdered—American Philofophical Society eftablifhed in Philadelphia—George Auguftus Frederic, prince of Wales, born Auguft 12th—Martinico furrendered to the Britifh, Feb. 4th—Havannah furrendered to ditto, Aug. 12th—Manilla taken by ditto, Oct. 6th.

1763 The definitive treaty of peace between Great Britain, France, Spain, and Portugal, concluded at Paris, Feb. 10th; which confirmed to Great Britain the extenfive provinces of Canada, Eaft and Weft Florida, and part of Louifiana, in North America; alfo the iflands of Grenada, St. Vincent, Dominica, and Tobago, in the Weft Indies—The Jefuits expelled from France.

1764 The parliament granted 10,000l. to Mr. Harrifon for his difcovery of the longitude by his time-piece—Famine and peftilence in Italy—An earthquake at Lifbon.

1765 A royal charter paffed, incorporating the fociety of Artifts—An act paffed annexing the fovereignty of the ifland of Man to the crown of Great Britain.

1766 April 21ft, a fpot or macula of the fun, more than thrice the bignefs of our earth, paffed the fun's centre—The American ftamp-act repealed, March 18th—A great earthquake at Conftantinople—The Jefuits expelled from Bohemia and Denmark.

1767 The Jefuits expelled from Spain, Venice, and Genoa, April 2d—Martinico almoft deftroyed by an earthquake—The Proteftants tolerated in Poland, Nov. 2d.

1768 Academy of painting eftablifhed in London—The Turks imprifon the Ruffian ambaffador, and declare war againft that empire—The Jefuits expelled from Naples, Malta, and Parma.

1769 Paoli fled from Corfica June 13th. The ifland then reduced by the French.

1770 An earthquake at St. Domingo.

1771 Dr. Solander and Mr. Banks, in the Endeavour, Lieut. Cook, return from a voyage round the world—An emigration of 500,000 Tourgouths from the coafts of the Cafpian fea to the frontiers of China.

1772 The king of Sweden changes the conftitution from ariftocracy to a limited monarchy—The Pretender marries a princefs of Germany, grand-daughter of Thomas late Earl of Aylefbury—The Emperor of Germany, Emprefs of Ruffia, and the King of Pruffia, ftrip the King of Poland of a great part of his dominions, which they divide among themfelves, in violation of the moft folemn treaties.

1773 Captain Phipps fent to explore the North Pole; but having made 81 degrees, is in danger of being locked up by the ice, and his attempt to difcover a paffage in that quarter fails—Judges fent to India for the better adminiftration of juftice in the Englifh fettlements—The war between the Ruffians and Turks proves difgraceful to the latter, who lofe the iflands in the Archipelago—The fociety of Jefuits fuppreffed by the pope's bull, Auguft 25th.

1774 Peace proclaimed between the Ruffians and the Turks—The American colonifts refift the tea-duty, and deny the right of the Britifh parliament to tax them—The American colonies fend deputies to Philadelphia, who affume the title of *The Congrefs of the Thirteen United Provinces*, and all the powers of Government.

1775 The American war commences. Action at Bunker's Hill, June 7th—The Spaniards land near Algiers, and are defeated, July 8th.

1776 The United States of America declare their independence—The Americans defeated at Long-Ifland, Aug. 27th.

1777 Philadelphia taken by the Britifh, Oct. 3d—General Burgoyne with his army furrenders to the Americans.

1778 A moft extraordinary eruption of Vefuvius Auguft 8th—The fiege of Gibraltar begun by the Spaniards, July 8th.

1779 Captain Cook killed by the natives of the iflands in the South feas.

1780 Jan. 14th, 6h. A. M. the thermometer fufpended in the open air at Glafgow, ftood at 46° below 0—The Spanifh fleet defeated by Admiral Rodney, Jan. 16th—Charleftown furrendered to the Britifh, May 12th—A dreadful infurrection in London, and riots in many other parts of the kingdom—Several Britifh fhips taken by the combined fleets of France and Spain—Lord Cornwallis defeats the Americans at Camden—A dreadful hurricane in the Leeward Iflands, Oct. 9th—An extraordinary ftorm of wind in England—War declared againft the Dutch, Dec. 20th.

1781 An obftinate engagement between the Dutch and Britifh fleets near the Dogger Bank, Auguft 5th—Lord Cornwallis with his army furrender to the united forces of France and America, Oct. 18th.

1782 Minorca furrendered to the Spaniards, Feb. 4th—The French fleet under De Graffe almoft deftroyed by Admiral Rodney, April 12th—Contractors difqualified by parliament—The Spanifh floating batteries before Gibraltar entirely deftroyed, Sept. 12th.

1783 Preliminaries of a general peace figned—America declared independent, Jan. 20th—A dreadful earthquake, attended with many extraordinary circumftances, in Italy and Sicily—A volcanic eruption in Iceland furpaffing any thing recorded in hiftory—A large meteor appears to the northward of Shetland, and takes its direction fouthward, its tract having been obferved for more than 1000 miles—Eaft and Weft Florida ceded to Spain—The order of knights of St. Patrick founded in Ireland—Armiftice betwixt Great Britain and Holland, Feb. 10th—Ratification of the definitive treaty of peace between Great Britain, France, Spain, and the United States of America, Sept. 3d.

1784 The city of London wait on the king with an addrefs of thanks for difmiffing the coalition miniftry, Jan. 16th—The great feal ftolen from the lord chancellor's houfe in Great Ormond-ftreet, March 24th—The ratification of the peace with America arrived, April 7th—The definitive treaty of peace between Great Britain and Holland, May 24th—The memory of Handel commemorated by a grand jubilee at Weftminfter Abbey, May 26th—Proclamation for a public thankfgiving, July 2d—Mr. Lunardi afcended in a balloon from the Artillery-ground, Moorfields, the firft attempt of the kind in England, Sept. 15th—The bull feafts abolifhed in Spain, except for pious or patriotic ufes by edict, Nov. 14.

1785 Mr. Blanchard and Dr. Jefferies went from Dover to Calais in an air balloon, in about two hours, Jan. 7th

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—A treaty of confederacy to preserve the indivisibility of the German empire entered into by the king of Prussia, the electors of Hanover, Saxony, and Mentz, May 29th—M. de Rosier and M. Romain ascended at Boulogne, intending to cross the channel; in twenty minutes the balloon took fire, and the aeronauts came to the ground and were killed on the spot—The toll was taken off Blackfriars bridge, June 22d—The preliminaries of peace were signed between the emperor and Holland, at Paris, Sept. 20th—The above powers signed the definitive treaty, and a treaty of alliance between France and the Dutch on the 16th Nov.—Dr. Seabury, an American missionary, was constituted bishop of Connecticut by five non-juring Scotch prelates, Nov.

1786 The king of Sweden prohibited the use of torture in his dominions—Cardinal Turlone, high inquisitor at Rome, was publicly dragged out of his carriage by an incensed multitude for his cruelty, and hung on a gibbet 50 feet high—Commercial treaty signed between England and France, Sept. 26th—471,000 3 per cent. stock transferred to the landgrave of Hesse, for Hessian soldiers lost in the American war, at 30l. a man, Nov. 21st—Mr. Adams, the American ambassador, presented Dr. White of Pennsylvania, and Dr. Provost of New York, to the archbishop of Canterbury, to be consecrated bishops for the United States. They were consecrated Feb. 4, 1787.

1787 Mr. Burke, at the bar of the house of lords, in the name of all the commons of Great Britain, impeached Warren Hastings, late governor-general of Bengal, of high crimes and misdemeanours, May 21st—The king, by letters patent, erected the province of Nova Scotia into a bishop's see, and appointed Dr. Charles Inglis to be the bishop, Aug. 11.

1788 In the early part of October, the first symptoms appeared of a mental disorder, which afflicted our gracious sovereign. On the 6th of November they were very alarming, and on the 13th a form of prayer for his recovery was ordered by the privy council.

1789 His majesty was pronounced to be in a state of convalescence, Feb. 17, and to be free from complaint, Feb. 26—A general thanksgiving for the king's recovery, who attended the service at St. Paul's with a great procession, April 23d—Revolution in France, capture of the bastile, execution of the governor, &c. July 14th.

1790 Grand confederation in the Champ de Mars, July 14th.

1791 In consequence of some gentlemen meeting to commemorate the French revolution in Birmingham, on the 14th of July, the mob arose and committed the most daring outrages for some days on the persons and properties of many of the inhabitants of the town and neighbourhood; burning and destroying meeting-houses,

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private dwellings, &c. Peace and security were at length restored by the interposition of the military power.

1792 The definitive treaty of peace was signed between the British and their allies, the Nizam and Mahrattas on one part, and Tippoo Sultan on the other, March 19th, by which he ceded one half of his territorial possessions, and delivered up two of his sons to lord Cornwallis, as hostages for the fulfilment of the treaty—Gustavus III. king of Sweden, died on the 29th of March, in consequence of being assassinated by Ankerstroom.

1793 Louis XVI. after having received innumerable indignities from his people, was guillotined, contrary to the express laws of the new constitution, which had declared the person of the king inviolable—France, unable to conciliate England, after many efforts to do so, declares war against her and Holland—The alien bill passed by parliament—Bill for the support of commercial credit passed—The board of agriculture established—A new constitution formed in France—The French revolutionary tribunal instituted—Toulon surrendered to the English, who afterwards evacuate it—The island of Tobago taken, and an unsuccessful attempt made by the English on Martinique—The queen of France tried and beheaded by the Jacobin faction at Paris—The new French calendar formed, and adopted by the people—Pondicherry taken by the British forces in India—Mr. Muir and the Rev. Fysche Palmer tried in Scotland, on a charge of seditious practices, and sentenced to transportation.

1794 The habeas corpus act suspended—John Horne Tooke, Hardy, Thelwall, and others, tried for high treason, and acquitted—Martinico, Guadaloupe, and other French West India Islands, taken by the British forces—Corsica annexed to the British dominions—Lord Macartney sent ambassador to China—Poland subjugated, after a gallant struggle for liberty, by Prussia and Russia—Lord Howe engages the French fleet, the latter losing 7 ships of the line, June 1st—Madame Elizabeth, sister to Louis XVI. tried and beheaded in France—Robespierre and his adherents guillotined at Paris.

1795 The Stadtholder takes refuge in England, in consequence of the complete conquest of Holland by the French—The Prince of Wales's debts paid a second time by parliament—The exportation of grain prohibited, and the distilleries stopped in consequence of the high price of bread—Negapatam, the principal Dutch fort in the island of Ceylon, taken by the English—The church of St. Paul, Covent-Garden, burnt.

1796 Million bank dissolved by act of parliament—A bounty ordered by the legislature, to encourage the importation of grain—Bread 15d. the quartern loaf, in London—Powder mills at Hounslow accidentally blew up.

CHRONOMETER, in general, denotes any instrument or machine used in measuring time; such are dials, clocks, watches, &c. The term *chronometer*, however, is generally used in a more limited sense, for a kind of clock so contrived as to measure a small portion of time with great exactness, even to the sixteenth part of a second; of such a one there is a description in Desaguliers's experimental philosophy, invented by the late ingenious Mr. George Graham; which must be allowed to be of great use for measuring small portions of time in astronomical observations, the time of the fall of bodies, the velocity of running waters, &c. But long spaces of time cannot be measured by it with sufficient exactness, unless its pendulum be made to vibrate in a cycloid; because otherwise it is liable to err considerably, as all clocks are which have short pendulums that swing in large arches of a circle.

Several machines have been contrived for measuring time, under the name of *chronometers*, upon principles very different from those on which clocks and watches are constructed. In

plate 80. fig. 1. reprefents an *air-chronometer*, which is conftructed in the following manner: Provide a glafs tube of about an inch in diameter, and three or four feet long: the diameter of the infide of this tube muft be precifely equal in every part: at the bottom muft be a fmall hole, clofely covered with a valve. In the tube place a pifton, E, fig. 2. which is made to fit it exactly, and muft be oiled, that it may move in the tube with the greateft freedom: in this pifton there is a cock that fhuts quite clofe; and from the top of it there goes a cord F, which paffes through the handle G. The cock of the pifton being clofed, it is to be let down to the bottom of the tube, and being then drawn up to the top, the air will then rufh in by the valve at the bottom of the tube, and fupport the pifton. You are then to turn the cock, fo as to make a very fmall vent; and the air paffing flowly through that vent, the pifton will gradually defcend and fhow the hour, either by lines cut in the tube with a diamond, or marked on the glafs. If this chronometer fhould go too faft or too flow, it may be eafily regulated by altering the pofition of the cock in the pifton, as it is on that the whole depends. If, inftead of marking the tube, you would have the time fhown by a dial, it may be eafily effected by placing an axis to which the hand of the dial is fixed, directly over the tube, and winding the ftring to which the pifton is joined round that axis; for then, as the pifton defcends, the axis will gradually turn the hand, and fhow the hour: but it muft be obferved, that as the defcent of the pifton is not conftantly regular, on account of the decreafe of refiftance from the quantity of the fubjacent air as the pifton defcends, the axis therefore muft not be a regular cylinder, but conical, like the fufee of a watch, as in fig. 3, by which means the motion of the hand of the dial will be conftant and regular.

Fig. 4. is a *lamp chronometer*, confifting of a chamber lamp A, which is a cylindrical veffel about three inches high, and one inch diameter, placed in the ftand B. The infide of this veffel muft be every where exactly of the fame diameter. To the ftand B is fixed the handle C, which fupports the frame DEFG, about 12 inches high, and four wide. This frame is to be covered with oiled paper, and divided into twelve equal parts by horizontal lines; at the end of which are written the numbers for the hours, from 1 to 12, and between the horizontal lines are diagonals that are divided into halves, quarters, &c. On the handle B, and clofe to the glafs, is fixed the ftyle or gnomon H. Now, as the diftance of the ftyle from the flame of the lamp is only half an inch, if the diftance of the frame from the ftyle is only fix inches, then, while the float that contains the light defcends by the decreafe of the oil one inch, the fhadow of the ftyle on the frame will afcend twelve inches, that is, its whole length, and fhow by its progreffion the regular increafe of the hours, with their feveral divifions. It is abfolutely neceffary, however, that the oil ufed in this lamp be always of the fame fort, and quite pure, and that the wick alfo be conftantly of the fame fize and fubftance; as it is on thefe circumftances, and the uniform figure of the veffel, that the regular progrefs of the fhadow depends.

Chronometer, among muficians, a fanciful kind of inftrument invented by *Loulie*, a French mufician, for the purpofe of meafuring time by means of a pendulum. The form of the inftrument is that of an Ionic pilafter, and is defcribed by Malcolm in his Treatife of Mufic, p. 407.

CHROSTASIMA, in natural hiftory, a genus of pellucid gems, comprehending all thofe which appear of one fimple and permanent colour in all lights; fuch are the diamond, carbuncle, ruby, garnet, amethyft, fapphire, beryl, emerald, and the topaz. See Diamond, Carbuncle, &c.

CHRYSALIS, or Aurelia, in natural hiftory, a ftate of reft and feeming infenfibility, which butterflies, moths, and feveral other kinds of infects, muft pafs through before they arrive at their winged or moft perfect ftate. In this ftate, no creatures afford fo beautiful a variety as the butterfly kinds, and they all pafs through this middle ftate without one exception. The figure of the aurelia or chryfalis generally approaches to that of a cone; or at leaft the hinder part of it is in this fhape; and the creature, while in this ftate, feems to have neither legs nor wings, nor to have any power of walking. It feems indeed to have hardly fo much as life. It takes no nourifhment in this ftate, nor has it any organs for taking any; and indeed its pofterior part is all that feems animated, this having a power of giving itfelf fome motions. The external covering of the chryfalis is cartilaginous, and confiderably large, and is ufually fmooth and gloffy: but fome few of them have a few hairs; fome are alfo as hairy as the caterpillars from which they are produced; and others are rough, and, as it were, fhagreened all over. In all of thefe there may be diftinguifhed two fides: the one of which is the back, the other the belly of the animal. On the anterior part of the latter, there may always be diftinguifhed certain little elevations running in ridges, and refembling the fillets wound about mummies: the part whence thefe have their origin is efteemed the head of the animal. The other fide, or back, is fmooth, and of a rounded figure in moft of the chryfalifes; but fome have ridges on the anterior part, and fides of this part; and thefe ufually terminate in a point, and make an angular appearance on the chryfalis.

From this difference is drawn the firft general diftinction of thefe bodies. They are by this divided into two claffes; the round and the angular kinds. The firft are, by the French naturalifts, called *feves*; from the common cuftom of calling the chryfalis of the filkworm, which is round, by this name. There is fomething more regular in this diftinction than might at firft be conceived; for the divifion is continued from the fly-ftate: the rounded chryfalifes being almoft all produced by the *phalenæ* or moths; and the angular ones by the *papilios*, or day-flies. There are feveral fubordinate diftinctions of thefe kinds; but, in general, they are lefs different from one another than the caterpillars from whence they are produced. The head of thofe of the firft clafs ufually terminates itfelf by two angular parts, which ftand feparate one from another, and refemble a pair of horns. On the back, eminences and marks are difcovered, which imagination may form into eyes, nofe, chin, and other parts of the human face.

There is a great variety and a great deal of beauty in the figures and arrangement of the eminences and fpots on the other parts of the body of the chryfalifes of different kinds. It is a general obfervation, that thofe chryfalifes which are terminated by a fingle horn, afford day-butterflies of the kind of thofe which have buttoned antennæ, and whofe wings, in a ftate of reft, cover the under part of their body, and which ufe all their fix legs in walking, thofe of many other kinds ufing only four of them. Thofe chryfalifes which are terminated by two angular bodies, and which are covered with a great number of fpines, and have the figure of a human face on their back in the greateft perfection, afford butterflies of the day-kind; and of that clafs the characters of which are, their walking on four legs, and ufing the other two, that is, the anterior part, in the manner of arms or hands. The chryfalifes which have two angular bodies on their heads, but fhorter than thofe of the preceding, and whofe back fhows but a faint fketch of the human face, and which have fewer fpines, and thofe lefs fharp, always turn to that fort of butterfly the upper wings of which are divided into fegments, one of which is fo long as to reprefent a tail, and whofe under wings are folded over the upper part of the back. A careful obfervation will eftablifh many more rules of this kind, which are not fo perfect as to be

free from all exceptions; yet are of great ufe, as they teach us in general what fort of fly we are to expect from the chryfalis, of which we know not the caterpillar, and therefore can only judge from appearances. Thefe are the principal differences of the angular chryfalifes; the round ones alfo have their different marks not lefs regular than thofe.

The greater number of the round chryfalifes have the hinder part of their body of the figure of a cone; but the upper end, which ought to be its circular plane bafe, is ufually bent and rounded into a fort of knee; this is ufually called the head of the chryfalis; but there are alfo fome of this kind, the head of which is terminated by a nearly plane furface: fome of the creeping ten-legged caterpillars give chryfalifes of this kind, which have each of them two eminences that feem to bring them towards the angular kind.

Among the angular chryfalifes there are fome whofe colours feem as worthy our obfervation as the fhapes of the others. Many of them appear fuperbly clothed in gold. Thefe elegant fpecies have obtained the name of *chryfalis* and *aurelia*, which are derived from Greek and Latin words, fignifying *gold*; and from thefe all other bodies of the fame kind have been called by the fame names, though lefs, or not at all, intitled to them. As fome kinds are thus gilded all over, fo others are ornamented with this gay appearance in a more fparing manner, having only a few fpots of it in different places on their back and belly. Thefe obvious marks, however, are not to be depended upon as certain characters of diftinction: for accidents in the formation of the chryfalis may alter them; and thofe which naturally would have been gilded all over, may be fometimes only fo in part; and either thefe or the others may, by accident, be fo formed, as to fhow nothing of this kind at all, but be only of a dufky brown. Thofe, however, which have neither filver nor gold to recommend them to your eyes, do not want other colours, and thofe beautifully variegated. Some of them are all over of an elegant green, as is the chryfalis of the fennel caterpillar; others of an elegant yellow; and fome of a bright greenifh tinge, variegated with fpots of a fhining black; we have a very beautiful inftance of this laft kind in the chryfalis of the elegant cabbage-caterpillar. The general colour of the chryfalis of the common butterflies, however, is brown. Some are alfo of a fine deep black; and of thefe many are fo fmooth and gloffy, that they are equal to the fineft Indian Japan. The common caterpillar of the fig-tree gives an inftance of one of thefe moft beautiful gloffy ones; the caterpillar of the vine affords another of thefe fine black chryfalifes. The rounded chryfalifes do not afford any thing of that variety of colouring fo remarkably beautiful in the angular ones; they are ufually of a dufky yellow, in different fhades, and are often varioufly fpotted with black: but thefe, as well as all other chryfalifes, before they arrive at their fixed colour, pafs through feveral other temporary ones; fome being of a different colour when firft produced from the caterpillar, from what they are a few days afterwards; and fome varying fo greatly, though only in degree, as not to be diftinguifhable, even by the moft converfant eye, from what they were when firft produced. The green rough caterpillar of the cabbage has a chryfalis which is green at firft; and from that gradually goes through all the fhades of green to a faint yellow, which is its lafting colour; and one of the oak caterpillars yields a chryfalis beautifully fpotted with red at its firft appearance; but thefe fpots change to brown for their fixed colour: the third day from their formation ufually fixes their lafting colours; and if they are obferved to turn black in any part of this time, it is a fign that they are dead or dying.

The feveral fpecies of infects, as a fly, fpider, and an ant, do not differ more evidently from one another in regard to appearance, than do a caterpillar, its chryfalis, and a butterfly produced from it; yet it is certain, that thefe are all the product of the fame individual egg; and nothing is more certain, than that the creature which was for a while a caterpillar, is, after a certain time, a chryfalis, and then a butterfly. Thefe great changes produced in fo fudden a manner, feem like the *metamorphofes* recorded in the fables of the ancients; and indeed it is not improbable that thofe fables firft took their origin from fuch changes.

The parts being diftinguifhable in the chryfalis, we eafily find the difference of the fpecies of the fly that is to proceed from it. The naked eye fhows whether it be one of thofe that have, or of thofe that have not, a trunk; and the affiftance of a microfcope fhows the antennæ fo diftinctly, that we are able to difcern whether it belongs to the day or night clafs; and often to what genus, if not the very fpecies: nay, in the plumofe horned kinds, we may fee, by the antennæ, whether a male or female phalæna is to be produced from the chryfalis; the horns of the female being in this ftate evidently narrower, and appearing lefs elevated above the common furface of the body, than thofe of the male. All thefe parts of the chryfalis, however, though feen very diftinctly, are laid clofe to one another, and feem to form only one mafs; each of them is covered with its own peculiar membrane in this ftate, and all are furrounded together by a common one; and it is only through thefe that we fee them; or rather we fee on thefe the figures of all the parts moulded within, and therefore it requires attention to diftinguifh them. The chryfalis is foft when firft produced, and is wetted on the front with a vifcous liquor; its fkin, though very tender at firft, dries and hardens by degrees: but this vifcous liquor, which furrounds the wings, legs, &c. hardens almoft immediately; and in confequence faftens all thofe limbs, &c. into a mafs, which were before loofe from one another: this liquor, as it hardens, lofes its tranfparence, and becomes brown; fo that it is only while it is yet moift that thefe parts are to be feen diftinct.

It is evident from the whole, that the chryfalis is no other than a butterfly, the parts of which are hid under certain membranes which faften them together; and, when the limbs are arrived at their due ftrength, they become able to break through thefe membranes, and then expand and arrange themfelves in their proper order. The firft metamorphofis, therefore, differs nothing from the fecond, except that the butterfly comes from the body of the caterpillar in a weak ftate, with limbs unable to perform their offices, whereas it comes from the chryfalis perfect.

Mr. Reaumur, in his Hiftory of Infects, vol. 1. has given many curious particulars on the ftructure and ufes of the feveral coverings that attend the varieties of the caterpillar-kind in this ftate. Thefe creatures in general remain wholly immoveable, and feem to have no bufinefs in it but a patient attendance on the time when they are to become butterflies; and this is a change that can happen to them, only as their parts, before extremely foft and weak, are capable of hardening and becoming firm by degrees, by the tranfpiration of that abundant humidity which before kept them foft: and this is proved by an experiment of Mr. Reaumur, who, inclofing fome chryfalifes in a glafs tube, found, after fome time, a fmall quantity of water at the bottom of it; which could have come there no other way, but from the body of the inclofed animal. This tranfpiration depends greatly on the temperature of the air; it is increafed by heat, and diminifhed by cold; but it has alfo its peculiarities in regard to the feveral fpecies of butterfly to which the chryfalis belongs.

According to thefe obfervations, the time of the duration of the animal in the chryfalis ftate muft be, in different fpecies, very different; and there is indeed this wide difference in the extremes, that fome fpecies remain only eight days in this ftate,

and others eight months. We know that the caterpillar changes its ſkin four or five times during its living in that ſtate; and that all theſe ſkins are at firſt produced with it from the egg, lying cloſely over one another. It parts with, or throws off all theſe one by one, as the butterfly, which is the real animal, all this time within, grows more and more perfect in the ſeveral firſt changes. When it throws off one, it appears in another ſkin exactly of the ſame form; but at its final change from this appearance, that is, when it throws off the laſt ſkin, as the creature within is now arrived at ſuch a degree of perfection as to need no farther taking of nouriſhment, there is no farther need of teeth, or any of the other parts of a caterpillar. The creature, in this laſt change, proceeds in the very ſame manner as in all the former, the ſkin opening at the back, and the animal making its way out in this ſhape. If a caterpillar, when about to throw off this laſt ſkin, be thrown into ſpirit of wine, and left there for a few days, the membranes within will harden, and the creature may be afterwards carefully opened, and the chryſalis taken out, in which the form of the tender butterfly may be traced in all its lineaments, and its eyes, legs, &c. evidently ſeen. It is not neceſſary, however, to ſeize upon this exact time for proving the exiſtence of the chryſalis or butterfly in the caterpillar: for if one of theſe animals be thrown into ſpirit of wine, or into vinegar, ſome days before that time, and left there for the fleſh to harden, it may afterwards be diſſected, and all the lineaments of the butterfly traced out in it; the wings, legs, antennæ, &c. being as evident here, and as large, as in the chryſalis.

It is very evident from this, that the change of the caterpillar into the chryſalis is not the work of a moment; but is carrying on for a long time before, even from the very hatching of the creature from the egg. The parts of the butterfly, however, are not diſpoſed exactly in the ſame manner while in the body of the caterpillar, as when left naked in the form of the chryſalis: for the wings are proportionally longer and narrower, being wound up into the form of a cord; and the antennæ are rolled up on the head. The trunk is alſo twiſted up and laid upon the head; but this in a very different manner from what it is in the perfect animal, and very different from that in which it lies within the chryſalis; ſo that the firſt formation of the butterfly in the caterpillar, by time arrives at a proper change of the diſpoſition of its parts, in order to its being a chryſalis. The very eggs, hereafter to be depoſited by the butterfly, are alſo to be found not only in the chryſalis, but in the caterpillar itſelf, arranged in their natural, regular order. They are indeed in this ſtate very ſmall and tranſparent; but after the change into the chryſalis they have their proper colour.

As ſoon as the ſeveral parts of the butterfly, therefore, are arrived at a ſtate proper for being expoſed to the more open air, they are thrown out from the body of the caterpillar ſurrounded only with their membranes; and as ſoon as they are arrived after this at a proper degree of ſtrength and ſolidity, they labour to break through theſe thinner coverings, and to appear in their proper and natural form. The time of their duration in this ſtate of chryſalis is very uncertain, ſome remaining in it only a few days, others ſeveral months, and ſome almoſt a year in appearance. But there is a fallacy in this that many are not aware of. It is natural to think, that as ſoon as the creature has incloſed itſelf in its ſhell, be that of what matter it will, it undergoes its change into the chryſalis ſtate. And this is the caſe with the generality: yet there are ſome which are eight or nine months in the ſhell before they become chryſalises; ſo that their duration in the real chryſalis ſtate is much ſhorter than it naturally appears to be. M. Reaumur carefully watched the auriculated caterpillar of the oak in its ſeveral changes, and particularly from its chryſalis, which is of this laſt kind, into the fly; and has given an account of the method of this as an inſtance of the general courſe of nature in theſe operations.

The membranes which envelop the creature in this chryſalis ſtate are at firſt tough and firm, and immediately touch the ſeveral parts of the incloſed animal; but by degrees, as theſe parts harden, they become covered, ſome with hairs, and others with ſcales. Theſe, as they continue to grow, by degrees fall off the ſeveral particular membranes which cover the parts on which they are placed, to a greater diſtance, and by degrees looſen them from the limbs. This is one reaſon of thoſe membranes drying and becoming brittle. The middle of the upper part of the CORSELET is uſually marked with a line which runs in a longitudinal direction; and this part is always more elevated than the reſt, even in the conic kinds, which are no otherwiſe angular. This line is in ſome very bold and plain; in others, it is ſo faint as not to be diſtinguiſhable without glaſſes; but it is always in the midſt of that line that the ſhell begins to open. The motion of the head of the butterfly backwards firſt occaſions this crack; and a few repetitions of the ſame motion open it the whole length of the line.

The clearing itſelf, however, entirely, is a work of more time in this caſe, than is the paſſing of the chryſalis out of the body of the caterpillar. In that caſe there is a crack ſufficiently large in the ſkin of the back, and the whole chryſalis being looſe comes out at once. But in this caſe, every particular limb, and part of the body, has its ſeparate caſe; and theſe are almoſt inconceivably thin and tender, yet it is neceſſary that every part be drawn out of them before it appear naked to the open air. As ſoon as all this is effected, and the animal is at full liberty, it either continues ſome time upon the remains of its covering, or creeps a little way diſtant from it, and there reſts. The wings are what we principally admire in this creature. Theſe are at this time ſo extremely folded up, and placed in ſo narrow a compaſs, that the creature ſeems to have none at all: but they by degrees expand and unfold themſelves; and finally, in a quarter of an hour, or half an hour at the utmoſt, they appear at their full ſize, and in all their beauty. The manner of this ſudden unfolding of the wings is this: the ſmall figure they make when the creature firſt comes out of its membranes, does not prevent the obſerving that they are at that time conſiderably thick. This is owing to its being a large wing folded up in the niceſt manner, and with folds ſo arranged as to be by no means ſenſible to the eye; for the wing is never ſeen to unfold; but, when obſerved in the moſt accurate manner, ſeems to grow under the eye to this extent. When the creature is firſt produced from the ſhell, it is every where moiſt and tender; even its wings have no ſtrength or ſtiffneſs, till they expand themſelves; but they then dry by degrees, and, with the other parts, become rigid and firm. But if any accident prevents the wings from expanding at their proper time, that is, as ſoon as the creature is out of its ſhell, they never afterwards are able to extend themſelves; but the creature continues to wear them in their contracted and wholly uſeleſs ſtate; and very often, when the wings are in part extended before ſuch an accident happens, it ſtops them in a partial extenſion, and the creature muſt be contented to paſs its whole life with them in that manner.

Mr. Reaumur has proved, that heat and cold make great differences in the time of hatching the butterfly from its chryſalis ſtate: and this he particularly tried with great accuracy and attention, by putting them in veſſels in warm rooms, and in ice-houſes; and it ſeemed wholly owing to the haſtening or retarding the evaporation of the abundant humidity of the animal in the chryſalis ſtate, that it ſooner or later appeared in the butterfly form. He varniſhed over ſome chryſaliſes, in order to try what would be the effect of thus wholly preventing their tranſpiration; and the conſequence was, that the butterfly

came forth from these two months later than their natural time. Thus was the duration of the animal in this state lengthened; that is, its existence was lengthened: but without any advantage to the creature, since it was in the time of its state of inaction, and probably of insensibility.

Though this was of no consequence, Mr. Reaumur deduces a hint from it that seems to be of some use. He observes, that hens eggs, of which we make so much use, and eat in so many forms, are properly a sort of chrysalis of the animal: their germ, after they are impregnated by the cock, containing the young animal alive; and waiting only a due degree of warmth to be hatched, and appear in its proper form. Eggs transpire notwithstanding the hardness of their shells; and when they have been long kept, there is a road found near one of their ends, between the shell and the internal membrane. This is a mark of their being stale, and is the effect of an evaporation of part of their humidity: and the same varnish which had been used to the chrysalis, being tried on eggs, was found to preserve them for two years, as fresh as if laid but the same day, and such as the nicest palate could not distinguish from those that were so. (See EGGS.) It is not yet known how much farther this useful speculation might be carried, and whether it might not be of great use even to human life, to invent something that should act in the manner of this varnish, by being rubbed over the body, as the *athletæ* did of old, and the savages of the West Indies do at this time, without knowing why. But to return to the insects, which are the subjects of this article; their third state, that in which they are winged, is always very short, and seems destined for no other action but the propagation of the species. See PAPILIO.

CHRYSANTHEMUM, CORN-MARIGOLD; a genus of the polygamia superflua order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ*. The receptacle is naked; the pappus marginated, or consisting only of a border; the calyx hemispherical and imbricated, with the marginal scales membranaceous. There are 19 species, of which the following are the most remarkable: 1. The *serotinum* is a native of North America. The roots of this plant creep far under the surface, and send up strong stalks more than four feet high, garnished with long sawed leaves ending in points. These stalks divide upward into many smaller; each being terminated by a large, white, radiated flower, which appears in the end of August or September. 2. The *coronarium* has been long cultivated in the gardens on account of the beauty of its flowers. It grows to the height of three feet, with a single upright stalk divided into numerous branches; garnished with pinnated leaves, and crowned with elegant compound flowers of different colours and properties. The varieties are, single and double flowers of a cream colour; yellow; yellow and white; brimstone coloured: fistular, or quilled; or those with finely jagged leaves, and flowers of all the above colours and properties. All the varieties begin flowering in July; the flowers are exceedingly numerous, and exhibit a constant succession of full bloom till November; and both single and double are succeeded by abundance of seed. 3. The *putescens*, a native of the Canary islands. It rises with a shrubby stalk near two feet high, dividing into many branches, which are garnished with pretty thick succulent leaves, of a greyish colour, cut into many segments. The flowers come out from the wings of the leaves, growing upon naked footstalks singly, which greatly resemble those of chamomile. There is a succession of flowers on the same plant for the greatest part of the year, for which it is chiefly esteemed. This plant will perfect seeds in Britain when the seasons are favourable. The first kind multiplies very fast by its creeping roots, and will thrive in any soil or situation. The second may be raised in abundance from seed, either in a hot-bed or warm border, in the spring, for transplanting; also by cuttings and slips of their branches in autumn. The third sort may be raised either from seeds or cuttings, but requires to be sheltered in the green-house in winter.

CHRYSES, the priest of Apollo, father of Astynome, called from him *Chryseis*. When Lyrnessus was taken, and the spoils divided among the conquerors, Chryseis fell to the share of Agamemnon. Chryses upon this went to the Grecian camp to solicit his daughter's restoration; and when his prayers were fruitless, he implored the aid of Apollo, who visited the Greeks with a plague, and obliged them to restore Chryseis.

CHRYSIPPUS, a Stoic philosopher, born at Solos in Cilicia, was disciple to Cleanthus, Zeno's successor. He wrote many books, several of which related to logic. None of the philosophers spoke in stronger terms of the fatal necessity of every thing, nor more pompously of the liberty of man, than the Stoics, Chrysippus in particular. He was so considerable among them, as to establish it into a proverb, that if it had not been for Chrysippus, the porch had never been. Yet the Stoics complained, as Cicero relates, that he had collected so many arguments in favour of the sceptical hypothesis, that he could not answer them himself; and thus had furnished Carneades, their antagonist, with weapons against them. There is an apophthegm of this philosopher preserved, which does him honour. Being told that some persons spoke ill of him, "It is no matter (said he), I will live so that they shall not be believed."

CHRYSIS, or GOLDEN-FLY, in natural history; a genus of insects belonging to the order of hymenoptera. The mouth is armed with jaws, but has no proboscis; the antennæ are filiform, bent, and consist of 12 articulations; the abdomen is arched, with a scale on each side; the anus is dentated, and armed with a sting; the wings lie plain; and the body appears as if gilt. There are several species; but the ignita, or flaming chrysis, is beautified with the most resplendent colours. The fore-part of its head is green and gold, and the hinder of a lovely azure. The thorax is likewise azured over, with a mixture of green, and terminates at its extremity with sharp points on both sides. The abdomen is green and gold before, and of a coppery-red behind, imitating molten copper highly polished. The whole insect is dotted on its upper part, which gives it a great resplendency of colour. The antennæ are black, and legs green intermixed with gold. This species dwells in holes of walls between the stones, and in the mortar that cements them. It is often seen issuing from such holes, where it nestles and performs its work. The larvæ, which resemble those of the wasp, likewise inhabit the holes of decayed walls.

CHRYSITRIX, in botany; a genus of the diœcia order, belonging to the polygamia class of plants. In the hermaphrodite the glume is two-valved, the corollæ from chaff numerous and bristly; many stamina, one within each chaff; one pistillum. The male is the hermaphrodite.

CHRYSOBALANUS, COCOA PLUM; a genus of the monogynia order, belonging to the icosandria class of plants; and in the natural method ranking under the 36th order, *Pomaceæ*. The calyx is quinquefid, the petals five; plum-kernel five-furrowed and five-valved. There is only one species, the icaco, which is a native of the Bahama islands and many other parts of America, but commonly grows near the sea. It rises with a shrubby stalk eight or nine feet high, sending out several side branches which are covered with a dark-brown bark. The flowers are white, and are succeeded by plums like damsons; some blue, some red, and others yellow. The stone is shaped like a pear, and has five longitudinal furrows. The plums have a sweet-luscious taste, and are brought to the tables of the inhabitants, by whom they are much esteemed.

CHRYSOCOMA, GOLDY-LOCKS; a genus of the polyga-


Shining Cuckow.
Crotophaga *Ani.*
Crax *rubra.*
Cyprœa.
Cuculus Indicator *or Honey Guide.*
Dermeftes
Chryfomela
Coracias.
Chinese.
Blue Striped.
Corvus *Dauricus.*

mia æqualis order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ*. The receptacle is naked; the pappus simple; the calyx hemispherical and imbricated; the style hardly longer than the florets. There are nine species, the most remarkable of which are, the linosyris, the coma aurea, and the cornua: these are herbaceous flowering perennials, growing from one to two feet high, ornamented with narrow leaves, and compound flosular flowers of a yellow colour. They are easily propagated by dividing the roots or by cuttings; but the two last require to be sheltered in the green-house in winter.

CHRYSOGONUM, in botany; a genus of the polygamia necessaria order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ*. The receptacle is paleaceous; the pappus monophyllous, and tridented; the calyx pentaphyllous; the seeds wrapped up each in a tetraphyllous calyculus, or little cup.

CHRYSOLARUS (Emanuel), one of those learned men in the 14th century who brought the Greek literature into the west. He was a man of rank; and descended from an ancient family, said to have removed with Constantine from Rome to Byzantium. He was sent into Europe by the emperor of the east to implore the assistance of the Christian princes. He afterwards taught at Florence, Venice, Pavia, and Rome; and died at Constantinople, in 1415, aged 47. He wrote a Greek grammar, and some other small pieces.

CHRYSOLITE, or YELLOWISH-GREEN TOPAZ; a precious stone of a grass green colour, found in the East Indies, Brazil, Bohemia, Saxony, Spain, in Auvergne and Bourbon in France, and in Derbyshire in England. Some are likewise found with volcanic lavas, as in the Vevarais, where some large lumps have been seen of about 20 or 30 pounds weight; but it is remarkable, that some of these chrysolites are partly decomposed into an argillaceous substance. All chrysolites, however, are far from being of the same kind. The oriental is the same with the peridot, and differs only by its green hue from the sapphires, topazes, and rubies of the same denomination. This becomes electric by being rubbed; has a prismatic form of six, or sometimes of five striated faces; and does not lose its colour or transparency in fire, which the common chrysolite often does, becoming either opaque, or melting entirely in a strong heat. The instant it melts, it emits a phosphoric light like the basis of alum and gypseous spar: with borax it produces a thin colourless glass. Its specific gravity is between 3.600 and 3.700; according to Brisson it is 2.7821, or 2.6923; and that of the Spanish chrysolite 3.0989. The substance of this precious stone is lamellated in the direction of the axis of its primitive form; but the chrysolite from Saxony is foliated in a perpendicular direction to the same axis. The chrysolite of the ancients was the same gem which is now called *topaz*; and the name of itself indicates that it ought to be so. Pliny says that the colour of the chrysolite is yellow like gold.

CHRYSOLITE *Paste*, a kind of glass made in imitation of natural chrysolite, by mixing two ounces of prepared crystal with ten ounces of red-lead, adding 12 grains of crocus martis made with vinegar; and then baking the whole for 24 hours, or longer, in a well luted cucurbit.

CHRYSOMELA, in zoology, a genus of insects belonging to the order of coleoptera. The antennæ are shaped like bracelets, and thicker on the outside; and neither the breast nor the elytra are marginated. There are no less than 122 species enumerated by Linnæus, principally distinguished by differences in their colour. They are to be found almost every where, in woods, gardens, &c. Their progressive motion is slow; and some when caught emit an oily liquor of a disagreeable smell. The glittering colours with which several species of chrysomelæ are adorned, and which seem to exhibit the brilliancy of gold and copper, have occasioned their bearing that pompous name. The larvæ of these insects have in general an oval body, rather oblong and soft; on the fore-part of which are situated six feet, which are scaly, as is also the head. They prey upon the substance of leaves, rejecting the fibrous part. Those of the leaping chrysomelæ infest the cotyledons and tender leaves of plants. Of this genus is that very pernicious insect called by the country people the *turnip fly*, which devours turnips and many crops in the garden, destroying often whole fields while in their seedling leaves. In very hot summers they abound to an amazing degree, and as you walk in a field or in a garden, make a pattering like rain, by jumping on the leaves of the turnips or cabbages. See plate 81.

CHRYSOPHYLLUM, or BULLY-TREE; a genus of the monogynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 43d order, viz. *Dumosæ*. The corolla is campanulated, decemfid, with the segments alternately a little patent. The fruit is a ten-seeded berry. There are two species, the cainito and glabrum, both natives of the West Indies. The first rises 30 or 40 feet high, with a large trunk covered with a brown bark, and divides into many flexible slender branches which generally hang downwards, garnished with spear-shaped leaves, whose under sides are of a bright russet colour. The flowers come out of the extremities of the branches, disposed in oblong bunches, which are succeeded by fruit of the size of a golden pippin, that are very rough to the palate, and astringent; but when kept some time mellow, as is practised here with medlars: they have an agreeable flavour. The second sort never rises to the height of the first, nor do the trunks grow to half the size; but the branches are slender, and garnished with leaves like those of the first. The flowers come out in clusters from the side of the branches, which are succeeded by oval smooth fruit about the size of a bergamot pear. This contains a white clammy juice when fresh; but after being kept a few days, it becomes sweet, soft, and delicious. Inclosed are four or five black seeds about the size of those of a pumkin. Both these plants are frequently preserved in gardens where there are large stoves, and are propagated by seeds, but the plants can never bear the open air in this country.

CHRYSOPLENIUM, in botany; a genus of the digynia order, belonging to the decandria class of plants; and in the natural method ranking under the 12th order, *Succulentæ*. The calyx is quadrifid or quinquefid, and coloured; no corolla; the capsule birostrated, unilocular, and polyspermous.

CHRYSOPRASUS, or CHRYSOPRASIUS, the 10th of the precious stones mentioned in the Revelations, as forming the foundation of the heavenly Jerusalem. The chrysoprasius is by mineralogists reckoned to be a variety of the chrysolite, and by Cronstedt called the *yellowish green and cloudy topaz*. He conjectures that it may perhaps be the substance which serves as a matrix to the chrysolite; as those that he had seen were like the clear veined quartz, called in Sweden *milk crystal*, which is the first degree of crystallization. Its name, from πρασο, shows it to be of a greenish-blue colour, like the leaves of a leek. It only differs from the chrysolite in its blueish hue.

CHRYSOSTOM (St. John), a celebrated patriarch of Constantinople, and one of the most admired fathers of the Christian church, was born of a noble family at Antioch, about the year 347. He studied rhetoric under Libavius, and philosophy under Andragathus; after which he spent some time in solitude in the mountains near Antioch: but the austerities he endured having impaired his health, he returned to Antioch, where he was ordained deacon by Meletius. Flavian, Meletius's successor, raised him to the office of presbyter five years after; when he distinguished himself so greatly by his eloquence, that he obtained the surname of *Golden Mouth*. Nectarius patriarch of Constantinople dying in 397, St. Chrysostom, whose

fame was spread throughout the whole empire, was chosen in his room by the unanimous consent of both the clergy and the people. The emperor Arcadius confirmed this election, and caused him to leave Antioch privately, where the people were very unwilling to part with him. He was ordained bishop on the 26th of February 398; when he obtained an order from the emperor against the Eunomians and Montanists; reformed the abuses which subsisted amongst his clergy; retrenched a great part of the expences in which his predecessors had lived, in order to enable him to feed the poor and build hospitals, and preached with the utmost zeal against the pride, luxury, and avarice of the great. But this pious liberty of speech procured him many powerful enemies. He differed with Theophilus of Alexandria, who got him deposed and banished; but he was soon recalled. After this, declaiming against the dedication of a statue erected to the empress, she banished him into Cucusus in Armenia, a most barren inhospitable place. Afterwards, as they were removing him from Petyus, the soldiers treated him so roughly, that he died by the way, A. D. 407. The best edition of his works is that published at Paris in 1718, by Montfaucon.

CHRYSTAL. See CRYSTAL.

CHUB, or CHUBB, in ichthyology. See BARBEL. These fish are commonly found in holes overshaded by trees, and sometimes, in great numbers, floating almost on the surface of the water in a hot day. They are not very desirable for the table, being very full of bones; but they entertain the angler very much, and are easily taken. The best manner of fishing for Chub is this: Having a very strong rod, fix to the hook a grasshopper; place yourself so as to be perfectly out of sight of the fish, and drop in the bait about two feet from the place where the fish lies; if he does not see the angler he very seldom fails biting; but he is so strong a fish that he should be taken out carefully, after a great deal of playing, otherwise the tackle will be in danger. A beetle, or any large fly, will also answer the purpose. In March and April, this fish may be caught with large red worms; in June and July with flies, snails, and cherries; but in August and September the proper bait is good cheese softened with a little butter. The angler must keep his bait for this fish at the bottom in cold weather, and near the surface in hot.

CHUBB (Thomas), a noted polemical writer, born at East Harnham, a village near Salisbury, in 1679. He was put an apprentice to a glover in Salisbury, and afterwards went into partnership with a tallow-chandler. Being a man of strong natural parts, he employed all his leisure in reading; and though a stranger to the learned languages, became tolerably versed in geography, mathematics, and other branches of science. His favourite study was divinity; and he formed a little society for the purpose of debating on religious subjects, about the time that the Trinitarian controversy was so warmly agitated between Clarke and Waterland. This subject, therefore, falling under the cognizance of Chubb's theological assembly, he, at their request, drew up and arranged his sentiments on it, in a kind of dissertation; which was afterwards published under the title of *The supremacy of the Father asserted*, &c. In this piece, Mr. Chubb showed great talents in reasoning; and acquired so much reputation, that the late Sir Joseph Jekyll, master of the rolls, took him into his family to enjoy his conversation: but though he is said to have been tempted to remain with him by the offer of a genteel allowance, he did not continue with him many years; but chose to return to his friends at Salisbury. He published afterwards a 4to volume of tracts, which Mr. Pope informs his friend Gay, he read through with admiration of the writer, though not always with approbation of his doctrine. He died unmarried in the 68th year of his age, and left two volumes of posthumous tracts, in which he appears to have had little or no belief in revelation. But however licentious his way of thinking may be deemed, nothing irregular or immoral has been fairly imputed to him in his life and actions.

CHUDLEIGH (Lady Mary), was born in 1656, and married to Sir George Chudleigh, baronet, by whom she had several children: her poems and essays have been much admired for delicacy of style. She died in 1710; and is said to have written several dramatic pieces, which, though not printed, are preserved by the family.

CHUPMESSAHITES, a sect among the Mahometans, who believe that Jesus Christ is God, and the true Messiah, the Redeemer of the world; but without rendering him any public or declared worship. The word in the Turkish language signifies *Protector of the Christians*. Ricaut says, there are abundance of these Chupmessahites among the people of fashion in Turkey, and some even in the seraglio.

CHURCH, has different significations, according to the different subjects to which it is applied. 1. It is understood of the collective body of Christians, or all those over the face of the whole earth who profess to believe in Christ, and acknowledge him to be the Saviour of mankind. This is what the ancient writers call the *catholic* or *universal church*. Sometimes the word church is considered in a more extensive sense, and divided into several branches; as the church militant, is the assembly of the faithful on the earth; the church triumphant, that of the faithful already in glory; to which the papists add the church patient; which, according to their doctrines, is that of the faithful in purgatory. 2. Church is applied to any particular congregation of Christians, who associate together and concur in the participation of all the institutions of Jesus Christ, with their proper pastors and ministers. Thus we read of the church of Antioch, the church of Alexandria, the church of Thessalonica, and the like. 3. Church denotes a particular sect of Christians distinguished by particular doctrines and ceremonies. In this sense, we speak of the Romish church, the Greek church, the Reformed church, the church of England, &c. The Latin or Western church, comprehends all the churches of Italy, France, Spain, Africa, the north, and all other countries whither the Romans carried their language. Great Britain, part of the Netherlands, of Germany, and of the North, have been separated from hence ever since the time of Hen. VIII; and constitute what we call the Reformed church, and what the Romanists call the western schism. The Greek, or Eastern church, comprehends the churches of all the countries anciently subject to the Greek or Eastern empire, and through which their language was carried; that is, all the space extended from Greece to Mesopotamia and Persia, and thence into Egypt. This church has been divided from the Roman, ever since the time of the emperor Phocas. The Gallican church, heretofore denoted the church of France, under the government and direction of their respective bishops and pastors. 4. The word church is used to signify the body of ecclesiastics, or the clergy, in contradistinction to the laity. (See CLERGY.) 5. Church is used for the place where a particular congregation or society of Christians assemble for the celebration of divine service. In this sense churches are variously denominated, according to the rank, degree, discipline, &c. as Metropolitan church, Patriarchal church, Cathedral church, Parochial church, Collegiate church, &c. See METROPOLIS, PATRIARCH, &c.

In ecclesiastical writers, we meet with *grand church*, for the chief church of a place. The first church publicly built by the Christians, some authors maintain to be that of St. Saviour at Rome founded by Constantine; others contend, that several churches abroad, called by the name of *St. Peter Vivus*, were built in honour of that apostle during his life-time.

CHURCH, with regard to architecture, Daviler defines a large oblong edifice, in form of a ship, with nave, choir, isles, chapels,

belfry, &c. (See each part under its proper head.) A *simple* CHURCH, is that which has only a nave and a choir; a CHURCH *with aisles*, that which has a row of porticos, in form of vaulted galleries, with chapels in its circumference. CHURCH *in a Greek cross*, is that where the length of the traverse part is equal to that of the nave; so called because most of the Greek churches are built in this form. CHURCH *in a Latin cross*, that whose nave is longer than the cross part, as in most of the Gothic churches. CHURCH *in Rotundo*, that whose plan is a perfect circle, in imitation of the Pantheon.

The form of the ancient Greek churches, when they had all their parts, was as follows: first there was a porch, or portion, called the *vaunt-nave*, προναος; this was adorned with columns on the outside, and on the inside surrounded with a wall; in the middle whereof was a door, through which they passed into a second portico. The first of these porticos was destined for the *energumeni*, and penitents in the first stage of their repentance; the second was much longer, destined for penitents of the second class, and the catechumens, and hence called ναρθηξ, *ferula*, because those placed in it began to be subject to the discipline of the church. These two porticos took up about one-third of the space of the church. From the second portico they passed into the nave, ναος, which took up near another third of the church. In the middle, or at one side of the nave, was the ambo, where the deacons and priests read the gospel and preached. The nave was destined for the reception of the people, who here assisted at prayers. Near the entrance of this was the baptistry or font. Beyond the nave was the choir, χορος, set with seats, and round: the first seat on the right, next the sanctuary, being for the chantor, or *choragus*. From the choir they ascended by steps to the sanctuary, which was entered at three doors. The sanctuary had three apsides in its length; a great one in the middle, under which was the altar, crowned with a baldachin, supported by four columns. Under each of the small apsides, was a kind of table or cupboard, in manner of a beaufet. Of the Greek churches now remaining, however, few have all the parts above described, most of them having been reduced to ruins or converted into mosques.

High-CHURCH, was a denomination originally given to those otherwise called *Nonjurors*, who refused to acknowledge the title of William III. to the crown of Great Britain, under a notion that James II. though excluded, was still their rightful sovereign. This appellation was given them, because they entertained high notions of the dignity and power of the church, and the extent of its prerogative and jurisdiction. And those on the contrary were called *low-church men*, who disapproved of the secession and obstinacy of the non-jurors, distinguished themselves by their moderation toward dissenters, and were less ardent in extending the limits of church authority. The denomination of *high-church men* is now more generally applied to all who form pompous and ambitious conceptions of the authority and jurisdiction of the church, and who would raise it to an absolute independence on all human power.

CHURCH-*Ale*. See WHITSUN *Ale*.

CHURCH-*Rieves*, the same with CHURCH-*Wardens*.

CHURCH-*Scot*, or *Churchchesset*, a payment or contribution, by the Latin writers frequently called *primitiæ seminum*; being, at first, a certain measure of wheat, paid to the priest on St. Martin's day, as the first fruits of harvest. This was enjoined by the laws of king Malcolm IV. and Canute, c. 10. But after this, *Church-scot* came to signify a reserve of corn-rent paid to the secular priests, or to the religious; and sometimes was taken in so general a sense as to include poultry, or any other provision that was paid in kind to the religious. See TITHE.

CHURCH-*Wardens (ecclesiæ guardiani)*, in the English ecclesiastical polity, are the guardians or keepers of the church, and representatives of the body of the parish. They are sometimes appointed by the minister, sometimes by the parish, sometimes by both together, as custom directs. They are taken, in favour of the church, to be, for some purposes, a kind of corporation at the common law; that is, they are enabled, by that name, to have a property in goods and chattels, and to bring actions for them, for the use and profit of the parish. Yet they may not waste the church goods, but may be removed by the parish, and then called to account by actions at common law: but there is no method of calling them to account but by first removing them; for none can legally do it but those who are put in their place. As to lands, or other real property, as the church, church-yard, &c. they have no sort of interest in them; but if any damage is done thereto, the parson only or vicar shall have the action. Their office is also to repair the church, and make rates and levies for that purpose: but these are recoverable only in the ecclesiastical courts. They are also joined with the overseers in the care and maintenance of the poor. They are to levy a shilling forfeiture on all such as do not repair to church on Sundays and holidays; and are empowered to keep all persons orderly while there; to which end it has been held that a church-warden may justify the pulling off a man's hat, without being guilty of either an assault or a trespass. There are also a multitude of other petty parochial powers committed to their charge by different acts of parliament.

CHURCHILL (Sir Winston), the father of the great duke of Marlborough, was descended from an ancient and honourable family in Dorsetshire. He was born at Wotton Glanvile in that county in 1610; and educated at St. John's college at Oxford. He engaged in the cause of his unfortunate sovereign Charles I. for which he suffered severely in his fortune; and having married, while young, Elizabeth, the daughter of Sir John Drake of Ashe in Devonshire, she was forced to seek a refuge in her father's house, when Mr. Churchill's misfortunes left him none that he could call his own; and there most of his children were born. After the Restoration, he was elected a burgess to serve in parliament for the borough of Weymouth; and in 1669 his majesty was pleased to confer on him the honour of knighthood. The next year he was made one of the commissioners of claims in Ireland; and upon his return from thence, was constituted one of the clerks comptrollers of the green cloth: but writing a kind of political essay upon the History of England, which gave great offence to the parliament, he was, in 1678, dismissed from his post. He was, however, soon restored to it again; and lived to see his eldest surviving son raised to the peerage, and the rest of his children in a fair way to promotion. He died in 1688.

CHURCHILL (John), Duke of Marlborough, and prince of the holy Roman empire, a most renowned general and statesman, was born at Ashe in Devonshire in 1650. He was eldest son of Sir Winston Churchill, who carried him to court while very young, and where he was particularly favoured by James, duke of York, afterwards king James II. when only twelve years of age. In 1666 he was made an ensign of the guards during the first Dutch war; and afterwards improved himself greatly in the military art at Tangier. In 1672 Mr. Churchill attended the duke of Monmouth, who commanded a body of auxiliaries in the French service, and was soon after made a captain in the duke's own regiment. At the siege of Nimeguen, which happened in that campaign, he distinguished himself so much that he was taken notice of by the celebrated marshal Turenne, who bestowed on him the name of the *handsome Englishman*.—In 1673 he was at the siege of Maestricht, where he gained such applause, that the king of France made him a public acknowledgement of his service; and the duke of Mon-

mouth, who had the direction of the attack, told king Charles II. that he owed his life to Mr. Churchill's bravery. In 1681 he married Sarah, daughter and co-heirefs (with her fifter the countefs of Tyrconnel) of Richard Jennings, Efq. of Sandrich, in Hertfordfhire. The duke of York recommended him in a very particular manner to the king, who in 1682 created him baron of Eyemouth in the county of Berwick, in Scotland, and made him colonel of the third troop of guards. A little after king James's acceffion, he was created baron Churchill of Sandrich in the county of Hertford, and made brigadier-general of his majefty's army in the weft; where, when the duke of Monmouth came to furprife the king's army, while the earl of Feverfham and the majority of the officers were in their beds, he kept the enemy in play, till the king's forces had formed themfelves, and thereby faved the whole army. When James fhowed an intention of eftablifhing the catholic religion in Britain, lord Churchill, notwithftanding the great obligations he owed him, thought it his duty to abandon the royal caufe; but even then did not leave him without acquainting him by letter with the reafon of his fo doing. Lord Churchill was gracioufly received by the prince of Orange; and was by him employed firft to re-affemble the troop of guards at London, and afterwards to reduce fome lately raifed regiments, and to new-model the army: for which purpofe he was invefted with the rank and title of lieutenant general. In 1689 he was fworn one of the privy council, and one of the gentlemen of the king's bed-chamber; and on the 9th of April following was raifed to the dignity of earl of Marlborough in the county of Wilts. He affifted at the coronation of their majefties; and was foon after made commander in chief of the Englifh forces fent over to Holland; and here he firft laid the foundation of that fame which was afterwards fpread over all Europe. In 1690 he was appointed general of the forces fent to Ireland; where he made the ftrong garrifons of Cork and Kinfale prifoners of war. The year following, king William fhowed the good opinion he had of his conduct, by fending him to Flanders to put all things in readinefs, and to draw the army together againft his arrival. In 1692 he was difmiffed from all his employments; and, not long after, was, with fome other peers, committed to the Tower on an accufation of high treafon: which, however, was afterwards found to be a falfe and malicious report, and the authors of it were punifhed. Marlborough was foon reftored to favour, and in 1698 was appointed governor to the earl of Gloucefter, with this extraordinary compliment from king William: "My lord, make him but what you are, and my nephew will be all I wifh to fee him." The fame day he was again fworn one of the privy council; and in July following was declared one of the lords juftices of England, for the adminiftration of the government; in which great truft he was three times fucceffively in the king's abfence. In 1701 he was appointed general of the foot, commander in chief of the Englifh forces, and ambaffador extraordinary and plenipotentiary at the Hague. Upon the acceffion of queen Anne to the throne, he was elected into the order of the garter, declared captain-general of all his majefty's forces, and fent ambaffador extraordinary and plenipotentiary to Holland. After feveral conferences about a war, he put himfelf at the head of the army, where all the other generals had orders to obey him. His exploits in the field have been amply detailed in all our Englifh Hiftories: we fhall therefore only notice the rewards and honours conferred upon him for thefe exploits. After his firft campaign he was created marquis of Blandford and duke of Marlborough, with a penfion of 5000l. out of the poft-office, to devolve for ever upon thofe enjoying the title of Duke of Marlborough. In 1703 he met Charles III. late emperor, going to Spain, who prefented him with a fword fet with diamonds. In 1704, having forced the enemy's lines at Schellenberg, he received a letter of thanks from the emperor Leopold, written with his own hand; an honour feldom done to any but fovereign princes. After the battle of Blenheim, he received congratulatory letters from moft of the potentates in Europe, particularly from the States-general, and from the emperor, who defired him to accept of the dignity of a prince of the empire, which, with the queen's leave, was conferred upon him by the title of *Prince of Mildenheim in the province of Swabia.* After the campaign was ended, he vifited the court of Pruffia, where he had laid fuch fchemes as fufpended the difputes with the Dutch about king William's eftate; which wife conduct caufed the whole confederacy to acknowledge that he had done the greateft fervice poffible to the common caufe. Upon his return to England, the queen, to perpetuate his memory, granted the intereft of the crown in the honour and manor of Woodftock and hundred of Wotton to him and his heirs for ever. In 1705 he made a tour to Vienna, upon an invitation of the emperor Jofeph; who highly careffed him, and made him a grant of the lordfhip of Mildenheim. After the campaign of 1708, the fpeaker of the houfe of commons was fent to Bruffels on purpofe to compliment him; and on his return to England he was again complimented in the houfe of lords by lord chancellor Cowper. All his fervices, however, and all the honours conferred upon him, were not fufficient to preferve him from being difgraced. After the change of the miniftry in 1710, his intereft daily declined; and in 1712, on the firft day of the new year, he was removed from all his places. Finding all arts ufed to render him obnoxious in his native country, he vifited his principality of Mildenheim, and feveral towns in Germany: after which he returned to England, and arrived there on the day of the queen's death. After being welcomed by the nobility and foreign minifters, he attended on king George I. in his public entry through London, who appointed him captain-general, colonel of the firft regiment of foot-guards, one of the commiffioners for the government of Chelfea hofpital, and mafter-general of the ordnance. Some years before his death, he retired from public bufinefs. He died at Windfor-lodge in 1722, aged 73; leaving behind him a very numerous pofterity, allied to the nobleft and greateft families in thefe kingdoms. Upon his demife all parties united in doing honour, or rather juftice, to his merit; and his corpfe was interred the 9th of Auguft following, with the folemnity due to a perfon who had deferved fo highly of his country, in Weftminfter-abbey. The noble pile near Woodftock, which bears the name of Blenheim-houfe, may be juftly ftyled his monument: but without pretending to the gift of prophecy, one may venture to foretel, that his glory will long furvive that ftructure; and that fo long as our hiftories remain, or indeed the hiftories of Europe, his memory will live and be the boaft of Britain, which by his labours was raifed to be the firft of nations, as during the age in which he lived he was defervedly efteemed the firft of men. If he had foibles, as thefe are infeparable from human nature, they were fo hidden by the fuperior luftre of his virtues as to be fcarcely perceived, or willingly forgotten. A certain parafite, who thought to pleafe Lord Bolingbroke by ridiculing the avarice of the Duke, was ftopped fhort by his Lordfhip; who faid, "He was fo very great a man, that I forget he had that vice." A variety of interefting anecdotes and teftimonies concerning this illuftrious perfonage, may be found in the new edition of the *Biographia Britannica*. How much he has been celebrated by our poets, is well known by Addifon's "Campaign," and by Philips's "Blenheim." Mr. Addifon, in his Rofamond, has properly affumed another and voluntary occafion of paying a fine compliment to his grace's military exploits, and the glory by which they would be followed. Upon the duke's removal from his places, an ode was infcribed to him by Mr. Somerville, ani-

mated with the zeal of whiggiſh enthuſiaſm, and containing ſome paſſages that are truly poetical. Another ode, not much inferior in ſpirit, was addreſſed to his grace, on the occaſion of his embarking for Oſtend in the year 1712.

CHURCHILL (CHARLES), an Engliſh poet, and celebrated ſatiriſt, was ſon of the Rev. Charles Churchill, curate and lecturer of St. John's, Weſtminſter, and born in 1731. He was educated at Weſtminſter ſchool, where his capacity was deemed greater than his application; ſo that he had the character of one of thoſe who could do ſomething if he would. It is eaſy to conceive, that a ſtrong imagination and violent ſpirits, ſuch as he poſſeſſed, could not tamely pace on in the trammels of a ſchool education. When ſent to Oxford, he was refuſed admittance, for want of ſkill in the learned languages: it is ſaid that he could have paſſed the examination if he would, but that he ſo deſpiſed the trifling queſtions put to him, as even to ridicule the gentlemen who examined him. Upon returning from Oxford, he applied again to his ſtudies at Weſtminſter; and there, at the age of ſeventeen, contracted an intimacy with a lady, whom he afterwards married. At the uſual age of going into orders, he was ordained by the biſhop of London, though he had taken no degree, nor ſtudied in either univerſity; and the firſt employment he had was a curacy in Wales, of thirty pounds a year. In order to eke out his ſcanty finances, he entered into a branch of trade, which was no other than keeping a cyder cellar, and dealing in this liquor through that part of the country: but this did not anſwer, and a ſort of rural bankruptcy was the conſequence of his attempt.

Upon leaving Wales, he came to London, and his father dying ſoon after, he ſtepped into the church where he had officiated. To improve his income, he alſo undertook to teach young ladies to read and write Engliſh; and was employed for this purpoſe in a boarding-ſchool, where he behaved with the moſt exact decorum. His revenue, however, not ſufficing for his ſtyle of living, ſeveral debts were contracted, and a gaol ſeemed ready to complete his misfortunes. Mr. Lloyd, the father of the poet of that name, and who was ſecond maſter of Weſtminſter-ſchool, relieved him from this diſtreſs, by paying his debts, or at leaſt ſatisfying his creditors; and Mr. Lloyd, the ſon, ſoon after publiſhing his much applauded poem, intitled "The Actor," Churchill followed his example, and undertook "The Roſciad." It firſt came out without the name of the author; but the juſtneſs of its remarks, and particularly the ſeverity of the ſatire, greatly excited the public curioſity. Though he never diſowned this piece, but even openly gloried in it; yet the public ſeemed unwilling to give him credit for it, and aſcribed it to a combination of wits, ſuch as Lloyd, Colman, Thornton, &c. He put his name, however, to the ſecond edition. His next performance was, "An Apology to the Critical Reviewers;" a performance much applauded alſo, and equally ſatirical with the former.

But what fame he got by theſe productions, which was indeed very great and deſerved, he loſt by his morals; and, while his writings amuſed the town, his actions diſguſted it. Not intoxicated merely, but downright drunk with ſucceſs, he now quitted his wife; and reſigning his gown, with all clerical functions, commenced a man of the town, and indulged in all the gaieties and even vices of it. His next poem was entitled "Night;" and after that he publiſhed "The Ghoſt." Dr. Johnſon, the author of "The Rambler," had, it ſeems, ſpoken lightly of Churchill's productions: in this poem he has deſcribed Johnſon under the character of Pomposo, and the deſcription is allowed to have merit. The poems "Night" and "The Ghoſt" had not the rapid ſale expected by the author; but "The Prophecy of Famine," which ſucceeded, produced him again in all his luſtre. It had all the circumſtances of time, place, and party, to recommend it; and Mr. Wilkes ſaid, before its publication, "that he was ſure it muſt take, becauſe it was at once perſonal, poetical, and political." He afterwards publiſhed his "Epiſtle to Hogarth," "Gotham," "Independence," "The Times," &c. in all which there are things great and ſhining; but, upon the whole, they ſeem written by a man who deſired to avail himſelf of the public curioſity in his favour, and whoſe principal aim herein was at the pockets of his readers.

In October 1764 he went over to Boulogne, on a viſit to Mr. Wilkes, and was there attacked by a fever, which carried him off on the 5th of November. After his death, his poems were collected and printed together, in two vols. 8vo.

CHURCHING OF WOMEN; a religious ceremony practiſed in our church after child-birth. It took its riſe from the Jewiſh rite of purification. In the Greek church it was limited to the fortieth day after delivery; but in the weſtern parts of Europe no certain time is obſerved. There is an office in the liturgy for this purpoſe.

CHURCHYARD, a piece of ground adjoining to a church, ſet apart for interment or burial of the dead.—In the church of Rome they are conſecrated with great ſolemnity. If a churchyard, which has been thus conſecrated, ſhall afterwards be polluted by any indecent action, or profaned by the burial of an infidel, an heretic, an excommunicated or unbaptized perſon, it muſt be *reconciled*; and the ceremony of the reconciliation is performed with the ſame ſolemnity as that of the bleſſing or conſecration.

CHURCHYARD (THOMAS), a poet who flouriſhed in the reigns of Henry VIII. Edward VI. queen Mary and queen Elizabeth, was born at Shrewſbury; and inherited a fortune, which he ſoon exhauſted in a fruitleſs attendance on the court, by which he only gained the favour of being retained a domeſtic in the family of lord Surrey; when, by his lordſhip's encouragement, he commenced poet. Upon his patron's death, he betook himſelf to arms; was in many engagements; was frequently wounded, and was twice made priſoner. He publiſhed twelve pieces, which he afterwards printed together in one volume, under the title of *Churchyard's Chips*; and alſo the tragedy of "Thomas Moubray duke of Norfolk." He died in 1570.

CHURLE, CEORLE, or CARL, in the Saxon times, ſignified a tenant at will, who held of the thanes on condition of rent and ſervice. They were of two ſorts: one rented the eſtate like our farmers: the other tilled and manured the demeſnes, and were called ploughmen. See CEORLE.

CHURN, a kind of deep wooden veſſel or tub, of a conical ſhape; reſting on its baſe, and having cloſely fitted into its upper part, a cover of wood, with a hole in its centre to admit the handle of the churn-ſtaff. This ſtaff conſiſts of a long upright pole, to the bottom of which is fixed a broad kind of foot, perforated at different parts, and calculated to occaſion a more univerſal agitation of the milk in churning. Many attempts have been made to improve this very neceſſary implement; but none have in any degree been accepted in our dairies, except what is called the *barrel*-churn, which is nothing more than a kind of rolling barrel, with ſuch an apparatus within as is calculated to quicken the proceſs of making butter. We find however, the following account of an improved churn by Mr. Bowler, in the Tranſactions of the Society for the Encouragement of Arts, &c. for 1795.

"The churn itſelf is of the barrel-kind, being a cylinder, eighteen inches diameter, and nine inches wide, the ſides wood, and the rim tin-plate, having two openings; the one eight inches and a half long, by four inches wide, through which the cream is put into the churn, and the hand introduced for cleaning it; the other, a ſhort pipe, one inch diameter, by which

the butter-milk runs out of the churn when the operation is finifhed. The firft of thefe openings has a wooden cover, faftened down by two fcrews, and the other a cork fitted to it, while the butter is churning. There is alfo, near the larger opening, a fmall vent-hole with a peg, to allow a paffage for any air difcharged from the cream at the beginning of the operation. An axle paffes through the churn, terminating in two gudgeons on which it hangs, its lower part being immerfed in a trough, to occafionally hold hot or cold water according to the feafon of the year; and on the infide of the rim are four projecting pieces of wood, with holes in them, ferving to beat the cream by the motion of the churn: this motion is caufed by a pendulum, three feet fix inches long, having an iron bob, weighing ten pounds, and at its upper end turning a pulley, ten inches diameter, from which goes a rope twice round another pulley, about three inches diameter, fixed on the axis of the churn, and caufing it to make a partial revolution by each vibration of the pendulum. There are fliding covers to the machinery, and alfo a cover to the water-trough, in order, when the hot water is ufed, to fecure the fteam, and keep the cream in a due and neceffary degree of warmth. The motion of the pendulum is given and kept up by a wooden rod, about three feet nine inches long, turning on a pin about three inches above the bob of the pendulum." In plate 88 we have given a reprefentation of this churn.

A. A. Is the body; B. an opening by which the cream is put in. C. The cover of the large opening: the fmall hole on the oppofite fide of the churn cannot be fhewn in this view. D. The gudgeon on which the body of the churn hangs. E. The upper or larger pulley. F. The fmaller pulley fixed on the axis or gudgeon of the churn. G. G. The rod of the pendulum hanging from the upper pulley, E. H. The bob of the pendulum. I. I. The handle, moveable on a pin at *a*, by which the pendulum is moved to and fro, making a traverfe, in form of the dotted line, K. K. L. The trough for the hot or cold water. M. A projecting piece of wood, with a fhoulder, by which the handle I. is fupported when the churn is not at work.

CHURNING, in country affairs, the operation of making butter by agitating milk in a well known veffel called a churn. For accelerating this operation, a correfpondent in the Bath Society Papers recommends a little diftilled vinegar to be poured into the churn; and the butter will be produced in an hour afterwards. He would not, however, recommend it to be ufed till the cream has undergone fome confiderable agitation. His firft trial was after the churning had been going forward half a day: whether he obferved the fame rule afterwards he does not fay; but all his trials proved fuccefsful, the butter being uniformly obtained in about an hour after the mixture.

CHUS, or *Chufch.* (Bible.) It is a tradition of an ancient ftanding, that the *Chus* of the Scriptures denotes *Ethiopia*, and *Chufchi* an *Ethiopian:* the Septuagint and Vulgate conftantly tranflate it fo; and in this they are followed by moft interpreters, and by Jofephus and Jerome. And yet what Bochart urges to the contrary is of no inconfiderable weight, from Ezekiel xxix. 10. in which the two oppofite extremes of Egypt are defigned; and therefore *Chus*, which is oppofite to Syene, muft be Arabia. But this is more ftrongly pointed out by Xenophon, by whom Ethiopia is faid to be the fouth boundary of Cyrus's empire; and Herodotus diftinguifhes between the Ethiopians of Afia and Africa, conjoining the former with the Arabians.

CHYLE, in the animal economy, a milky fluid fecreted from the aliments after digeftion by means of the lacteal veffels. See Anatomy, page 200.

CHYLIFICATION, the formation of the chyle, or the act whereby the food is changed into chyle. The chyle has by fome authors been thought to have a great refemblance in its nature and chemical analyfis to milk. The fubject, however, hath as yet been but imperfectly inveftigated. See the article Milk.

CHYME, or chymus, a term ufed by the old phyficians to denote every kind of humour which is incraffated by concoction; under which notion it comprehends all the humours fit or unfit for preferving and nourifhing the body, whether good or bad. It frequently imports the fineft parts of the chyle, when feparated from the fæces, and contained in the lacteals and thoracic duct.

CHYMOLOGI, an appellation given to fuch naturalifts as have employed their time in inveftigating the properties of plants from their tafte and fmell.

CHYMOSIS, in medicine, the act of making or preparing chyme. The word comes from χυμος, *fuccus*, of χεω, *fundo*, I melt. Chymofis was ufed to fignify the fecond of the concoctions made in the body; namely, a repeated preparation of the moft impure and grofs parts of the chyle, which being rejected by the lacteals, entered by the mefcraics, and thence paffed to the liver, to be there elaborated, purified, and fubtilized afrefh. It is of this, according to Rogers, that the animal fpirits are formed; but thefe doctrines are now obfolete.

Chymosis is alfo a diftortion of the eye-lids, arifing from an inflammation; alfo an inflammation of the tranfparent cornea of the eye.

CHYTLA, in antiquity, a liquor made of wine and oil, and fometimes ufed in divination.

CHYTRI, among the Athenians, a feftival in honour of Bacchus and Mercury, kept on the 13th of the month Anthefterion.

CIBBER (Colley), a celebrated comedian, dramatic writer, and poet laureat to the king, was born at London in 1671. His father Caius Gabriel Cibber was a native of Holftein, and a fkilful ftatuary, who executed the baffo-relievo on the pedeftal of the monument, and the two admired figures of lunatics over the piers of the gate to Bethlem Hofpital in Moorfields. Colley, who derived his Chriftian name from the furname of his mother's family, was intended for the church, but betook himfelf to the ftage, for which he conceived an early inclination; and he was fome time before he acquired any degree of notice, or even a competent falary. His firft effay in writing was the comedy of *Love's Laft Shift*, acted in 1695, which met with fuccefs; as did his own performance of the character of the fop in it. From that time, as he fays himfelf, "My mufe and my fpoufe were fo equally prolific, that the one was feldom the mother of a child, but in the fame year the other made me the father of a play. I think we had a dozen of each fort between us; of both which kinds fome died in their infancy, and near an equal number of each were alive when we quitted the theatre." The *Carelefs Hufband*, acted in 1704, met with great applaufe, and is reckoned his beft play; but none was of more importance to him than the *Non-juror*, acted in 1717, and levelled againft the Jacobites. This laid the foundation of the mifunderftanding between him and Mr. Pope, raifed him to be the hero of the Dunciad, and made him poet-laureat in 1730. He then quitted the ftage, except a few occafional performances; and died in 1757. Cibber neither fucceeded in acting nor in writing tragedy; and his odes were not thought to partake of the genius or fpirit he fhowed in his comedies. His fon *Theophilus*, alfo a comic actor after him, was born during a great ftorm in 1703; and after paffing a life of extravagance, diftrefs and perplexity, he perifhed in another ftorm in 1758, in the paffage between Dublin and England. Theophilus married the fifter of Thomas Auguftine Arne, the famous mufical compofer; who became a celebrated tragic actrefs, and whofe honour was facrificed to her hufband's extravagance.

CIBDELOPLACIA, in natural hiftory; a genus of fpars debafed by a very large admixture of earth. They are opaque, formed of thin crufts, covering vegetables and other bodies, by way of incruftations. Of this genus we have the following fpecies: 1. A greyifh white one, with a rough furface. 2. A whitifh-brown one: both thefe are friable. 3. A hard, pale-brown kind, which is the ofteocolla of the fhops. 4. The whitifh-grey kind, with a fmooth furface: this is the unicornu foffile and ceratites of authors. 5. The whitifh-brown coralloide kind.

CIBDELOSTRACIA, in natural hiftory, terrene fpars, deftitute of all brightnefs and tranfparence, formed into thin plates, and ufually found coating over the fides of fiffures, and other cavities of ftones, with congeries of them of great extent, and of plain or botroyide furfaces. Of thefe there are ufually reckoned feven kinds; the firft the hard, brownifh-white cibdeloftracium, found in Germany: the fecond is the hard, whitifh cibdeloftracium, with thin crufts, and a fmoother furface, found alfo in the Harts-forefts in Germany: the third is the hard, pale-brown cibdeloftracium, with numerous very thin crufts, found in fubterranean caverns in many parts of England as well as Germany: the fourth is the white, light, and friable cibdeloftracium, found alfo in Germany, but very rarely in any part of England: the fifth is the light, hard, pale-brown cibdeloftracium, with a fmooth furface, found in almoft all parts of the world: the fixth is the whitifh, friable, cruftaceous cibdeloftracium, with a rougher furface, frequent in Germany and England; and the feventh is the brownifh-white friable cibdeloftracium, with a dufty furface, found in feveral parts of Ireland, as well as Germany.

CIBORIA, in antiquity, the large hufk of Egyptian beans, which are faid to have been fo large as to ferve for drinking-cups: whence they had their name *ciborium*, fignifying a cup, in the Egyptian language.

CIBORIUM, in ecclefiaftical writers, the covering for the altar. This covering is fupported by four high columns, and forms a kind of tent for the eucharift, in the Romifh churches. Some authors call it *turris geftatoria*, and others *pyxis*; but the pyxis is properly the box in which the eucharift is preferved.

CIBUS FERIALIS, in antiquity, an entertainment peculiar to a funeral; for which purpofe, beans, parfley, lettuce, bread, eggs, lentils, and falts, were in ufe.

CICADA, the FROG-HOPPER or *Flea-locuft*, in zoology, a genus of infects belonging to the order of hemiptera. See plate 87. The beak is inflected; the antennæ are fetaceous; the four wings are membranaceous and deflected; and the feet, in moft of the fpecies, are of the jumping kind. The fpecies are fifty-one. The larvæ of feveral of this genus evacuate great quantities of a frothy matter upon the branches and leaves of plants, in the midft of which they conftantly refide, probably for fhelter againft the fearch of other animals, to which it would become a prey. Nature has afforded this kind of defence to infects whofe naked and foft bodies might otherwife very eafily be injured; perhaps alfo the moifture of this foam may ferve to fcreen it from the fultry beams of the fun. On removing the foam, you difcover the larva concealed underneath; but it does not long remain uncovered. It foon emits frefh foam, that hides it from the eye of obfervation. It is in the midft of this foamy fubftance the larva goes through its metamorphofis into a chryfalis and perfect infect. Other larvæ, whofe bodies are not fo foft, run over plants without any manner of defence, and efcape from infects that might hurt them, by the nimblenefs of their running, but efpecially of their leaping.

The chryfalids, and all the larvæ that produce them, differ little from each other, only that the former have the rudiments of wings, a kind of knob at the place where the wings will afterwards be in the perfect infect. As to other refpects, the chryfalids walk, leap, and run over plants and trees; as do the larva and the frog-hopper, which they are to produce. At length they throw off their teguments of chryfalids, flip their laft flough, and then the infect appears in its utmoft ftate of perfection. The male alone is then endowed with the faculty of finging, which it exercifes not with its throat, but with an organ fituated under the abdomen. Behind the legs of the male are obferved two valvulæ, which, raifed up, difcover feveral cavities, feparated by various membranes. The middle contains a fcaly triangle. Two vigorous mufcles give motion to another membrane, which alternately becomes concave and convex. The air, agitated by this membrane, is modified within the other cavities; and by the help of this fonorous inftrument, he amoroufly folicits his female. By pulling the mufcles of a frog-hopper lately dead, it may be made to fing. This infect begins its fong early in the morning, and continues it during the heat of the noontide fun. Its lively and animated mufic is, to the country people, a prefage of a fine fummer, a plentiful harveft, and the fure return of fpring. The cicadæ have a head almoft triangular, an oblong body, their wings faftigiated, or in form of a roof, and fix legs with which they walk and leap pretty brifkly. In the females, at the extremity of the abdomen, are feen two large laminæ, between which is inclofed, as in a fheath, a fpine, or lamina, fomewhat ferrated, which ferves them for the purpofe of depofiting their eggs, and probably to fink them into the fubftance of thofe plants which the young larvæ are to feed upon.

CICATRICULA, among natural hiftorians, denotes a fmall whitifh fpeck in the yolk of an egg, fuppofed to be the firft rudiments of the future chick.

CICATRIX, in furgery, a little feam or elevation of callous flefh rifing on the fkin, and remaining there after the healing of a wound or ulcer. It is popularly called a *fcar*.

CICATRIZANTS, in pharmacy, medicines which affift nature to form a cicatrix. Such are moft of the aftringent earths, &c.

CICATRIZANTS, among the old furgeons, were alfo named *epulotics*, *incarnatives*, *agglutinants*, &c.

CICCA, in botany; a genus of the tetrandria order, belonging to the monœcia clafs of plants. The male calyx is tetraphyllous; there is no corolla: the female calyx triphyllous; no corolla; four ftiles; the capfule quadricoccous, or four-berried.

CICELY, in botany, the Englifh name of a fpecies of chærophyllum. See CHÆROPHYLLUM.

CICER, or CHICK-PEA, in botany; a genus of the decandria order, belonging to the diadelphia clafs of plants; and in the natural method ranking under the *Papilionaceæ*, or 32d order. The calyx is quinquepartite, as long as the corolla, with its four uppermoft fegments incumbent on the vexillum: the legumen is rhomboidal, turbid, and difpermous. There is but one fpecies, which produces peafe fhaped like the common ones, but much fmaller. They are much cultivated in Spain, where they are natives, being one of the ingredients in their olios: as alfo in France; but are rarely known in Britain.

CICERO (MARCUS) TULLIUS, the celebrated Roman orator, was born in the year of Rome 647, about 107 years before Chrift. His father, Marcus Tullius, who was of the equeftrian order, took great care of his education, which was directed particularly with a view to the bar. Young Tully, at his firft appearance in public, declaimed with fuch vehemence againft Sylla's party, that it became expedient for him to retire into Greece; where he heard the Athenian orators and philofophers, and greatly improved both in eloquence and knowledge. Here he met with T. Pomponius, who had been his fchool-fellow; and who, from his love to Athens, and fpending a great part of his days in it, obtained the furname of *Atticus*; and there

they revived and confirmed that noted friendſhip which ſubſiſted between them through life, with ſo celebrated a conſtancy and affection. From Athens he paſſed into Aſia; and after an excurſion of two years came back again into Italy.

Cicero was now arrived at Rome; and, after one year more ſpent at the bar, obtained, in the next place, the dignity of quæſtor. Among the cauſes which he pleaded before his queſtorſhip, was that of the famous comedian Roſcius, whom a ſingular merit in his art had recommended to the familiarity and friendſhip of the great men in Rome. The queſtors were the general receivers or treaſurers of the republic, and were ſent annually into the provinces diſtributed to them, as they always were, by lot. The iſland of Sicily happened to fall to Cicero's ſhare; and that part of it, for it was conſiderable enough to be divided into two provinces, which was called *Lilybæum*. This office he received, not as a gift, but as a truſt; and he acquitted himſelf ſo well in it, that he gained the love and admiration of all the Sicilians. Before he left Sicily, he made the tour of the iſland, to ſee every thing that was curious, and eſpecially the city of Syracuſe; where he diſcovered the tomb of Archimedes to the magiſtrates who were ſhewing him the curioſities of the place, but who, to his ſurpriſe, knew nothing of any ſuch tomb.

We have no account of the preciſe time of Cicero's marriage with Terentia; but it is ſuppoſed to have been celebrated immediately after his return from his travels to Italy, when he was about 30 years old. He was now diſengaged from his queſtorſhip in Sicily, by which firſt ſtep, in the legal gradation and aſcent of public honours, he gained an immediate right to the ſenate, and an actual admiſſion into it during life; and ſettled again in Rome, where he employed himſelf conſtantly in defending the perſons and properties of its citizens, and was indeed a general patron. Five years were almoſt elapſed ſince Cicero's election to the queſtorſhip, which was the proper interval preſcribed by law before he could hold the next office of ædile; to which he was now, in his 37th year, elected by the unanimous ſuffrages of all the tribes, and preferably to all his competitors. After Cicero's election to the ædileſhip, but before his entrance upon the office, he undertook the famed proſecution of C. Verres, the late prætor of Sicily; who was charged with many flagrant acts of injuſtice, rapine, and cruelty, during his triennial government of that iſland. This was one of the moſt memorable tranſactions of his life; for which he was greatly and juſtly celebrated by antiquity, and for which he will, in all ages, be admired and eſteemed by the friends of mankind. The reſult was, that, by his diligence and addreſs, he ſo confounded Hortenſius, though the reigning orator at the bar and uſually ſtyled *the king of the forum*, that he had nothing to ſay for his client. Verres, deſpairing of all defence, ſubmitted immediately, without expecting the ſentence, to a voluntary exile; where he lived many years, forgotten and deſerted by all his friends. He is ſaid to have been relieved in this miſerable ſituation by the generoſity of Cicero; yet was proſcribed and murdered after all by Mark Antony, for the ſake of thoſe fine ſtatues and Corinthian veſſels of which he had plundered the Sicilians.

After the uſual interval of two years from the time of his being choſen ædile, Cicero offered himſelf a candidate for the prætorſhip; and in three different aſſemblies convened for the choice of prætors, two of which were diſſolved without effect, he was declared every time the firſt prætor by the ſuffrages of all the centuries. He was now in the career of his fortunes; and in ſight, as it were, of the conſulſhip, the grand object of his ambition; and therefore, when his prætorſhip was at an end, he would not accept any foreign province, the uſual reward of that magiſtracy, and the chief fruit which the generality propoſed from it. He had no particular love for money, nor genius for arms; ſo that thoſe governments had no charms for him: the glory which he purſued was to ſhine in the eyes of the city as the guardian of its laws; and to teach the magiſtrates how to execute, the citizens how to obey them.

Being now in his 43d year, the proper age required by law, he declared himſelf a candidate for the conſulſhip; along with ſix competitors, L. Sulpicius Galba, L. Sergius Catilina, C. Antonius, L. Caſſius Longinus, Q. Cornificius, and C. Licinius Sacerdos. The two firſt were patricians; the two next plebeians, yet noble; the two laſt the ſons of fathers who had firſt imported the public honours into their families: Cicero was the only *new man*, as he was called, among them, or one of equeſtrian rank. Theſe were the competitors; and in this competition the practice of bribing was carried on as openly and as ſhamefully by Antonius and Catiline as it uſually is at our elections in Britain. However, as the election approached, Cicero's intereſt appeared to be ſuperior to that of all the candidates: for the nobles themſelves, though always envious and deſirous to depreſs him, yet out of regard to the dangers which threatened the city from many quarters, and ſeemed ready to burſt out into a flame, began to think him the only man qualified to preſerve the republic, and break the cabals of the deſperate by the vigour and prudence of his adminiſtration. The method of chooſing conſuls was not by an open vote; but by a kind of ballot, or little tickets of wood diſtributed to the citizens, with the names of the ſeveral candidates inſcribed upon each: but in Cicero's caſe the people were not content with this ſecret and ſilent way; but, before they came to any ſcrutiny, loudly and univerſally proclaimed Cicero the firſt conſul: ſo that, as he himſelf ſays, " he was not choſen by the votes of particular citizens, but the common ſuffrage of the city; not declared by the voice of the crier, but of the whole Roman people."

Cicero had no ſooner entered upon his office than he had occaſion to exert himſelf againſt P. Servilius Rullus, one of the new tribunes, who had been alarming the ſenate with the promulgation of an Agrarian law; the purpoſe of which was to create a decemvirate, or ten commiſſioners, with abſolute power for five years over all the revenues of the republic, to diſtribute them at pleaſure to the citizens, &c. Theſe laws uſed to be greedily received by the populace, and were propoſed therefore by factious magiſtrates as oft as they had any point to carry with the multitude againſt the public good; ſo that Cicero's firſt buſineſs was to quiet the apprehenſions of the city, and to baffle, if poſſible, the intrigues of the tribune. Accordingly, in an artful and elegant ſpeech from the roſtra, he gave ſuch a turn to the inclination of the people, that they rejected this law with as much eagerneſs as they had ever received one. But the grand affair of all, which conſtituted the glory of his conſulſhip, and has tranſmitted his name with ſuch luſtre to poſterity, was the ſkill he ſhowed, and the unwearied pains he took, in ſuppreſſing that horrid conſpiracy which was formed by Catiline and his accomplices for the ſubverſion of the commonwealth. For this great ſervice he was honoured with the glorious title of *pater patriæ*, the father of his country, which he retained for a long time after.

Cicero's adminiſtration was now at an end; but he had no ſooner quitted his office, than he began to feel the weight of that envy which is the certain fruit of illuſtrious merit. He was now, therefore, the common mark, not only of all the factious, againſt whom he had declared perpetual war, but of another party not leſs dangerous, the envious too; whoſe united ſpleen never left him from this moment till they had driven him out of that city which he had ſo lately preſerved. Cicero, upon the expiration of his conſulſhip, took care to ſend a particular account of his whole adminiſtration to Pompey, who was

finishing the Mithridatic war in Asia; in hopes to prevent any wrong impressions there from the calumnies of his enemies, and to draw from him some public declaration in praise of what he had been doing. But Pompey being informed by Metellus and Cæsar of the ill humour that was rising against Cicero in Rome, answered him with great coldness; and instead of paying him any compliment, took no notice at all of what had passed in the affair of Catiline: upon which Cicero expostulates with him in a letter which is still extant.

About this time Cicero bought a house of M. Crassus of the Palatine-hill, adjoining to that in which he had always lived with his father, and which he is now supposed to have given up to his brother Quintius. The house cost him near 30,000l. and seems to have been one of the noblest in Rome. It was built about 30 years before by the famous tribune M. Livius Drusus: on which occasion we are told, that when the architect promised to build it for him in such a manner that none of his neighbours should overlook him: "But if you have any skill (replied Drusus), contrive it rather so that all the world may see what I am doing." The purchase of so expensive a house raised some censure on his vanity; and especially as it was made with borrowed money. This circumstance he himself does not dissemble; but says merrily upon it, that he was now plunged so deeply in debt, as to be ready for a plot, only that the conspirators would not trust him.

The most remarkable event that happened in this year, which was the 45th of Cicero's life, was the pollution of the mysteries of the *bona dea* by P. Clodius; which, by an unhappy train of consequences, involved Cicero in a great and unexpected calamity. Clodius had an intrigue with Cæsar's wife Pompeia, who, according to annual custom, was now celebrating in her house those awful sacrifices of the goddess, to which no male creature ever was admitted, and where every thing masculine was so scrupulously excluded, that even pictures of that sort were covered during the ceremony. It flattered Clodius's imagination greatly to gain access to his mistress in the midst of her holy ministry; and with this view he dressed himself in a woman's habit, that by the benefit of his smooth face, and the introduction of one of the maids, he might pass without discovery: but by some mistake between him and his guide, he lost his way when he came within the house, and fell in unluckily among the other female servants. Here he was detected by his voice, and the servants alarmed the whole company by their shrieks, to the great amazement of the matrons, who threw a veil over their sacred mysteries, while Clodius found means to escape. The story was presently spread abroad, and raised a general scandal and horror throughout the city. The whole defence which Clodius made when, by order of the senate, he was brought to trial, was to prove himself absent at the time of the fact; for which purpose he produced two men to swear that he was then at Interamna, about two or three days journey from the city. But Cicero being called upon to give his testimony, deposed, that Clodius had been with him that very morning at his house in Rome. Irritated by this, Clodius formed a scheme of revenge. This was to get himself chosen tribune, and in that office to drive Cicero out of the city, by the publication of a law, which, by some stratagem or other, he hoped to obtrude upon the people. But as all patricians were incapable of the tribunate by its original institution, so his first step was to make himself a plebeian, by the pretence of an adoption into a plebeian house, which could not yet be done without the suffrage of the people. The first triumvirate was now formed; which was nothing else in reality but a traitorous conspiracy of three of the most powerful citizens of Rome, to extort from their country by violence what they could not obtain by law. Pompey's chief motive was to get his acts confirmed by Cæsar in his consulship, which was now coming on; Cæsar, by giving way to Pompey's glory, to advance his own; and Crassus, to gain that ascendence by the authority of Pompey and Cæsar, which he could not sustain alone. Cicero might have made what terms he pleased with the triumvirate; and been admitted even a partner of their power, and a fourth in their league: but he would not enter into any engagements with the three whose union he and all the friends of the republic abhorred. Clodius, in the mean time, had been pushing on the business of his adoption: which at last he effected; and began soon after to threaten Cicero with all the terrors of his tribunate, to which he was now advanced without any opposition. Both Cæsar and Pompey secretly favoured his scheme; not that they intended to ruin Cicero, but only to keep him under the lash: and if they could not draw him into their measures, or make him at least keep quiet, to let Clodius loose upon him. Cæsar, in particular, wanted to distress him so far as to force him to a dependence on himself: for which end, while he was privately encouraging Clodius to pursue him, he was proposing expedients to Cicero for his security. But though his fortunes seemed now to be in a tottering condition, and his enemies to gain ground daily upon him; yet he was unwilling to owe the obligation of his safety to any man, far less to Cæsar, whose designs he always suspected, and whose schemes he never approved. This stiffness in Cicero so exasperated Cæsar, that he resolved immediately to assist Clodius with all his power to oppress him; while Pompey was all the while giving him the strongest assurances that there was no danger, and that he would sooner be killed himself than suffer him to be hurt.

Clodius, in the mean time, was obliging the people with several new laws, contrived chiefly for their advantage; the design of all which was only to introduce, with a better grace, the ground-plot of the play, the banishment of Cicero. In short, having caused a law to be enacted, importing, that any who had condemned a Roman citizen unheard, should himself be banished, he soon after impeached Cicero upon it. It was in vain that this great man went up and down the city soliciting his cause in the habit of a suppliant, and attended by many of the first young noblemen whom he had taught the rules of eloquence. Those powers of speaking which had so often been successful in defending the cause of others, seemed totally to forsake his own: he was banished by the votes of the people 400 miles from Italy; his houses were ordered to be demolished, and his goods set up to sale. It cannot be denied, that in this great calamity he did not behave himself with that firmness which might reasonably be expected from one who had borne so glorious a part in the republic, conscious of his integrity, and suffering in the cause of his country: for his letters are generally filled with such lamentable expressions of grief and despair, that his best friends, and even his wife, were forced sometimes to admonish him to rouse his courage, and remember his former character. Atticus was constantly putting him in mind of it; and sent him word of a report that was brought to Rome by one of Crassus's freed men, that his affliction had disordered his senses. He was now indeed attacked in his weakest part; the only place in which he was vulnerable. To have been as great in affliction as he was in prosperity, would have been a perfection not given to man: yet this very weakness flowed from a source which rendered him the more amiable in all the other parts of his life; and the same tenderness of disposition which made him love his friends, his children, and his country, more passionately than other men, made him feel the loss of them more sensibly. When he had been gone a little more than two months, a motion was made in the senate by one of the tribunes, who was his friend, to recall him, and repeal the laws of Clodius; to which the whole house readily agreed. Many obstructions, as may be easily imagined, were given to it

by the Clodian faction; but this made the fenate only more refolute to effect it. They paffed a vote, therefore, that no other bufinefs fhould be done till Cicero's return was carried: which at laft it was; and in fo fplendid and triumphant a manner, that he had reafon, he fays, to fear, left people fhould imagine that he himfelf had contrived his late flight for the fake of fo glorious a reftoration.

Cicero, now in his 50th year, was reftored to his former dignity, and foon after to his former fortunes; fatisfaction being made to him for the ruin of his eftates and houfes; which laft were built up again by himfelf with more magnificence than before. But he had domeftic grievances about this time, which touched him very nearly; and which, as he fignifies obfcurely to Atticus, were of too delicate a nature to be expreffed in a letter. They arofe chiefly from the petulant humour of his wife, which began to give him frequent occafions of chagrin: and, by a feries of repeated provocations, confirmed in him that fettled difguft which at laft ended in a divorce.

In the 56th year of his age, he was made proconful of Cilicia; and his adminiftration there gained him great honour. About this time the expectation of a breach between Cæfar and Pompey engaged the general attention. Craffus had been deftroyed with his army fome years before in the war with the Parthians; and Julia the daughter of Cæfar, whom Pompey married, and who, while fhe lived, was the cement of their union, was alfo dead in child-bed. Cæfar had put an end to the Gallic war, and reduced the whole province to the Roman yoke: but though his commiffion was near expiring, he feemed to have no thoughts of giving it up and returning to the condition of a private fubject. He pretended that he could not poffibly be fafe if he parted with his army; efpecially while Pompey held the province of Spain prolonged to him for five years. This difpofition to a breach Cicero foon learned from his friends, as he was returning from his province of Cilicia. But as he forefaw the confequences of a war more clearly and fully than any of them, fo his firft refolution was to apply all his endeavours and authority to the mediation of a peace; though, in the event of a breach, he was determined within himfelf to follow Pompey. He clearly forefaw, what he declared without fcruple to his friends, that which fide foever got the better, the war muft neceffarily end in a tyranny. The only difference, he faid, was, that if their enemies conquered, they would be profcribed; if their friends, they would be flaves.

He no fooner arrived at the city, however, than he fell, as he tells us, into the very flame of civil difcord, and found the war in effect proclaimed: for the fenate had juft voted a decree, that Cæfar fhould difband his army by a certain day, or be declared an enemy; and Cæfar's fudden march towards Rome effectually confirmed it. In the midft of all his hurry and confufion, Cæfar was extremely folicitous about Cicero; not fo much to gain him, for that was not to be expected, as to prevail with him to ftand neuter. He wrote to him feveral times to that effect; and employed all their common friends to prefs him with letters on that fubject: all which was done; but in vain, for Cicero was impatient to be gone to Pompey. In the mean time, thefe letters give us a moft fenfible proof of the high efteem and credit in which Cicero flourifhed at this time in Rome; when, in a conteft for empire, which force alone was to decide, we fee the chiefs on both fides fo folicitous to gain a man to their party, who had no peculiar fkill in arms or talents for war. Purfuing, however, the refult of all his deliberations, he embarked at length to follow Pompey, who had been obliged to quit Italy fome time before, and was then at Dyrrhachium; and arrived fafely in his camp with his fon, his brother, and his nephew, committing the fortunes of the whole family to the iffue of that caufe. After the battle of Pharfalia, in which Pompey was defeated, Cicero returned into Italy, and was afterwards received into great favour by Cæfar, who was now declared dictator the fecond time, and Mark Antony his mafter of horfe. We may eafily imagine, what we find indeed from his letters, that he was not a little difcompofed at the thoughts of an interview with Cæfar, and the indignity of offering himfelf to a conqueror againft whom he had been in arms: for though upon many accounts he had reafon to expect a kind reception from Cæfar, yet he hardly thought his life, he fays, worth begging; fince what was given by a mafter might always be taken away again at pleafure. But at their meeting he had no occafion to fay or do any thing that was below his dignity: for Cæfar no fooner faw him than he alighted, ran to embrace him, and walked with him alone, converfing very familiarly for feveral furlongs.

Cicero was now in his 61ft year, and forced at laft to part with his wife Terentia; whofe humour and conduct had been long uneafy to him. She was a woman of an imperious and turbulent fpirit, and though he had borne her perverfenefs in the vigour of health, and flourifhing ftate of his fortunes, yet, in a declining life, foured by a continual fucceffion of mortifications from abroad, the want of eafe and quiet at home was no longer tolerable to him. But he was immediately oppreffed by a new and moft cruel affliction, the death of his beloved daughter Tullia, who died in child-bed foon after her divorce from her third hufband Dolabella. She was about 32 years old at the time of her death; and, by the few hints which are left of her character, appears to have been an excellent and admirable woman. She was moft affectionately and pioufly obfervant of her father; and, to the ufual graces of her fex having added the more folid accomplifhments of knowledge and polite letters, was qualified to be the companion and delight of his age; and was juftly efteemed not only as one of the beft, but the moft learned, of the Roman ladies. His affliction for the death of his daughter was fo great, that, to fhun all company as much as he could, he removed to Atticus's houfe, where he lived chiefly in his library, turning over every book he could meet with on the fubject of moderating grief. But finding his refidence here too public, and a greater refort to him than he could bear, he retired to Auftria, one of his feats near Antium, a little ifland on the Latian fhore, at the mouth of a river of the fame name, covered with woods and groves cut into fhady walks; a fcene of all others the fitteft to indulge melancholy, and where he could give a free courfe to his grief. "Here (fays he to Atticus) I live without the fpeech of man; every morning early I hide myfelf in the thickeft of the wood, and never come out till the evening. Next to yourfelf, nothing is fo dear to me as this folitude; and my whole converfation is with my books." Indeed his whole time was employed in little elfe than reading and writing during Cæfar's adminiftration, which he could never cheerfully fubmit to; and it was within this period that he drew up one of the graveft of thofe philofophical pieces which are ftill extant in his works.

Upon the death of Cæfar, Octavius his nephew and heir, coming into Italy, was prefented to Cicero by Hirtius and Panfa, with the ftrongeft profeffions on the part of the young man that he would be governed entirely by his direction. Indeed Cicero thought it neceffary to cherifh and encourage Octavius, if for nothing elfe, yet to keep him at a diftance from Antony; but could not yet be perfuaded to enter heartily into his affairs. He fufpected his youth and want of experience; and that he had not ftrength enough to deal with Antony; and, above all, that he had no good difpofition towards the confpirators. He thought it impoffible he fhould ever be a friend to them; and was perfuaded rather, that if ever he got the upper hand, his uncle's acts would be more violently enforced,

and his death more cruelly revenged, than by Antony himſelf. And when Cicero did conſent at laſt to unite himſelf to Octavius's intereſts, it was with no other view but to arm him with a power ſufficient to oppreſs Antony; yet ſo checked and limited, that he ſhould not be able to oppreſs the republic.

In the hurry of all theſe politics, he was ſtill proſecuting his ſtudies with his uſual application; and, beſides ſome philoſophical pieces, now finiſhed his book of offices, or the duties of man, for the uſe of his ſon; a work admired by all ſucceeding ages as the moſt perfect ſyſtem of heathen morality, and the nobleſt effort and ſpecimen of what reaſon could do in guiding man through life with innocence and happineſs. However, he paid a conſtant attention to public affairs; miſſed no opportunities, but did every thing that human prudence could do for the recovery of the republic: for all that vigour with which it was making this laſt effort for itſelf, was entirely owing to his counſels and authority. This appears from thoſe memorable Philippics which from time to time he publiſhed againſt Antony, as well as from other monuments of antiquity. But all was in vain: for though Antony's army was entirely defeated at the ſiege of Modena, which made many people imagine that the war was at an end, and the liberty of Rome eſtabliſhed; yet the death of the conſuls Panſa and Hirtius in that action gave the fatal blow to all Cicero's ſchemes, and was the immediate cauſe of the ruin of the republic.

Octavius having ſubdued the ſenate to his mind, marched towards Gaul to meet Antony and Lepidus; who had already paſſed the Alps, and brought their armies into Italy, in order to have a perſonal interview with him; which had been privately concerted for ſettling the terms of a triple league, and dividing the power and provinces of Italy among themſelves. The place appointed for this interview was a ſmall iſland about two miles from Bononia, formed by the river Rhenus, which runs near that city. Here they met, and ſpent three days in a cloſe conference to adjuſt the plan of their accommodation: and the laſt thing they adjuſted was the liſt of a proſcription which they were determined to make of their enemies. This, as the writers tell us, occaſioned much difficulty and warm conteſts among them; till each in his turn conſented to ſacrifice ſome of his beſt friends to the revenge and reſentment of his colleagues. Cicero was at his Tuſculan villa, when he firſt received the news of the proſcription, and of his being included in it. It was the deſign of the triumvirate to keep it a ſecret, if poſſible, to the moment of execution; in order to ſurpriſe thoſe whom they had deſtined to deſtruction, before they were aware of their danger, or had time to make their eſcape. But ſome of Cicero's friends found means to give him early notice of it; upon which he ſet forward to the ſea-ſide, with a deſign to tranſport himſelf out of the reach of his enemies. There, finding a veſſel ready, he preſently embarked; but the winds being adverſe, and the ſea uneaſy to him, after he had ſailed about two leagues along the coaſt, he was obliged to land, and ſpend the night on ſhore. From thence he was forced, by the importunity of his ſervants, on board again; but was ſoon afterwards obliged to land at a country-ſeat of his a mile from the ſhore, weary of life, and declaring he was reſolved to die in that country which he had ſo often ſaved. Here he ſlept ſoundly for ſome time, till his ſervants once more forced him away in a litter towards the ſhip, having heard that he was purſued by Antony's aſſaſſins. They were ſcarce departed when the aſſaſſins arrived at his houſe; and, perceiving him to be fled, purſued him immediately towards the ſea, and overtook him in a wood that was near the ſhore. Their leader was one Popilius Lenas, a tribune of the army, whoſe life Cicero formerly defended and ſaved. As ſoon as the ſoldiers appeared, the ſervants prepared to defend their maſter's life at the hazard of their own; but Cicero commanded them to ſet him down and make no reſiſtance. They ſoon cut off his head and his hands, returning with them to Rome as the moſt agreeable preſent to their cruel employer. Antony, who was then at Rome, received them with extreme joy, rewarding the murderer with a large ſum of money, and ordering the head to be fixed upon the roſtra between the two hands: a ſad ſpectacle to the city; and what drew tears from every eye, to ſee thoſe mangled members which uſed to exert themſelves ſo glorioufly from that place in defence of the lives, the fortunes, and the liberties of the Roman people, ſo lamentably expoſed to the ſcorn of ſycophants and traitors. The deaths of the reſt, ſays an hiſtorian of that age, cauſed only a private and particular ſorrow; but Cicero's an univerſal one. It was a triumph over the republic itſelf; and ſeemed to confirm and eſtabliſh the perpetual ſlavery of Rome.

Mr. Swinburne, however, is of opinion, that "poſterity has been too much ſeduced by the name of Cicero, and that better citizens were ſacrificed to the jealouſy of the triumvirs without exciting ſo much indignation. If we take an impartial ſurvey of Cicero's conduct and principles, avowed in his own epiſtolary correſpondence, and trace him through all the labyrinths of his contradictory letters, we ſhall find more to blame than to admire; and diſcover, that the deſire of advancing his fortunes, and making himſelf a name, were, from his outſet in life, the only objects he had in view. The good of his country, and the dictates of ſtern ſteady virtue, were not, as in Brutus and Cato, the conſtant ſprings of his actions. The misfortunes that befel him after his conſulſhip, developed his character, and ſhowed him in his true colours: from that time to his death, puſillanimity, irreſolution, and unworthy repining, tainted his judgment, and perplexed every ſtep he wiſhed to take. He flattered Pompey and cringed to Cæſar, while in his private letters he abuſed them both alternately. He acknowledges, in a letter to his friend, the time-ſerving Atticus, that, although he was at preſent determined to ſupport the cauſe of Rome and liberty, and to bear misfortune like a philoſopher, there was one thing which would gain him over to the triumvirs, and that was their procuring for him the vacant augurſhip; ſo pitiful was the bribe to which he would have ſacrificed his honour, his opinion, and the commonwealth. By his wavering imprudent conduct, he contributed greatly towards its deſtruction. After reproaching the conſpirators for leaving him out of the ſecret, and loading them with the moſt flattering compliments on their delivering Rome from Cæſar's tyranny, he calls Caſca an *aſſaſſin*, to pay his court to the boy Octavius, by whom he was completely duped. His praiſes of this triumvir are in the higheſt ſtrain of panegyric. Mark Antony well knew, that the virulent abuſe which Cicero was continually pouring out againſt him, was not an effuſion of patriotic zeal or virtuous indignation, but merely the ebullitions of perſonal hatred. He therefore cauſed Cicero to be killed, as an angry man that has been ſtung, ſtamps on a venomous animal that comes within reach of his foot. The cloak he threw over the body of Brutus, and the ſpeech he pronounced at the ſight of that hero when dead, differ widely from the treatment he gave the remains of Cicero; and ſhow, that he made a diſtinction between a Roman who oppoſed him from political motives, and one whoſe enmity aroſe from private pique."

Cicero's death happened on the 7th of December, in the 64th year of his age, about ten days from the ſettlement of the firſt triumvirate; and with him expired the ſhort empire of eloquence among the Romans. As an orator he is thus characteriſed by Dr. Blair: "In all his orations his art is conſpicuous. He begins commonly with a regular exordium: and with much addreſs prepoſſeſſes the hearers, and ſtudies to gain their affections. His method is clear, and his arguments are arranged with exact propriety. In a ſuperior clearneſs of method, he

has an advantage over Demosthenes. Every thing appears in its proper place. He never tries to move till he has attempted to convince; and in moving, particularly the softer passions, he is highly successful. No one ever knew the force of words better than Cicero. He rolls them along with the greatest beauty and magnificence; and in the structure of his sentences is eminently curious and exact. He amplifies every thing; yet though his manner is generally diffuse, it is often happily varied and accommodated to the subject. When an important public object rouses his mind, and demands indignation and force, he departs considerably from that loose and declamatory manner to which he at other times is addicted, and becomes very forcible and vehement. This great orator, however, is not without his defects. In most of his orations there is too much art, even carried to a degree of ostentation. He seems often desirous of obtaining admiration rather than of operating by conviction. He is sometimes, therefore, showy rather than solid, and diffuse where he ought to have been urgent. His sentences are always round and sonorous. They cannot be accused of monotony, since they possess variety of cadence; but from too great a fondness for magnificence, he is on some occasions deficient in strength. Though the services which he had performed to his country were very considerable, yet he is too much his own panegyrist. Ancient manners, which imposed fewer restraints on the side of decorum, may in some degree excuse, but cannot entirely justify, his vanity."

CICHORIUM, SUCCORY: a genus of the polygamia æqualis order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ*. The receptacle is a little paleaceous: the calyx calyculated; the pappus almost quinquedentated, and indistinctly hairy. The species are, 1. The *intybus*, or wild succory, grows naturally by the sides of the roads, and in shady lanes, in many parts of Britain. It sends out long leaves from the roots, from between which the stalks arise, growing to the height of three or four feet, and branching out into smaller ones. The flowers come out from the sides of the stalks, and are of a fine blue colour. They are succeeded by oblong seeds covered, inclosed in a down. 2. The *spinosum*, with a prickly forked stalk, grows naturally on the sea coasts in Sicily, and the islands of the Archipelago. This sends out from the root many long leaves which are indented on their edges, and spread flat on the ground; from between these arise the stalks, which have very few leaves, and those are small and entire: these stalks are divided in forks upward, and from between them come out the flowers, which are of a pale blue colour, and are succeeded by seeds shaped like those of the common sorts. The ends of the smaller branches are terminated by star-like spines which are very sharp. 3. The *endivia*, or succory with broad crenated leaves, differs from the wild sort in its duration, being only annual, whereas the wild sort is perennial. The last species may be considered both as an annual and biennial plant. The great excellence of endive is to have its inner leaves finely whitened or blanched. They naturally incline to whiteness of themselves; but this may be greatly improved by art when the plants are arrived at full growth. Different methods are practised for this purpose, such as tying the leaves together; or taking up the plants, and replanting them directly, almost to their tops, in ridges of dry earth, laying boards or tiles flat-ways on the top of the plants; but the first is found to answer the purpose most effectually.

CICINDELA, the SPARKLER, in zoology, a genus of insects belonging to the order of coleoptera. (See Plate 78.) The antennæ are setaceous; the jaws are prominent, and furnished with teeth; the eyes are a little prominent; and the breast is roundish and marginated. There are 14 species. The *campestris*, or field-sparkler, is one of the most beautiful of the genus. The upper part of its body is of a fine green colour, rough, and rather blueish. The under side, as also the legs and antennæ, are of a shot colour, gold and red, of a copperish cast. The eyes are very prominent, and give the head a broad appearance. The thorax is angular, and narrower than the head; which constitutes the character of the cicindela. It is rough, and of a green colour tinged with gold, as well as the head. The elytra are delicately and irregularly dotted. Each of them has six white spots, viz. one on the top of the elytrum, at its outward angle: three more along the outward edge, of which the middlemost forms a kind of lunula: a fifth, on the middle of the elytra, opposite the lunula; and that one is broader, and tolerably round: lastly, a sixth, at the extremity of the elytra. There is also sometimes seen a black spot on the middle of each elytrum, opposite to the second white spot. The upper lip is also white, as is the upper side of the jaws, which are very prominent and sharp. This insect runs with great swiftness, and flies easily. It is found in dry sandy places, especially in the beginning of spring. In the same places its larva is met with, which resembles a long, soft, whitish worm, armed with six legs, and a brown scaly head. It makes a perpendicular round hole in the ground, and keeps its head at the entrance of the hole to catch the insects that fall into it; a spot of ground is sometimes entirely perforated in this manner. The insects belonging to this genus are in general very beautiful, and merit the attention of the curious in their microscopic observations: some are minute, though not inferior in splendour, therefore best suited for the experiment. Living subjects are ever preferable to dead ones. The larvæ of all this genus live under ground; and are, as well as the perfect insects, tigers in their nature, attacking and destroying all they can overcome.

CICISBEO, an Italian term, which in its etymology signifies a *whisperer*; which has been bestowed in Italy both on lovers, and on those who to outward appearance act as such, attending on married ladies with as much attention and respect as if they were their lovers. This Italian custom has been spoken of very reproachfully by some writers; Mr. Baretti has taken great pains to vindicate it. He ascribes it to a spirit of gallantry, derived from the ages of chivalry, and much heightened and refined by the revival of the Platonic philosophy in Italy, about the thirteenth century; and by the verses of Petrarch in compliment to the beautiful Laura, and his numerous imitators.

CICLUT, or CICLUCH, a strong frontier town of Dalmatia, situated on the river Norentha, in E. long. 17. 40. N. lat. 45. 20. It is surrounded with walls built in the ancient manner, and was taken by the Venetians from the Turks in 1694.

CICONES, a people of Thrace near the Hebrus. Ulysses at his return from Troy conquered them, and plundered their chief city Ismarus. They tore Orpheus to pieces for his obscene indulgences.

CICUTA, properly signifies an hollow intercepted between two knots, of the stalks or reeds of which the ancient shepherds used to make their pipes. It is now, however, generally used to signify the water hemlock, and also the common sort; but Linnæus has described the latter under the old name of CONIUM. There are three species of water-hemlock; the *virosa*, the *bulbifera*, and the *maculata*. Of these the first is the only one remarkable, and that for the poisonous qualities of its roots, which have been often known to destroy children who ate them for parsnips.

CICUTA is also used chiefly among the ancients, for the juice or liquor expressed from the above plant, being the common poison wherewith the state criminals at Athens were put to death; though some have suggested, that the poisonous draught to which the Athenians doomed their criminals was an inspissated juice compounded of the juice of *cicuta* and some other deleterious herbs. Plato, in his dialogue on the immor-

tality of the foul, obferves, that "the executioner advifed Socrates not to talk, for fear of caufing the *cicuta* to operate too flowly."

CID (Roderico Dias le), a Caftilian officer, who was very fuccefsful againft the Moors, under Ferdinand II. king of Caftile; but whofe name would hardly have been remembered, if Corneille had not made his paffion for Chimene the fubject of an admired tragedy, founded on a fimple but affecting incident. The Cid is defperately in love with Chimene, daughter of the Count de Gomes: but he is at variance with the Count; and being challenged by him, kills him in a duel. The conflict between love and honour in the breaft of Chimene, who at length pardons and marries the Cid, forms the beauty of the piece. He died in 1098.

CIDARIS, in antiquity, the mitre ufed by the Jewifh high-priefts. The Rabbins fay, that the bonnet ufed by priefts in general was made of a piece of linen cloth 16 yards long, which covered their heads like a helmet or turban; and they allow no other difference between the high-prieft's bonnet and that of the other priefts, than that the one is flatter, and more in the form of a turban; whereas that worn by ordinary priefts rofe fomething more in a point.

CIGNANI (Carlo), an Italian painter, was born at Bologna in 1628; and was the difciple of Albani. He was efteemed by pope Clement XI. who nominated him prince of the academy of Bologna, and loaded him with favours. Cignani died at Forli in 1719. The cupola of la Madona del Fuoco at Forli, in which he reprefented Paradife, is an admirable work. His principal pictures are at Rome, Bologna, and Forli.

CIGOLI, or Civoli, the painter. See Civoli.

CILIA, the Eye-lashes. See Anatomy, p. 210.

CILIATED leaf, among botanical writers, one furrounded with parallel filaments fomewhat like the hairs of the eye-lids.

CILICIA, an ancient kingdom of Afia, lying between the 36th and 40th degree of north latitude: bounded on the eaft by Syria, or rather by Mount Amanus, which feparates it from that kingdom; by Pamphylia, on the weft; by Ifauria, Cappadocia, and Armenia Minor, on the north; and by the Mediterranean fea, on the fouth. It is furrounded by fteep and craggy mountains, chiefly the Taurus Amanus, that it may be defended by a handful of refolute men againft a numerous army, there being but three narrow paffes leading into it, commonly called *Pylæ Ciliciæ*, or the gates of Cilicia; one on the fide of Cappadocia, called the *Pafs of Mount Taurus*; and the other two called the *Pafs of Mount Amanus*, and the *Pafs of Syria*. The whole country was divided by the ancients into Cilicia Afpera and Cilicia Campeftris; the former called by the Greeks *Trachea* or *Stony*, from its abounding fo with ftones; and to this day the whole province is called by the Turks, *Tas Wilcieth*, or *the Stony Province*.

The Cilicians, if we believe the Greek and Roman hiftorians, were a rough unpolifhed race of people, unfair in their dealings, cruel, and liars even to a proverb. In the Roman times they became greatly addicted to piracy. They were, however, at laft defeated and entirely fuppreffed by Pompey the Great.

Cilicia *Terra*, in the natural hiftory of the ancients, a bituminous fubftance improperly called an earth, which, by boiling, became tough like bird-lime, and was ufed inftead of that fubftance to cover the ftocks of the vines for preferving them from the worms. It probably ferved in this office in a fort of double capacity, driving away thefe animals by its naufeous fmell, and entangling them if they chanced to get amongft it.

CILICIUM, in Hebrew antiquity, a fort of habit made of coarfe ftuff, formerly in ufe among the Jews in times of mourning and diftrefs. It is the fame with what the Septuagint and Hebrew verfions call fackcloth.

CILLEY, an ancient and famous town of Germany, in the circle of Auftria, and in Upper Carniola. It is the capital of a county of the fame name, and is fituated on the river Saan, in E. long. 15. 45. N. lat. 46. 28.

CIMA, or Sima, in architecture, the fame with Cymatium, or Ogee. See Architecture.

CIMABUE (Giovani), a renowned painter, born at Florence in 1240, and the firft who revived the art of painting in Italy. He painted, according to the cuftom of thofe times, in frefco and in diftemper; colours in oil not being then found out. He excelled in architecture as well as in painting; and was concerned in the fabric of Sancta Maria del Fior at Florence: during which employment he died at the age of 60, and left many difciples.

CIMBRI, an ancient Celtic nation, inhabiting the northern parts of Germany. They are faid to have been defcended from the Afiatic *Cimmerians*, and to have taken the name of *Cimbri* when they changed their old habitations. When they firft became remarkable, they inhabited chiefly the peninfula now called *Jutland*, and by the ancients *Cimbrica Cherfonefus*.

CIMEX, or Bug, in zoology, a genus of infects belonging to the order of hemiptera. See plate 78. The roftrum is inflected. The antennæ are longer than the thorax. The wings are folded together crofs-wife; the upper ones are coriaceous from their bafe towards their middle. The back is flat; the thorax margined. The feet are formed for running. This genus is divided into different fections, viz. 1. Thofe without wings. 2. Thofe in which the efcutcheon is extended fo far as to cover the abdomen and the wings. 3. The coleoptrati, whofe elytra are wholly coriaceous. 4. Thofe whofe elytra are membranaceous: thefe are very much depreffed like a leaf. 5. In which the thorax is armed on each fide with a fpine. 6. Thofe which are of an oval form, without fpines on the thorax. 7. In which the antennæ become fetaceous towards their point. 8. Thofe of an oblong form. 9. Thofe whofe antennæ are fetaceous, and as long as the body. 10. Thofe that have their thighs armed with fpines. 11. Thofe whofe bodies are long and narrow. Linnæus enumerates no fewer than 121 fpecies, to which feveral have been added by other naturalifts. A very peculiar fpecies was difcovered by Dr. Sparman at the Cape, which he has named *Cimex paradoxus*. He obferved it as at noon-tide he fought for fhelter among the branches of a fhrub from the intolerable heat of the fun. "Though the air (fays he) was extremely ftill and calm, fo as hardly to have fhaken an afpen leaf, yet I thought I faw a little withered, pale, crumpled leaf, eaten as it were by caterpillars, flittering from the tree. This appeared to me fo very extraordinary, that I thought it worth my while fuddenly to quit my verdant bower in order to contemplate it: and I could fcarcely believe my eyes, when I faw a live infect, in fhape and colour refembling the fragment of a withered leaf, with the edges turned up and eaten away, as it were, by caterpillars, and at the fame time all over befet with prickles. Nature, by this peculiar form, has certainly extremely well defended and concealed, as it were in a mafk, this infect from birds and its other diminutive foes; in all probability with a view to preferve it, and employ it for fome important office in the fyftem of her economy; a fyftem with which we are too little acquainted, in general too little inveftigate, and, in every part of it, can never fufficiently admire with that refpect and veneration which we owe to the great Author of Nature and Ruler of the Univerfe."

The larvæ of bugs only differ from the perfect infect by the want of wings; they run over plants; grow and change to chryfalids, without appearing to undergo any material differ-

ence. They have only rudiments of wings, which the laft transformation unfolds, and the infect is then perfect. In the two firft ftages they are unable to propagate their fpecies. In their perfect ftate, the female, fecundated, lays a great number of eggs, which are often found upon plants, placed one by the fide of another; many of which, viewed through a glafs, prefent fingular varieties of configuration. Some are crowned with a row of fmall hairs, others have a circular fillet; and moft have a piece which forms a cap; this piece the larva pufhes off when it forces open the egg. Releafed by nature from their prifon, they overfpread the plant on which they feed, extracting, by the help of the roftrum, the juices appropriated for their nourifhment: even in this ftate, the larvæ are not all fo peaceably inclined; fome are voracious in an eminent degree, and fpare neither fex nor fpecies they can conquer. In their perfect ftate they are mere cannibals, glutting themfelves with the blood of animals; they deftroy caterpillars, flies; and even the coleopterous tribe, whofe hardnefs of elytra one would imagine was proof againft their attacks, have fallen an eafy prey to the fharp piercing nature of the roftrum of the bug, and the incautious naturalift may even experience a feeling feverity of its nature. The cimex lectularius, or houfe-bug, is particularly acceptable to the palate of fpiders in general, and is even fought after by wood-bugs; which is not indeed furprifing, when the general voracity of this genus is confidered. Trials have been made of various methods of deftroying houfe-bugs, with oil of turpentine, camphor, folutions of fublimate, the fmoke of corn-mint, narrow-leaved wild crefs, &c. See Bug and Cimicifuga.

CIMICIFUGA, in botany: a genus of the polyandria order, belonging to the diœcia clafs of plants. The male calyx is almoft pentaphyllous: there is no corolla; the ftamina are 20 in number: the female calyx is almoft pentaphyllous; no corolla; the ftamina 20, and barren; the capfules from 4 to 7, polyfpermous. Mefferfchmidius, in the Ifis Siberica, gives it the following character and name: *Cimicifuga fœtida*, with the leaves of the herb Chriftopher, bearing a thyrfus of yellow male flowers with a red villous feed, the feed-veffel in form of a horn. This whole plant fo refembles the actea racemofa, that it is difficult to diftinguifh them when not in flower; but in the fructification it greatly differs from it, the cimicifuga having four piftils, the actea but one. Jacquin fays, that it is a native of the Carpathian mountains. It has obtained the name of *cimicifuga*, or *bugbane*, both in Siberia and Tartary, from its property of driving away thofe infects: and the botanifts of thofe parts of Europe which are infefted by them, have long defired to naturalize it in their feveral countries. Gmelin mentions, that in Siberia the natives alfo ufe it as an evacuant in dropfy; and that its effects are violently emetic and draftic.

CIMMERII, anciently a people near the Palus Mæotis. They invaded Afia Minor 1284 years before Chrift, and feized upon the kingdom of Cyaxares. After they had been mafters of the country for 28 years, they were driven back by Alyattes king of Lydia.—Another nation alfo on the weftern coaft of Italy were fo named. The country which they inhabited was fuppofed to be fo gloomy, that to exprefs a great obfcurity the expreffion of *Cimmerian darknefs* has proverbially been ufed; and Homer, according to Plutarch, drew his images of hell and Pluto from the gloomy and difmal country where they dwelt.

CIMOLIA terra, in natural hiftory; a name by which the ancients expreffed a very valuable medicinal earth; but which latter ages have fuppofed to be no other than our tobacco-pipe clay and fuller's earth. The cimolia terra of the ancients was found in feveral of the iflands of the Archipelago; particularly in the ifland of Cimolus, from whence it has its name. It was ufed with great fuccefs in the eryfipelas, inflammations, and the like, being applied by way of cataplafm to the part. They alfo ufed, as we do, what we call *cimolia*, or fuller's earth, for the cleanfing of clothes. This earth of the ancients, though fo long difregarded, and by many fuppofed to be loft, is yet very plentiful in Argentiere (the ancient Cimolus), Sphanto, and many of thofe iflands. It is a marl of a lax and crumbly texture, and a pure bright white colour, very foft to the touch. It adheres firmly to the tongue; and, if thrown into water, raifes a little hiffing and ebullition, and moulders to a fine powder. It makes a confiderable effervefcence with acids, and fuffers no change of colour in the fire. Thefe are the characters of what the ancients called fimply *terra cimolia:* but befides this, they had, from the fame place, another earth which they called by the fame general name, but diftinguifhed by the epithet purple, *purpurafcens*. This they defcribed to be fattifh, cold to the touch, of a mixed purple colour, and nearly as hard as a ftone. And this was evidently the fubftance we call *fteatites*, or the *foap-rock*; common in Cornwall, and alfo in the ifland of Argentiere, or Cimolus.

Cimolia *Alba*, the official name of the earth of which we now make tobacco-pipes. Its diftinguifhing characters are, that it is a denfe, compact, heavy earth, of a dull white colour, and very clofe texture; it will not eafily break between the fingers, and flightly marks the fkin in handling. It adheres firmly to the tongue; melts very flowly in the mouth, and is not readily diffufible in water. It is found in many places. That of the ifle of Wight is much efteemed for its colour. Great plenty of it is found near Poole in Dorfetfhire, and near Wednefbury in Staffordfhire.

Cimolia *Nigra*, is of a dark lead colour, hard, dry, and heavy; of a fmooth compact texture, and not vifcid: it does not colour the hands; crumbles when dry; adheres to the tongue; diffufes flowly in water; and is not acted upon by acids. It burns perfectly white, and acquires a confiderable hardnefs. The chief pits for this clay are near Northampton, where it is ufed in the manufacture of tobacco-pipes. It is alfo mixed with the critche clay of Derbyfhire, in the proportion of one part to three, in the manufacture of the hard reddifh brown ware.

CIMON, an Athenian, fon of Miltiades and Hegifipyle. He was famous for his debaucheries in his youth, and the reformation of his morals when arrived at years of difcretion. He behaved with great courage at the battle of Salamis, and rendered himfelf popular by his munificence and valour. He defeated the Perfian fleet, took 200 fhips, and totally routed their land army, the very fame day, A. U. C. 284. The money that he obtained by his victories was not applied for his own private ufe, but with it he fortified and embellifhed the city. He fome time after loft all his popularity, and was banifhed by the Athenians, who declared war againft the Lacedæmonians. He was recalled from his exile; and at his return he made a reconciliation between Lacedæmon and his countrymen. He was afterwards appointed to carry on the war againft Perfia in Egypt and Cyprus, with a fleet of 200 fhips, and on the coaft of Afia he gave battle to the enemy, and totally ruined their fleet, A. U. C. 304. He died as he was befieging the town of Citium in Cyprus. He may be called the laft of the Greeks whofe fpirit and boldnefs defeated the armies of the barbarians. He was fuch an inveterate enemy to the Perfian power, that he formed a plan of totally deftroying it; and in his wars he had fo reduced the Perfians, that they promifed in a treaty not to pafs the Chelidonian iflands with their fleet, or to approach within a day's journey of the Grecian feas. See Attica.

CINALOA, a province of Mexico in North America, abounding in corn, cattle, and cotton; and rendered extremely picturefque, by a number of beautiful cafcades of clear water

that fall down from the mountains. It lies on the eaftern coaft of the fea of California, and has a town of the fame name, fituated in W. long. 110. N. lat. 26.

CINARA, in botany, the ARTICHOKE. See CYNARA.

CINCHONA, in botany, *Peruvian* BARK. See BARK.

CINCINNATUS, the Roman dictator, was taken from the plough, to be advanced to the dignity of conful; in which office he reftored public tranquillity, and then returned to his rural employments. Being called forth a fecond time to be dictator, he conquered the enemies of Rome, and, refufing all rewards, retired again to his farm, after he had been dictator only 16 days. The fame circumftance occurred once more in the 80th year of his age. He died 376 years before Chrift.

Order of CINCINNATUS, or the *Cincinnati*, a fociety which was eftablifhed in America foon after the peace, and confifts of the generals and officers of the army and navy of the United States. This inftitution, called after the name of the Roman dictator mentioned in the preceding article, was intended to perpetuate the memory of the revolution, the friendfhip of the officers, and the union of the States; and alfo to raife a fund for the relief of poor widows and orphans, whofe hufbands and fathers had fallen during the war, and for their defcendants. The fociety was fub-divided into ftate-focieties, which were to meet on the 4th of July, and with other bufinefs depute a number of their members to convene annually in general meetings. The members of the inftitution were to be diftinguifhed by wearing a medal, emblematical of the defign of the fociety: and the honours and advantages were to be hereditary in the eldeft male heirs, and, in default of male iffue, in the collateral male heirs. Honorary members were to be admitted, but without the hereditary advantages of the fociety, and provided their number fhould never exceed the ratio of one to four of the officers or their defcendants. Though the apparent defigns of this fociety were harmlefs and honourable, it did not efcape popular jealoufy. Views of a deeper nature were imputed to the framers; and the inftitution was cenfured and oppofed, as giving birth to a military nobility, or a dangerous ariftocratic power, which might ultimately prove ruinous to the liberties of the new empire. But the principal ground of apprehenfion was the fuppofed right of inheritance connected with this honour to render it hereditary; which, however, hath been given up and totally difclaimed by the fociety.

CINCTURE, in architecture, a ring, lift, or orlo, at the top and bottom of the fhaft of a column, feparating the fhaft at one end from the bafe, and at the other from the capital.

CINEAS, a Theffalian, minifter and friend to Pyrrhus king of Epirus. He was fent to Rome by his mafter to fue for a peace, which he, however, could not obtain. He told Pyrrhus that the Roman fenate was a venerable affembly of kings; and obferved, that to fight with them was to fight againft another Hydra. He was of fuch a retentive memory, that the day after his arrival at Rome, he could call every fenator and knight by his name.

CINERITIOUS, an appellation given to different fubftances, on account of their refembling afhes either in colour or confiftence; hence it is that the cortical part of the brain has fometimes got this epithet.

CINNA (L. Corn.), a Roman who oppreffed the republic with his cruelties. He was banifhed by Octavius for attempting to make the fugitive flaves free. He joined himfelf with Marius; and with him at the head of the flaves he defeated his enemies, and made himfelf conful even to a fourth time. He maffacred fo many citizens at Rome, that his name became odious; and one of his officers affaffinated him at Ancena, as he was preparing war againft Sylla.

CINNA (C. Helvius), a poet intimate with Cæfar. He went to attend the obfequies of Cæfar, and being miftaken by the populace for the other Cinna, he was torn to pieces.—Alfo a grandfon of Pompey's. He confpired againft Auguftus, who pardoned him, and made him one of his moft intimate friends. He was conful A. U. C. 758, and made Auguftus his heir.

CINNABAR, in natural hiftory, is either native or factitious. The *native* is an ore of quickfilver, moderately compact, very heavy, and of an elegant ftriated red colour. *Factitious* cinnabar is a mixture of mercury and fulphur fublimed, and thus reduced to a fine red fubftance. The beft is of a high colour, and full of needle-like fpiculæ. See CHEMISTRY. The chief ufe of cinnabar is for painting, for which purpofe it generally goes by the name of *vermilion*. Cinnabar is often employed as an internal medicine. Hoffman greatly recommends it as a fedative and antifpafmodic; and Stahl makes it an ingredient in his *Temperant Powder*. Other intelligent phyficians deny that cinnabar taken internally has any medicinal quality; and their opinion is grounded on the infolubility of it in any menftruum. This queftion, concerning its utility as a medicine, cannot be decided without further refearches. Cinnabar, however, is certainly ufed with fuccefs, as a means of mercurial fumigation in venereal difeafes. For this purpofe it is burnt on live coals, or a red-hot iron, by which the mercury is difengaged, and forms a vapour, which, being applied to the body of the difeafed perfon, is abforbed, and produces effects fimilar to thofe of quickfilver adminiftered by friction.

CINNAMON, the bark of two fpecies of laurus. The true cinnamon is from the laurus cinnamomum; and the bafe cinnamon, which is often fold for the true, is from the laurus caffia. See BAY-*Tree*. CINNAMON-*water*, now named by the London College *Spiritus Cinnamomi*, is made by diftilling the bark with fpirit of wine.

Clove-CINNAMON is the bark of a tree growing in Brazil, which is often fubftituted for real cloves.

White CINNAMON, called alfo *Winter's bark*, is the bark of a tree frequent in the ifles of St. Domingo, Guadaloupe, &c. of a fharp biting tafte, like pepper. Some ufe it inftead of nutmeg; and in medicine it is efteemed a ftomachic and antifcorbutic. See CANELLA.

CINNAMUS, a Greek hiftorian, wrote a hiftory of the eaftern empire, during the reigns of John and Manuel Comnenes, from 1118 to 1143. His ftyle is reckoned the beft of the modern Greek authors. He died after the year 1183.

CINQUEFOIL, in botany. See POTENTILLA.

CINQUE-PORTS. See BARONS *of the Cinque-Ports*.

CINTRA, a cape and mountain of Portugal, in the province of Eftremadura, ufually called the *Rock of Lifbon*. It lies on the north fide of the entrance of the river Tajo; and there is a town of the fame name fituated thereon. W. long. 10. 15. N. lat. 39. 0.

CINUS, or CYNUS, a famous civilian of Piftoia in the 14th century. His commentary on the Code was finifhed in 1313: he alfo wrote on fome parts of the Digeft. He was no lefs famous for his Italian poems; and is ranked among thofe who firft gave graces to the Tufcan lyric poetry.

CINYRA, in the Jewifh antiquities, a mufical inftrument. This, and the Hebrew *cinnor*, which is generally tranflated *cithara*, *lyra*, or *pfalterium*, are the fame. It was made of wood, and was played on in the temple of Jerufalem. Jofephus fays that the *cinyra* of the temple had ten ftrings, and that it was touched with a bow. In another place he fays that Solomon made a great number of them with a precious kind of metal called *electrum*; wherein he contradicts the fcriptures, which inform us that Solomon's *cinnors* were made of wood.

CION, or SCION, in gardening, a young fhoot, fprout, or fprig, put forth by a tree. Grafting is performed by the application of the cion of one plant upon the ftock of another.

To produce a ftock of cions for grafting, planting, &c. the gardeners fometimes cut off the bodies of trees a little above the ground, and only leave a ftump or root ftanding: the redundant fap will not fail next fpring to put forth a great number of fhoots. In dreffing dwarf-trees, a great many cions are to be cut off.

CIOTAT, a fea-port of France, in the department of the mouths of the Rhone and late province of Provence. The harbour is defended by a ftrong fort. It is famous for Mufcadine wine, and is feated on the bay of Laquee, between Marfeilles and Toulon. Lon. 5. 46. E. Lat. 43. 12. N.

CIPHER, or CYPHER, one of the Arabic characters or figures ufed in computation, formed thus, 0. See ARITHMETIC.

CIPHER is alfo a kind of enigmatic character, compofed of feveral letters interwoven, which are generally the initial letters of the perfon's names for whom the ciphers are intended. Thefe are frequently ufed on feals, coaches, and other moveables.—Anciently merchants and tradefmen were not allowed to bear arms; in lieu thereof, they bore their ciphers, or the initial letters of their names, artfully interwoven about a crofs; of which we have various inftances on tombs, &c. See DEVICE.

CIPHER denotes likewife certain fecret characters difguifed and varied, ufed in writing letters that contain fome fecret, not to be underftood but by thofe between whom the cipher is agreed on. De la Guilletiere, in his *Lacedemon ancient and modern*, endeavours to make the ancient Spartans the inventors of the art of writing in cipher. Their fcytala, according to him, was the firft fketch of this myfterious art: thefe fcytalæ were two rollers of wood, of equal length and thicknefs; one of them kept by the ephori; the other by the general of the army fent on any expedition againft the enemy. Whenfoever thofe magiftrates would fend any fecret orders to the general, they took a flip of parchment, and rolled it very juftly about the fcytala which they had referved; and in this ftate wrote their intentions, which appeared perfect and confiftent while the parchment continued on the roll. When taken off, the writing was maimed, and without connection: but was eafily retrieved by the general, upon his applying it to his fcytala. Polybius fays, that Æneas Tacticus, 2000 years ago, collected together 20 different manners of writing fo as not to be underftood by any but thofe in the fecret; part whereof were invented by himfelf, and part ufed before his time.—Trithemius, Cap. Porta, Vigenere, and P. Niceron, have written exprefsly on the fubject of *Cipher*.

As the writing in *cipher* is become an art; fo is the reading or unravelling of it, called *deciphering*. The rules of deciphering are different in different languages; but in fact, it is difficult, if not impoffible, to apply any general rules to detect an art which is arbitrary in its nature, and which frames fpecific rules for itfelf in every different inftance. Inftead of dwelling therefore on this fubject we fhall proceed to defcribe certain contrivances employed for communicating intelligence by way of cipher:

1. *By means of a pack of cards.* The parties muft previoufly agree in what manner the cards fhall be firft placed, and then how they fhall be fhuffled. Thus fuppofe the cards are to be firft placed in the order as here-after follows, and then fhuffled by taking off 3 from the top, putting the next 2 over them, and the following 3 under them, and fo alternately. Therefore the party who fends the cipher firft, writes the contents of it on a feparate paper, and then copies the firft 32 letters on the cards, by writing one letter on every card: he then fhuffles them, in the manner defcribed, and writes the fecond 32 letters: he fhuffles them a fecond time, and writes the third 32 letters, and fo of the reft. An example will make this plain; fuppofe the letter to be as follows:

I am in full march to relieve you; within| three days I fhall be with you. If the ene|my in the mean time fhould make an affau|lt, remember what you owe to your countr|y, to your family, and yourfelf. Live with| honour, or die with glory.

Order of the cards before the 1ft fhuffle:

Ace fpades	*i a d u y i*	Queen clubs	*r o n u y b*
10 diamonds	*a l e u l*	9 fpades	*c u i y f y*
8 hearts	*m l m o i u*	King hearts	*l e t e u o*
King fpades	*i s u m l*	Queen diamonds	*i d s o e*
9 clubs	*n b l c o*	Eight fpades	*c i n w s o*
7 diamonds	*f b m r i*	Knave clubs	*v f a n t g*
9 diamonds	*u c a c t n*	Seven clubs	*e t s l y*
Ace clubs	*l w k|r y i*	Ace hearts	*y r e b r*
Knave hearts	*l s c e a e*	Nine hearts	*o l n w o t*
7 fpades	*m i a r m w*	Ace diamonds	*u b s t & d*
10 clubs	*a i t b e r*	Knave fpades	*w l m a l*
10 hearts	*r r b o f*	Ten fpades	*i e y t r r*
Queen fpades	*c b c e i*	King diamonds	*t t i b u r*
8 diamonds	*b a b y w*	Queen hearts	*b b m m u*
8 clubs	*t y o o o l*	King clubs	*i n a t b*
7 hearts	*o y a o b o*	Knave diamonds	*n e r u o*

The perfon that receives thefe cards firft places them in the order agreed on, and tranfcribes the firft letter on every card. He then fhuffles them, according to order, and tranfcribes the fecond letter on each card. He fhuffles them a fecond time, and tranfcribes the third letter: and fo of the reft. If the cards were to be fhuffled the fecond time by threes and fours, the third time by twos and fours, &c. it would make the cipher ftill more difficult to difcover: though as all ciphers depend on the combination of letters, there are fcarce any that may not be deciphered with time and pains; as we fhall fhow further on. Thofe ciphers are the beft that are by their nature moft free from fufpicion of being ciphers; as for example, if the letters were there wrote with fympathetic ink, the cards might then pafs for a common pack.

2. *By a dial.* On a piece of pafteboard, reprefented in plate 79, fig. 4. draw three circles, and divide them into 26 equal parts, in each of which muft be written one of the letters of the alphabet. On the infide of this there muft be another circle of pafteboard, moveable round a pin in the centre, and the extremity of this muft be divided into the fame number of equal parts as the other. On this alfo muft be written the letters of the alphabet, which, however, need not be difpofed in the fame order. The perfon with whom you correfpond muft have a fimilar dial, and at the beginning of your letter you muft put any two letters that anfwer to each other when you have fixed the dial.

Suppofe for example, you would write as follows: "If you will come over to us, you fhall have a penfion, and you may ftill make a fham oppofition." You begin with the letters *Ma*, which fhow how the dial is fixed: then for *If you*, you write *un juc*, and fo for the reft. The whole will appear thus: *Ma un juc iumm svar vgrx qv cd gvc dbbmm bbgr b yrkduvk bkt —juc abi dqumm ablr b dbba vyyvduquvk.*

The fame intention may be anfwered by a ruler, the upper part of which is fixed and the lower part made to flide; but in this cafe the upper part muft contain two alphabets in fucceffion, that fome letter of that part may conftantly correfpond to one in the lower part. The divifions ftanding directly over each other in a ftraight line will be much more obvious than in the circumference of a circle. Or two ftraight pieces of pafteboard regularly divided, the one containing a fingle and the other a double alphabet, would anfwer exactly the fame purpofe. In this cafe a blank fpace may be left at each end of the fingle alphabet, and one or two weights being placed on both the pieces will keep them fteady.

3. *The correſponding ſpaces.* Take two pieces of paſteboard or ſtiff paper, through which you muſt cut long ſquares, at different diſtances, as you will ſee in the following example. One of theſe pieces you keep yourſelf, and the other you give to your correſpondent. When you would ſend him any ſecret intelligence, you lay the paſteboard upon a paper of the ſame ſize; and in the ſpaces cut out, you write what you would have underſtood by him only, and then fill up the intermediate ſpaces with ſomewhat that makes with thoſe words a different ſenſe. For inſtance:

|I ſhall be| much obliged to you, as reading |alone| engages my attention |at| preſent, if you will lend me any one |of the| |eight| volumes of the Spectator. I hope you will excuſe |this| freedom; but for a winter's |evening| I |don't| know a better entertainment. If I |fail| to return it ſoon, never truſt me for the time |to come.|

A paper of this ſort may be placed four different ways, either by putting the bottom at the top, or by turning it over; and by theſe means the ſuperfluous words may be the more eaſily adapted to the ſenſe of the others.

This is a very eligible cipher, as it is free from ſuſpicion, but it will do only for ſhort meſſages: for if the ſpaces be frequent, it will be very difficult to make the concealed and obvious meanings agree together: and if the ſenſe be not clear, the writing will be liable to ſuſpicion.

4. *The muſical cipher.* The conſtruction of this cipher is ſimilar to that of N° 2. The circle Plate 79. fig. 3. is to be divided into twenty-ſix equal parts: in each part there muſt be wrote one of the letters of the alphabet; and on the anterior circle, which is moveable round the centre, there is to be the ſame number of diviſions. The circumference of the inner circle muſt be ruled in the manner of muſic paper; and in each diviſion there is to be placed a note, differing either in figure or poſition. Laſtly, within the muſical lines place the three keys; and on the outer circle, the figures that are commonly uſed to denote the time.

Then provide yourſelf with a ruled paper, and place one of the keys, as ſuppoſe that of *ge re ſol*, againſt the time two-fourths at the beginning of the paper, which will inform your correſpondent how to fix his circle. You then copy the notes that anſwer to the ſeveral letters of the words you intend to write, in the manner expreſſed at fig. 5.

A cipher of this ſort may be made more difficult to diſcover by frequently changing the key, and that will not in the leaſt embarraſs the reader. You may likewiſe add the mark ♯ or ♭ to the note that begins a word, which will make it more eaſy to read, and at the ſame time give the muſic a more natural aſpect. This cipher is preferable to that of N° 2. above, as it may be incloſed in a letter about common affairs, and paſs unſuſpected.

CIPPUS, in antiquity, a low column, with an inſcription, erected on the high roads, or other places, to ſhow the way to travellers; to ſerve as a boundary; to mark the grave of a deceaſed perſon, &c.

CIRCÆA, ENCHANTER'S NIGHT-SHADE; a genus of the monogynia order, belonging to the diandria claſs of plants; and in the natural method ranking under the 48th order, *Aggregatæ*. The corolla is dipetalous; the calyx diphyllous, ſuperior, with one bilocular ſeed. There are two ſpecies, one of which is a native of Britain, and the other of Germany. They are low herbaceous plants with white flowers, and poſſeſſed of no remarkable property.

CIRCASSIA, one of the ſeven Caucaſian nations, lying between the Black Sea and the Caſpian. It is bounded by the government of Taurica and Caucaſus on the N. and by Mingrelia and Georgia on the S. being ſeparated from Taurica by the river Cuban. It contains the diſtricts of Great Cabarda, Little Cabarda, Beſlin, Temirgoi, Abeſech, Bſeduch, Hatukai, and Bſhani. This nation, from extent of territory, which includes nearly 10 degrees of longitude, and from their extraordinary courage and military genius, might become very formidable, were they united under one chief. But a nation of mountaineers, who ſubſiſt by raiſing cattle, and are therefore forced to fix themſelves on the banks of rivers for the ſake of water and paſturage, ſoon forget their origin, and divide into ſeparate and hoſtile tribes. From this principle of diſunion, the Circaſſians of the Cuban are ſo little powerful, as to be ſcarcely known even to Ruſſians, but by the general appellation of Cuban Tartars, in which they are confounded with the Abkas and Nogays, their neighbours. The Cabardian Circaſſians, however, are ſtill the moſt powerful people of the N. ſide of Caucaſus; and this ſuperiority has introduced among their neighbours ſuch a general imitation of their manners, that, from a deſcription of theſe, an idea may be formed of all the reſt. They are divided into three claſſes; namely, the princes; the nobles, called uſdens; and the vaſſals or people. A certain number of the people is allotted to each princely family. In each of theſe, the eldeſt individual is conſidered as chief of the family, and as judge, protector, and father of all the vaſſals attached to it. No prince can be a landholder; he has no other property than his arms, horſes, ſlaves, and the tribute he may be able to extort from the neighbouring nations. The perſon of every prince is ſacred: and this extraordinary privilege extended even to the princes of the Crimea. This is, however, the only diſtinction of birth when unaccompanied by perſonal merit. The greateſt honour a prince can acquire is that of being the firſt of the nation to charge the enemy. The princes are not to be diſtinguiſhed in the time of peace from the nobles, or even from the peaſants: their food and dreſs are the ſame, and their houſes are little better. The nobles are choſen by the princes from the inferior claſs. They are the officers of the prince, and the executors of the laws, and are employed in the general aſſemblies of the nation to gain the aſſent of the people to the meaſures propoſed by the princes. The people, as well as the uſdens, are proprietors of lands. By an odd kind of contradiction, the princes claim, and ſometimes attempt to exerciſe, the right of ſeizing the whole property of their vaſſals; but, at the ſame time, the vaſſal has a right to transfer his allegiance to any other prince, whenever he thinks himſelf aggrieved: by this privilege, the princes are compelled to gain the affections of their vaſſals, on whoſe readineſs to follow them into the field, all their hopes of greatneſs and wealth muſt abſolutely depend. The Circaſſians do not appear to have ever had any written laws, but are governed by a kind of common law, or collection of ancient uſages. On great occaſions the whole nation is aſſembled: a meaſure is propoſed by the oldeſt of the princes; it is firſt debated among the uſdens; and afterward by the deputies of the people, who are old men, who often poſſeſs greater influence than the prince himſelf. If the propoſition be accepted, it is confirmed by a ſolemn oath by the whole people. They have few manufactures. Their coats of mail, which are very beautiful, are brought from Perſia, and their fire-arms from Kubeſcha. Their agriculture produces barely ſufficient for their own ſubſiſtence. Sheep and horſes are the principal articles of their commerce; particularly the latter, which ſell at a high price; but notwithſtanding this, the balance of trade would be conſiderably againſt them, were it not for the ſlaves which they make in their predatory excurſions. At the birth of a prince, ſome uſden, or ſometimes a prince of another family, is choſen by the father as his future preceptor. At a year old he is preſented, at the ſame time, with ſome playthings and arms: if he appear to prefer the lat-

ter, the event is celebrated in the family by great rejoicings. At ſeven (or, according to others, at twelve) years of age, he leaves his father's houſe for that of his preceptor. By him he is taught to ride, to uſe his arms, and to ſteal, and conceal his thefts. The word *thief* is a term of the utmoſt reproach among them, becauſe it implies detection. He is afterwards led to more conſiderable and dangerous robberies, and does not return to his father's houſe, until his cunning, addreſs, and ſtrength, are ſuppoſed to be perfect. The preceptor is recompenſed by nine-tenths of the booty made by his pupil while under his tuition. It is ſaid that this mode of education is perſevered in, with a view to prevent the bad effects of paternal indulgence. The cuſtom is ſuppoſed to be peculiar to the Circaſſians; but the object of education is the ſame among all the mountaineers of Caucaſus, who univerſally ſubſiſt by robbery. The education of a child renders the preceptor a kind of adopted father; therefore, as this is a very vindictive nation, a perſon who has killed any prince, endeavours to ſteal away ſome child of the family, in order to educate him. The accompliſhment of this is the only way to effect a reconciliation. Some travellers report, that a vaſſal ſometimes contrives to ſteal and educate the ſon of his prince, and by his ſucceſs inſure his own advancement to nobility. The point in which all agree is the neceſſity that the child ſhould be educated at a diſtance from the father. Girls are brought up by the mother. They learn to embroider, to make their own dreſs, and that of their future huſbands. The daughters of ſlaves receive the ſame education, and are ſold according to their beauty, from 20 to 100l. Theſe are principally Georgians. Soon after the birth of a girl, a wide leather belt is ſewed round her waiſt, and continues till it burſts, when it is replaced by a ſecond. By a repetition of this practice, their waiſts are rendered aſtoniſhingly ſmall, but their ſhoulders become proportionably broad; a defect, which is little attended to, on account of the beauty of their breaſts. On the wedding night, the belt is cut with a dagger by the huſband; a cuſtom ſometimes productive of fatal accidents. The bridegroom pays for his bride a marriage-preſent, conſiſting of arms or a coat of mail; but he muſt not ſee her, or cohabit with her, without the greateſt myſtery. This reſerve continues during life. A Circaſſian will ſometimes permit a ſtranger to ſee his wife; but he muſt not accompany him. The father makes the bride a preſent on the wedding day, but reſerves the greater part of what he intends to give her till the birth of her firſt child. On this occaſion ſhe pays him a viſit, receives from him the remainder of her portion, and is clothed by him in the dreſs of a matron, the principal diſtinction of which conſiſts in a veil. Until this time, the dreſs of the women is much like that of the men, excepting that the cloak is longer, and frequently white, a colour never worn by men. The cap too is generally red, or roſe-coloured. Before marriage, the youth of both ſexes ſee each other freely at the little rejoicings which take place on feſtivals. Before the ball, the young men ſhow their activity and addreſs in a variety of military exerciſes, and the moſt alert have the privilege of chooſing the moſt beautiful partners. Their muſical inſtruments are a long flute with only three ſtops, a ſpecies of mandoline, and a tambourin. Their dances are in the Aſiatic ſtyle, with little gaiety or expreſſion; the ſteps difficult, but not graceful. The women participate in the general character of the nation: they take pride in the courage of their huſbands, and reproach them ſeverely when defeated. They poliſh and take care of the armour of the men. Widows tear their hair, and disfigure themſelves with ſcars, in teſtimony of their grief. The men had formerly the ſame cuſtom, but are now grown more tranquil under the loſs of their wives and relations. The habitation of a Circaſſian is compoſed of two huts, becauſe the wife and huſband are not ſuppoſed to live together. One of theſe huts is allotted to the huſband, and to the reception of ſtrangers; the other to the wife and family: the court which ſeparates them is ſurrounded by palliſades. At meals the whole family is aſſembled; ſo that here, as among the Tartars, each village is reckoned at a certain number of kettles. Their food is extremely ſimple, conſiſting only of a little meat, ſome paſte made of millet, and a kind of beer, compoſed of the ſame grain fermented. The Circaſſians are accuſed of frequent perjuries and violations of treaties; but this is ſaid to be a new vice among them. Whatever may have been the original religion of this people, they have been ſucceſſively converted to Chriſtianity and Mahometaniſm, and have now no religion or worſhip among them. They break, without ſcruple, ſuch oaths as they have taken on the bible and the koran; but there are certain forms of oaths, and certain places in the neighbourhood of their ruins (ſuppoſed to be remains of Chriſtian churches) which inſure their fidelity. Their courage, great as it is, is not proof againſt religious terrors. Like all barbarians, they believe that what is called accident may be influenced by particular ceremonies. The Circaſſians have not any letters of their own; thoſe among them who wiſh to write their language being obliged to make uſe of Arabian characters.

CIRCE, in fabulous hiſtory, a daughter of Sol and Perſeus, celebrated for her knowledge of magic and venomous herbs. She was ſiſter to Æetes king of Colchis, and to Paſiphae the wife of Minos. She married a Sarmatian prince of Colchis, whom ſhe murdered to obtain the kingdom. She was expelled by her ſubjects, and carried by her father upon the coaſts of Italy in an iſland called *Ææa.* Ulyſſes, at his return from the Trojan war, viſited her coaſt; and all his companions, who ran headlong into pleaſure and voluptuouſneſs, were changed by Circe's potions into filthy ſwine. Ulyſſes, who was fortified againſt all enchantments by an herb called *moly*, which he had received from Mercury, went to Circe, and demanded, ſword in hand, the reſtoration of his companions to their former ſtate. She complied, and loaded the hero with pleaſures and honours. In this voluptuous retreat Ulyſſes had by Circe one ſon called *Telegonus*; or two, according to Heſiod, called *Agrius* and *Latinus*. For one whole year Ulyſſes forgot his glory in Circe's arms. At his departure the nymph adviſed him to deſcend to hell and to conſult the manes of Tireſias concerning the fates that attended him. Circe ſhowed herſelf cruel to Scylla her rival, and to Picus.

CIRCENSIAN GAMES, a general term under which were comprehended all combats exhibited in the Roman circus, in imitation of the Olympic games in Greece. Moſt of the feaſts of the Romans were accompanied with Circenſian games; and the magiſtrates, and other officers of the republic, frequently preſented the people with them, in order to procure their favour. The grand games were held five days, commencing on the 15th of September. See CIRCUS.

CIRCLE, in geometry, a plane figure comprehended by a ſingle curve line, called its *circumference*, to which right lines drawn from a point in the middle, called the *centre*, are equal to each other. See GEOMETRY.

CIRCLES *of the ſphere*, are ſuch as cut the mundane ſphere, and have their periphery either on its moveable ſurface, or in another immoveable, conterminous, and equidiſtant ſurface. See SPHERE. Hence ariſe two kinds of circles, moveable and immoveable. The firſt, thoſe whoſe peripheries are in the moveable ſurface, and which therefore revolve with its diurnal motion; as, the meridians, &c. The latter having their periphery in the immoveable ſurface, do not revolve; as the ecliptic, equator, and its parallels, &c. See GEOGRAPHY.

CIRCLES *of Altitude*, otherwiſe called *almucantars*, are circles parallel to the horizon, having their common pole in the zenith, and ſtill diminiſhing as they approach the zenith. See ALMUCANTAR.

Diurnal Circles, are immoveable circles, ſuppoſed to be deſcribed by the ſeven ſtars, and other points of the heavens, in their diurnal rotation round the earth; or rather, in the rotation of the earth round its axis. The diurnal circles are all unequal: the equator is the biggeſt.

Horary Circles, in dialling, are the lines which ſhow the hours on dials; though theſe be not drawn circular, but nearly ſtraight. See Dialling.

Circles *of Latitude*, or *Secondaries of the Ecliptic*, are great circles parallel to the plane of the ecliptic, paſſing through the poles thereof, and through every ſtar and planet. They are ſo called, becauſe they ſerve to meaſure the latitude of the ſtars, which is nothing but an arch of one of theſe circles intercepted between the ſtar and the ecliptic. See Latitude.

Circles *of Longitude*, are ſeveral leſſer circles, parallel to the ecliptic; ſtill diminiſhing, in proportion as they recede from it. On the arches of theſe circles, the longitude of the ſtars is reckoned.

Circle *of perpetual Apparition*, one of the leſſer circles, parallel to the equator; deſcribed by any point of the ſphere touching the northern point of the horizon; and carried about with the diurnal motion. All the ſtars included within this circle never ſet, but are ever viſible above the horizon.

Circle *of perpetual Occultation*, is another circle at a like diſtance from the equator; and contains all thoſe ſtars which never appear in our hemiſphere. The ſtars ſituated between theſe circles alternately riſe and ſet at certain times.

Polar Circles, are immoveable circles, parallel to the equator, and at a diſtance from the poles equal to the greateſt declination of the ecliptic. That next the northern pole is called the arctic; and that next to the ſouthern one the antarctic.

Fairy-Circle. See Fairy-*Circle*.

Druidical Circles, in Britiſh topography, a name given to certain ancient incloſures formed by rude ſtones circularly arranged, in the manner repreſented in Plate 89. Theſe, it is now generally agreed, were temples, and many writers think alſo places of ſolemn aſſemblies for councils or elections, and ſeats of judgment. Mr. Borlace is of this opinion. "Inſtead, therefore (ſays he), of detaining the reader with a diſpute, whether they were places of worſhip or council, it may with great probability be aſſerted, that they were uſed for both purpoſes; and having for the moſt part been firſt dedicated to religion, naturally became afterwards the curiæ and foræ of the ſame community." Theſe temples, though generally circular, occaſionally differ as well in figure as magnitude: with relation to the firſt, the moſt ſimple were compoſed of one circle. Stonehenge conſiſted of two circles and two ovals, reſpectively concentric; whilſt that at Bottalch near St. Juſt in Cornwall is formed by four interſecting circles. And the great temple at Abury in Wiltſhire, it is ſaid, deſcribed the figure of a ſeraph or fiery flying ſerpent, repreſented by circles and right lines. Some beſides circles have avenues of ſtone pillars. Moſt, if not all of them, have pillars or altars within their penetralia or centre. In the article of magnitude and number of ſtones, there is the greateſt variety; ſome circles being only twelve feet diameter and formed only of twelve ſtones, whilſt others, ſuch as Stonehenge and Abury, contained, the firſt one hundred and forty, the ſecond ſix hundred and fifty-two, and occupied many acres of ground. All theſe different numbers and meaſures and arrangements had their pretended reference, either to the aſtronomical diviſions of the year, or ſome myſteries of the druidical religion. Mr. Borlace, however, ſuppoſes, that thoſe very ſmall circles, ſometimes formed of a low bank of earth, ſometimes of ſtones erect, and frequently of looſe ſmall ſtones thrown together in a circular form, encloſing an area of about three yards diameter, without any larger circle round them, were originally places of burial.

Circle, in logic, or *Logical* Circle, is when the ſame terms are proved *in orbem* by the ſame terms; and the parts of the ſyllogiſm alternately by each other, both directly and indirectly.

Circles *of the Empire*, ſuch provinces and principalities of the German empire as have a right to be preſent at diets. Maximilian I. divided the empire into ſix, and ſome years after into ten circles. This laſt diviſion was confirmed by Charles V. The circles, as they ſtand in the Imperial Matricola, are as follow: Auſtria, Burgundy, the Lower Rhine, Bavaria, Upper Saxony, Franconia, Swabia, Upper Rhine, Weſtphalia, and the Lower Saxony.

CIRCONCELLIONES, a ſpecies of fanatics, ſo called becauſe they were continually rambling round the houſes in the country. They took their riſe among the donatiſts in the reign of the emperor Conſtantine. It is incredible what ravages and cruelties theſe vagabonds committed in Africa through a long ſeries of years. They were illiterate, ſavage peaſants, who underſtood only the Punic language. Intoxicated with a barbarous zeal, they renounced agriculture, profeſſed continence, and aſſumed the title of "Vindicators of Juſtice, and Protectors of the Oppreſſed." To accompliſh their miſſion, they enfranchiſed ſlaves, ſcoured the roads, forced maſters to alight from their chariots, and run before their ſlaves, whom they obliged to mount in their place; and diſcharged debtors, killing the creditors if they refuſed to cancel the bonds. But the chief objects of their cruelty were the catholics, and eſpecially thoſe who had renounced donatiſm. At firſt they uſed no ſwords, becauſe God had forbidden the uſe of one to Peter; but they were armed with clubs, which they called the *clubs of Iſrael*; and which they handled in ſuch a manner as to break a man's bones without killing him immediately, ſo that he languiſhed a long time, and then died. When they took away a man's life at once, they looked upon it as a favour. They became leſs ſcrupulous afterwards, and made uſe of all ſorts of arms. Their ſhout was *Praiſe be to God*. Theſe words in their mouths were the ſignal of ſlaughter, more terrible than the roaring of a lion. They had invented an unheard of puniſhment; which was to cover with lime diluted with vinegar, the eyes of thoſe unhappy wretches whom they had cruſhed with blows, and covered with wounds, and to abandon them in that condition. Never was a ſtronger proof what horrors ſuperſtition can beget in minds deſtitute of knowledge and humanity. Theſe brutes, who had made a vow of chaſtity, gave themſelves up to wine and all ſorts of impurities, running about with women and young girls as drunk as themſelves, whom they called *ſacred virgins*, and who often carried proofs of their incontinence. Their chiefs took the name of *Chiefs of the Saints*. After having glutted themſelves with blood, they turned their rage upon themſelves, and ſought death with the ſame fury with which they gave it to others. Some ſcrambled up to the tops of rocks, and caſt themſelves down headlong in multitudes; others burned themſelves, or threw themſelves into the ſea. Thoſe who propoſed to acquire the title of martyrs, publiſhed it long before; upon which they were feaſted and fattened like oxen for the ſlaughter; after theſe preparations they ſet out to be deſtroyed. Sometimes they gave money to thoſe whom they met, and threatened to murder them if they did not make them martyrs. Theodoret gives an account of a ſtout young man, who meeting with a troop of theſe fanatics, conſented to kill them, provided he might bind them firſt; and having by this means put it out of their power to defend themſelves, whipped them as long as he was able, and then left them tied in that manner. Their biſhops pretended to blame them, but in reality made

ufe of them to intimidate fuch as might be tempted to forfake their fect; they even honoured them as faints. They were not, however, able to govern thofe furious monfters; and more than once found themfelves under a neceffity of abandoning them, and even of imploring the affiftance of the fecular power againft them. The counts Urfacius and Taurinus were employed to quell them; they deftroyed a great number of them, of whom the donatifts made as many martyrs. Urfacius, who was a good catholic and a religious man, having loft his life in an engagement with the barbarians, the donatifts did not fail to triumph in his death, as an effect of the vengeance of heaven. Africa was the theatre of thefe bloody fcenes during a great part of Conftantine's life.

CIRCUIT, in law, fignifies a longer courfe of proceedings than is needful to recover the thing fued for. It alfo fignifies the journey or progrefs, which the judges take twice every year, through the feveral counties of England and Wales, to hold courts and adminifter juftice, where recourfe cannot be had to the king's courts at Weftminfter: hence England is divided into fix circuits, *viz.* the Home circuit; Norfolk circuit; Midland circuit; Oxford circuit; Weftern circuit, and Northern circuit. In Wales there are but two circuits, North and South Wales: two judges are affigned by the king's commiffion to every circuit. In Scotland, the judges of the fupreme criminal court, or court of jufticiary, are divided into three feparate courts, confifting of two judges each; and the kingdom into as many diftricts. In certain boroughs of every diftrict, each of thefe courts by rotation is obliged to hold two courts in the year, in fpring and autumn; which are called *circuit-courts.*

Electrical Circuit, denotes the courfe of the electric fluid from the charged furface of an electric body, to the oppofite furface into which the difcharge is made. Some of the firft electricians apprehended, that the fame particles of the electric fluid, which were thrown on one fide of the charged glafs, actually made the whole circuit of the intervening conductors, and arrived at the oppofite fide: whereas Dr. Franklin's theory only requires, that the redundancy of electric matter on the charged furface fhould pafs into the bodies which form that part of the circuit which is contiguous to it, driving forward that part of the fluid which they naturally poffefs; and that the deficiency of the exhaufted furface fhould be fupplied by the neighbouring conductors, which form the laft part of the circuit. On this fuppofition, a vibrating motion is fucceffively communicated through the whole length of the circuit. This circuit is always formed of the beft conductors, let the length of it be ever fo great. Many attempts were made, both in France and England, at an early period in the hiftory of electricity, to afcertain the diftance to which the electric fhock might be carried, and the velocity of its motion. The French philofophers, at different times, made it to pafs through a circuit of 900 toifes, and of 2000 toifes, or about two Englifh miles and a half; and they difcharged the Leyden phial through a bafon of water, the furface of which was about an acre. And M. Mounier found, that, in paffing through an iron wire of 950 toifes in length, it did not fpend a quarter of a fecond; and that its motion was inftantaneous through a wire of 1319 feet. In 1747, Dr. Watfon, and other Englifh philofophers, after many experiments of a fimilar kind, conveyed the electric matter through a circuit of four miles; and they concluded from this and another trial, that its velocity is inftantaneous.

CIRCULAR, in a general fenfe, any thing that is defcribed, or moved in a round, as the circumference of a circle, or furface of a globe.

Circular *Numbers,* called alfo *fpherical ones,* according to fome, are fuch whofe powers terminate in the roots themfelves. Thus, for inftance, 5 and 6, all whofe powers do end in 5 and 6, as the fquare of 5 is 25; the fquare of 6 is 36, &c.

Circular *Sailing,* is the method of failing by the arch of a great circle. See Navigation.

CIRCULATION, the act of moving round, or in a circle; thus, the Circulation *of the Blood,* is the natural motion whereby that fluid is alternately carried from the heart into all parts of an animal body, by the arteries, and from thence brought back to the heart again by the veins. See Anatomy, p. 193.

In a fœtus, the apparatus for the circulation of the blood is fomewhat different from that in adults. The feptum, which feparates the two auricles of the heart, is pierced through with an aperture, called the *foramen ovale*; and the trunk of the pulmonary artery, a little after it has left the heart, fends out a tube into the defcending aorta, called the *communicating canal.* The fœtus being born, the foramen ovale clofes by degrees, and the canal of communication dries up, and becomes a fimple ligament.

The current of the blood in fmall animals, that is, its paffing on through the veffels, either to or from the heart, is very eafily feen by the help of a microfcope; but its circulation, that is, its running to the extreme parts, and then returning, is more difficult; becaufe the veffels where this fhould be feen are fo extremely minute, as not eafily to come under obfervation. The larger arteries are eafily diftinguifhed from the veins by the motion of the blood through them, which in the veins is always fmooth and regular; but in the arteries by feveral propulfions after the manner of pulfation. But this difference is not to be found in the more minute veffels; in all which, as well arteries as veins, the motion of the blood is even and regular.

The tranfparent membrane, or web between the toes of a frog's hinder foot, is a very proper object to obferve the circulation of the blood in. The tails or fins of fifhes are alfo very fuitable; for when the fifh is very fmall, thefe are tranfparent, and afford a view of a great number of veins and arteries, with a very quick and beautiful fucceffion of blood through them. The tail of a flounder may be very conveniently placed before the double microfcope on a plate of glafs; and its body being fupported by fomething of equal height, the fifh will lie ftill and the circulation may be feen very agreeably. In the minuteft veffels thus examined, the blood always appears pale or colourlefs, but in the large ones it is manifeftly red. The tail of a newt or water-lizard affords alfo a very entertaining profpect of the circulation of the blood through almoft numberlefs fmall veffels; but no object fhows it fo agreeably as one of thefe animals while fo young as not to be above an inch long; for then the whole body is fo very tranfparent, that the circulation may be feen in every part of it, as well as in the tail; and, in thefe objects, nothing is more beautiful than the courfe of the blood into the toes, and back again, where it may be traced all the way with great eafe.

Circulation *of the fap of Plants.* See Botany, Part I. alfo the articles Plant, and Sap.

Circulation, in chemiftry, is an operation whereby the fame vapour, raifed by fire, falls back, to be returned and diftilled feveral times.

Circulation *of Money.* See Commerce, and Money.

Subterranean Circulation. See Springs.

CIRCULUS, in chemiftry, an iron inftrument in form of a ring, which being heated red-hot, and applied to the necks of retorts and other glafs veffels till they grow hot, a few drops of cold water thrown upon them, or a cold blaft, will make the necks fly regularly and evenly off. Another method of doing this, is, to tie a thread, firft dipt in oil of turpentine, round the place where you would have it break; and then fet-

ting fire to the thread, and afterwards ſprinkling the place with cold water, the glaſs will crack exactly where the thread was tied.

CIRCUMCELLIONES. See CIRCONCELLIONES.

CIRCUMCISION, the act of cutting off the prepuce; a ceremony in the Jewiſh and Mahometan religions, wherein they cut off the foreſkin of their males, who are to profeſs the one or the other law. *Circumciſion* commenced in the time of Abraham; and was, as it were, the ſeal of a covenant ſtipulated between God and him. It was in the year of the world 2178, that Abraham, by divine appointment, circumciſed himſelf, and all the males of his family; from which time it became an hereditary practice among his deſcendants. The ceremony, however, was not confined to the Jews; but it obtained alſo among the Egyptians and Ethiopians. The practice of circumciſion among the Hebrews, however, differed very conſiderably from that of the Egyptians. Among the firſt it was a ceremony of religion, and was performed on the eighth day after the birth of the child; among the latter a point of mere decency and cleanlineſs; and, as ſome will have it, of phyſical neceſſity; and was not performed until the 13th year, and then on girls as well as boys.

Among the Jews, the time for performing this rite was the eighth day, that is, ſix full days after the child was born. The law of Moſes ordained nothing with reſpect to the perſon by whom, the inſtrument with which, or the manner how, the ceremony was to be performed; the inſtrument was generally a knife of ſtone. The child is uſually circumciſed at home, where the father, or god-father, holds him in his arms, while the operator takes hold of the prepuce with one hand, and with the other cuts it off; a third perſon holds a porringer, with ſand in it, to catch the blood; then the operator applies his mouth to the part, and, having ſucked the blood, ſpits it into a bowl of wine, and throws a ſtyptic powder upon the wound. This ceremony was uſually accompanied with great rejoicings and feaſting; and it was at this time that the child was named in preſence of the company. The Jews invented ſeveral ſuperſtitious cuſtoms at this ceremony, ſuch as placing three ſtools, one for the circumciſor, the ſecond for the perſon who holds the child, and the third for Elijah, who, they ſay, aſſiſts inviſibly at the ceremony, &c.

The Jews diſtinguiſh their proſelytes into two ſorts, according as they became circumciſed or not: thoſe who ſubmitted to this rite were looked upon as children of Abraham, and obliged to keep the laws of Moſes; the uncircumciſed were only bound to obſerve the precepts of Noah, and were called *Noachidæ*. The Turks never circumciſe till the ſeventh or eighth year, as having no notion of its being neceſſary to ſalvation. The Perſians circumciſe their boys at 13, and their girls from 9 to 15. Thoſe of Madagaſcar cut the fleſh at three ſeveral times; and the moſt zealous of the relations preſent, catches hold of the preputium and ſwallows it.

Circumciſion is practiſed on women by cutting off the foreſkin of the clitoris, which bears a near reſemblance and analogy to the preputium of the male penis. We are told that the Egyptian captive-women were circumciſed; and alſo the ſubjects of Preſter John.

CIRCUMCISION is alſo the name of a feaſt, celebrated on the firſt of January, in commemoration of the circumciſion of our Saviour.

CIRCUMFERENCE, in a general ſenſe, denotes the line or lines bounding a plane figure; but it is generally uſed in a more limited ſenſe, for the curve line which bounds a circle, and otherwiſe called a *periphery*; the boundary of a right-lined figure being expreſſed by the term *perimeter*.

CIRCUMFERENTOR, an inſtrument uſed by ſurveyors for taking angles. See Plate 69. It conſiſts of a braſs index and circle, all of a piece. The index is commonly about 14 inches long, and an inch and a half broad; the diameter of the circle is about ſeven inches. On this circle is made a chart, whoſe meridian line anſwers to the middle of the breadth of the index, and is divided into 360 degrees. There is a braſs ring ſoldered on the circumference of the circle, on which ſcrews another ring, with a flat glaſs in it, ſo as to form a kind of box for the needle, ſuſpended on the pivot in the centre of the circle. There are alſo two ſights to ſcrew on, and ſlide up and down the index; as alſo a ſpangle and ſocket ſcrewed on the back ſide of the circle for putting the head of the ſtaff in.

Let it be required by means of this inſtrument, to find *the quantity of the angle* EKG deſcribed in the plate. Firſt place the circumferentor with the fleur-de-lis of the chart towards you; then direct your ſights to E, and obſerve what degrees are cut by the ſouth end of the needle, which may be 296; then, turning the inſtrument about, direct your ſights to G, noting then alſo what degrees are cut by the ſouth end of the needle, which ſuppoſe 247. This done, always ſubtract the leſſer from the greater, as in this example, 247 from 296, the remainder is 49 degrees, which is the true quantity of the angle EKG.

In the plate we have given a repreſentation of a circumferentor made by Jones of Holborn on an improved conſtruction. From a very ſimple contrivance, it is rendered ſufficient to take angles with the accuracy of a common theodolite; and by it angles of altitude and depreſſion may be obſerved as readily as horizontal ones. The improvement chiefly conſiſts in an arm or index G, ſo applied to the centre of the compaſs box, and within it, that, at the time of obſerving, by only ſlipping out a pin *p*, the circle of degrees alone may move round, and leave the index G fixed. This index will remain ſtationary, from its being attached to the ſocket that ſcrews on the head of the ſtaffs. On the end of this index, next the degrees in the box, there is graduated a nonius ſcale, by which the circle of 360 degrees is ſubdivided into 5 minutes or leſs if deſired. To take angles of altitude or depreſſions, the inſtrument is turned down on its ball and ſocket into a perpendicular poſition, and adjuſted to its level by a plumb-line *l*, that is hung on a pin at the back of the box, and made to coincide with a mark made thereon. Then by looking through the ſmall ſight holes *s*, *s*, *s*, purpoſely made, the angles are ſhown on the circle of degrees by the nonius, as before. The arms AA of the inſtruments ſlip off at BB, and the whole packs into a caſe but $5\frac{1}{2}$ inches ſquare and 3 deep.

CIRCUMFLEX, in grammar, an accent, ſerving to note, or diſtinguiſh, a ſyllable of an intermediate ſound between acute and grave; and generally ſomewhat long.—The Greeks had three accents, the acute, the grave, and the circumflex; formed thus, ´, `, ˜. In Latin, Engliſh, French, &c. the circumflex is made thus ˆ.—The acute raiſes the voice, and the grave falls or lowers it: the circumflex is a kind of undulation, or wavering of the voice, between the two. It is ſeldom uſed among the moderns, unleſs to ſhow the omiſſion of a letter which made the ſyllable long and open; a thing much more frequent with the French than among us: thus they write *pâte* for *paſte*; *tête* for *teſte*; *fûmes* for *fuſmes*, &c. They alſo uſe the circumflex in the participles; ſome of their authors writing *connu*, *peu*, others *connû*, *pû*, &c. Father Buffier is at a loſs for the reaſon of the circumflex on this occaſion. The form of the Greek circumflex was anciently the ſame as ours, viz. ˆ; being a compoſition of the other two accents in one. But the copyiſts, changing the form of the characters, and introducing the running-hand, changed alſo the form of the circumflex accent; and inſtead of making the juſt

angle, rounded it off, adding a dafh, through too much hafte; and thus formed an *s*, laid horizontally, which produced this figure ~, inftead of this A.

CIRCUMGYRATION, denotes the whirling motion of any body round a centre; fuch is that of the planets round the fun.

CIRCUMLOCUTION, an ambages, or tour of words, ufed either when a proper term is not at hand, to exprefs a thing naturally and immediately by; or when one choofes not to do it, out of refpect, or for fome other reafon. The word comes from *circumloquor*, "I fpeak about."

CIRCUMLOCUTION, in oratory, is the avoiding of fomething difagreeable or inconvenient to be expreffed in direct terms; by intimating the fenfe thereof in a kind of paraphrafe, fo conceived as to foften or break the force of it. Thus Cicero, unable to deny that Clodius was flain by Milo, owns it, with this circumlocution, "Milo's fervants being prevented "from affifting their mafter, who was reported to be killed by "Clodius; they, in his abfence, and without his privity, or "confent, did what every body would expect from their own "fervants on fuch an occafion."

CIRCUMPOLAR STARS, an appellation given to thofe ftars, which, by reafon of their vicinity to the pole, move round it without fetting.

CIRCUMPOTATIO, in antiquity, a funeral feaft provided in honour of the dead. This was very frequent among the ancient Romans, as well as among the Athenians. Solon at Athens, and the decemviri at Rome, endeavoured to reform this cuftom, thinking it abfurd that mirth and drunkennefs fhould mingle with forrow and grief.

CIRCUMSCRIBED, in geometry, is faid of a figure which is drawn round another figure, fo that all its fides or planes touch the infcribed figure.

CIRCUMSCRIPTION, in natural philofophy, the termination, bounds, or limits, of any natural body.

CIRCUMSTANTIAL EVIDENCE, in law, or the doctrine of prefumption, takes place next to pofitive proof. Circumftances which either neceffarily or ufually attend facts of a particular nature, that cannot be demonftratively evinced, are called *prefumptions*, and are only to be relied on till the contrary be actually proved.

CIRCUMSTANTIBUS, in law, a term ufed for fupplying and making up the number of jurors (in cafe any impanelled appear not, or appearing are challenged by any party), by adding to them fo many of the perfons prefent as will make up the number, in cafe they are properly qualified.

CIRCUMVALLATION, or *Line of* CIRCUMVALLATION, in the art of war, is a trench bordered with a parapet, thrown up quite round the befieger's camp, by way of fecurity againft any army that may attempt to relieve the place, as well as to prevent defertion.

CIRCUMVOLUTION, in architecture, denotes the torus of the fpiral line of the Ionic order.

CIRCUS, in antiquity, a large building, either round or oval, ufed for the exhibiting of fhows to the people. The Roman circus was a large oblong edifice, arched at one end; encompaffed with porticos, and furnifhed with rows of feats, placed afcending over each other. In the middle was a kind of foot-bank, or eminence, with obelifks, ftatues, and pofts at each end. This ferved them for the courfes of their *bigæ* and *quadrigæ*. There were no lefs than ten circufes at Rome: the largeft was built by the elder Tarquin, called *Circus Maximus*, between the Aventine and Palatine mounts. It was fo called, either becaufe of its vaft circumference, or becaufe the great games were celebrated in it; or again, becaufe it was confecrated to the great gods, viz. to Vertumnus, Neptune, Jupiter, Juno, Minerva, and the Dii Penates of Rome. Dionyfius Halicarnaffenfis fays that it was three ftadia and a half in length, and four jugera broad; and thefe meafures, according to Pliny, allowing to the Roman ftadia 625 Roman feet, each of which is twelve inches, will give for the length 2187 Roman feet, or fomewhat more than three Englifh furlongs; and as to the breadth, allowing for each of the jugera 240 Roman feet, it will be 960 Roman feet. It was beautified and enlarged by the Roman emperors, fo as to feat 250,000 fpectators. The moft magnificent circufes were thofe of Auguftus and Nero. There are ftill fome remains of the circufes at Rome, at Nifmes, and other places.

The Games of the CIRCUS, which fome call *Circenfian Games*, were combats celebrated in the circus, in honour of Confus the god of councils; and thence alfo called *Confualia*. They were alfo called *Roman Games, Ludi Romani*, either on account of their antiquity, as being coeval with the Roman people, or becaufe eftablifhed by the Romans: and the games held there, the great games, *ludi magni*, becaufe celebrated with more expence and magnificence than others; and becaufe held in honour of the great god Neptune, who was their Confus.—Thofe who fay they were inftituted in honour of the fun, confound the *pompa circenfis*, or proceffion of the circus, with the games.

The games of the circus were inftituted by Evander, and re-eftablifhed by Romulus: the pomp, or proceffion, was only a part of the games, making the prelude thereof, and confifting of a fimple cavalcade of chariots. Till the time of the elder Tarquin, they were held in an ifland of the Tiber; and were called *Roman Games*: after that prince had built the circus, they took their name therefrom; as being conftantly held there. There were fix kinds of exercifes in the circus: the firft was wreftling, and fighting with fwords, with ftaves, and with pikes; the fecond was racing; the third, faltatio, dancing; the fourth, difci, quoits, arrows, and ceftus: all which were on foot: the fifth was horfe-courfing: the fixth, courfes of chariots, whether with two horfes or with four. In this laft exercife, the combatants were at firft divided into two fquadrons or quadrils; then into four; each bearing the names of the colours they wore; *factio alba, ruffea*, &c. At firft there was only white and red; then green was added, and blue. Domitian added two more colours, but they did not continue. It was Oenomaus who firft invented this method of diftinguifhing the quadrils by colours. The green was for thofe who reprefented the earth; the blue for the fea, &c.

CIRENCESTER, an ancient town of Gloucefterfhire in England. It was ftrongly fortified with walls and a caftle in the time of the Romans. The ruins of the walls and ftreet are, or were lately, to be feen in the adjacent meadows, where many Roman coins, chequered pavements, and infcriptions on marble, have been found. Two of the Roman confular ways crofs each other at this town. The foffe-way, which comes from Scotland, paffes through this county and town to Totnefs in Devonfhire. The other, called *Irmin-ftreet*, comes from Gloucefter, and runs along to Southampton. Not many years ago they difcovered, by digging in a meadow near the town, an ancient building under ground, 50 feet long, 40 broad, and 4 high, and fupported by 100 brick pillars, curioufly inlaid with ftones of various colours, fuppofed to have been a Roman bath. Cirencefter has now but one church, in the windows of which are the remains of very valuable painted glafs. The town is governed by 2 high conftables, and 14 wardfmen, who govern 7 diftinct wards; and it fends two members to parliament. It has a free fchool, a charity fchool, with feveral alms-houfes; and is feated on the river Churn, 36 miles north-eaft of Briftol, and 88 weft by north of London. W. long. 30. 1. N. lat. 51. 42.

CIREMZA, a city of Naples, capital of the Basilicate, with an archbishop's see. It was formerly a considerable place, but is now of small consequence. It is seated on the river Brandano, at the foot of the Apennine mountains, in E. long. 16. 44. N. lat. 40. 48.

CIRO-FERRI, an excellent Italian painter and architect, was born at Rome in 1614, and was the disciple of Peter de Cortona, whose designs he imitated with such exactness, that it is difficult to distinguish them. He was esteemed by Pope Alexander VII. and his three successors, and died at Rome in 1689.

CIRRI, in ichthyology, certain oblong and soft appendages, not unlike little worms, hanging from the under jaws or mouths of some fishes: these cirri, commonly translated *beards*, afford marks to distinguish the different species of the fishes on which they are found.

CIRRUS, or CIRRHUS, in botany, a clasper or tendril: that fine spiral string or fibre put out from the foot-stalks, by which some plants, as the ivy and vine, fasten themselves to walls, pales, or trees, for support. The term is synonymous to the capreolus, clavicula, and viticulus of other botanists; and is ranked by Linnæus among the fulcra, or parts of plants that serve for protection, support, and defence. Tendrils are sometimes placed opposite to the leaves, as in the vine; sometimes at the side of the foot-stalk of the leaf, as in passion flower; and sometimes, as in winged pea, *pisum ochrus*, they are emitted from the leaves themselves. With respect to composition, they are either simple, that is, composed of one fibre or chord, as in the vetch; or compound, that is, consist of two, three, or more, as in the everlasting pea. Bitter-sweet, solanum, dulcamara, bignonia, and ivy, send forth tendrils which plant themselves like roots in the adjacent walls, or the bark of the neighbouring trees. Claspers, says the ingenious Dr. Grew, are like trunk-roots, a mean betwixt a root and a trunk, but a compound of both, as may be gathered from their circumvolutions, in which they mutually ascend and descend. In the mounting of the trunk, continues the same author, claspers serve for support. Thus, in vines, the branches being very long, fragile, and slender, would be liable to frequent breaking, unless, by means of their claspers, they were mutually contained together; so that the whole care is divided betwixt the gardener and nature: the former, with his ligaments of leather, secures the main branches; and nature, with those of her own providing, secures the less.

CISALPINE, any thing on this side the Alps. The Romans divided Gaul and the country now called *Lombardy*, into Cisalpine and Transalpine. That which was Cisalpine with regard to the Romans, is Transalpine with regard to us.

CISLEU, in Hebrew chronology, the ninth month of their ecclesiastical, and third of their civil year, answering nearly to our November.

CISSAMPELOS, in botany; a genus of the monadelphia order, belonging to the diœcia class of plants; and in the natural method ranking under the 11th order, *Sarmentaceæ*. The male calyx is tetraphyllous; no corolla; the nectarium wheel-shaped; four stamina with their filaments grown together. The female calyx is monophyllous and ligulated roundish, or like a piece of garter a little roundish. There is no corolla; three styles, and a monospermous berry. There are two species, the pareira and caapeba, both natives of the warmest parts of America. The root of the second, applied externally, is said to be an antidote against the bite of venomous serpents. The plant being infused in water, quickly fills the liquor with a mucilaginous substance, which is as thick as jelly; whence the name of *freezing-wytb*, by which this genus of plants has been distinguished by the Brazilians.

CISSOID, in geometry, a curve of the second order, first invented by Diocles, whence it is called *the cissoid of Diocles*. See FLUXIONS.

CISSUS, the WILD-GRAPE; a genus of the monogynia order, belonging to the tetrandria class of plants; and in the natural method ranking under the 46th order, *Hederaceæ*. The berry is monospermous, surrounded by the calyx, and a quadripartite corolla. There are four species, all of them natives of the island of Jamaica, and some of the other islands in the warm parts of America. They send out slender branches, having tendrils at their joints, by which they fasten to the neighbouring trees, bushes, and any other support, mounting to a considerable height. The fruit of some of the species is eaten by the negroes.

CISTERCIANS, in church-history, a religious order founded in the 11th century by St. Robert, a Benedictine. They became so powerful, that they governed almost all Europe, both in spirituals and temporals. Cardinal de Vitri, describing their observances, says, they neither wore skins nor shirts; nor ever ate flesh, except in sickness; and abstained from fish, eggs, milk, and cheese: they lay upon straw-beds, in tunics and cowls; they rose at midnight to prayers: they spent the day in labour, reading, and prayer; and in all their exercises observed a continual silence. The habit of the Cistercian monks is a white robe, in the nature of a cassock, with a black scapulary and hood, and is girt with a woollen girdle. The nuns wear a white tunic, and a black scapulary and girdle.

CISTERN, denotes a reservoir, or vessel serving as a receptacle for rain or other water, for the necessary uses of a family. Thus, there are lead-cisterns, jar-cisterns, &c. Authors mention a cistern at Constantinople, the vaults of which are supported by two rows of pillars, 212 in each row, each pillar being two feet in diameter. They are planted circularly, and in radii tending to that of the centre. Anciently there were cisterns all over the country in Palestine. There were some likewise in cities and private houses. As the cities for the most part were built on mountains, and the rains fell regularly in Judea at two seasons of the year only, in spring and autumn, people were obliged to keep water in cisterns in the country for the use of their cattle, and in cities for the convenience of the inhabitants. There are still cisterns of very large dimensions to be seen in Palestine, some whereof are 150 paces long, and 54 wide. There is one to be seen at Ramah of 32 paces in length, and 28 in breadth. Wells and cisterns, springs and fountains, are generally confounded in scripture-language.

CISTUS, the ROCK-ROSE; a genus of the monogynia order, belonging to the polyandria class of plants; and in the natural method ranking under the 20th order, *Rotaceæ*. The corolla is pentapetalous; the calyx pentaphyllous, with two of its leaves smaller than the rest. The seeds are contained in a capsule. There are 37 species, most of them natives of the southern parts of Europe, but hardy enough to bear the open air in this country. They are beautiful evergreen shrubs, generally very branchy quite from the bottom, and forming diffused heads. They are very ornamental in gardens, not only as evergreens, making a fine variety at all seasons with their leaves of different figures, sizes, and shades of green and white, but also as first-rate flowering shrubs, being very profuse in most elegant flowers of white, purple, and yellow colours. These flowers only last for one day; but there is a continual succession of new ones for a month or six weeks on the same plant; and when there are different species, they will exhibit a constant bloom for near three months. They are propagated either by seeds or cuttings, and thrive best in a dry soil. Gum labdanum is found upon a species of cistus which grows naturally in the Levant, and is therefore called *ladanifera*. See LABDANUM.

CITADEL, a place fortified with five or six bastions, built on a convenient ground near a city, that it may command it in case of a rebellion or tumult.

CITADELLA, the capital town in the ifland of Minorca, in the Mediterranean, with a new harbour. This, with the whole ifland, were taken by General Stanhope and the confederate fleet in 1708, and ceded to Great Britain by the treaty of Utrecht in 1713: but it was taken by the French, after a brave defence, in 1756; and reftored by the peace. In 1782, it was taken by the Spaniards, and confirmed to them at the fubfequent peace. It is 27 miles weft of Port-Mahon. E. long. 3. 30. N. lat. 39. 58.

CITADINESCA, in natural hiftory, a name given by fome writers to the Florentine marble, which is fuppofed to reprefent towns, palaces, ruins, rivers, &c. Thefe delineations are merely accidental, and are commonly much affifted by the imagination, though the natural lines of a ftone may fometimes luckily enough reprefent the ruins of fome ancient building, or the courfe of a river. In England there is a kind of feptaria, or ludus Helmontii, which has fometimes pretty beautiful, though very irregular, delineations of this kind. The Florentine marble, as we fee it wrought up in the ornaments of cabinets, &c. owes a great deal to the fkill of the workmen, who always pick out the proper pieces from the mafs, and difpofe them in the work fo as to reprefent what they pleafe.

CITATION, in ecclefiaftical courts, is the fame with fummons in civil courts. See SUMMONS.

CITATION, is alfo a quotation of fome law, authority, or paffage of a book.

CITHARA, in antiquity, a mufical inftrument, the precife ftructure of which is not known; fome think it refembled the Greek delta Δ; and others the fhape of a half moon. At firft it had only 3 ftrings, but the number was at different times increafed to 8, to 9, and laftly to 24. It was ufed in entertainments and private houfes, and played upon with a plectrum or quill, like the lyre.

CITHAREXYLON, FIDDLE-WOOD; a genus of the angiofpermia order, belonging to the didynamia clafs of plants; and in the natural method ranking under the 40th order, *Perfonatæ*. The calyx is quinquedentated, campanulated, wheel-fhaped, and inclining to be funnel-fhaped, with its fegments villous on the upper fide, equal. The fruit a difpermous berry: the feeds bilocular. There are two fpecies, both natives of the warm parts of America, where they grow to be large trees, and are adorned with white flowers growing in fpikes. In Britain they appear only as fhrubs, and muft be conftantly retained in the ftove, where they make a fine appearance, being beautiful evergreens. They may be propagated either by feeds or cuttings.

CITIZEN, a native or inhabitant of a city, vefted with the freedom and liberties of it. The term *citizen* has become general among the French people fince the eftablifhment of the republic. A citizen of Rome was diftinguifhed from a ftranger, becaufe he belonged to no certain commonwealth fubject to the Romans. A citizen is either by birth or election; and fons may derive the right from their fathers. To make a good Roman citizen, it was neceffary to be an inhabitant of Rome, to be inrolled in one of the tribes, and to be capable of dignities. Thofe to whom were granted the rights and privileges of Roman citizens, were only honorary citizens. It was not lawful to fcourge a citizen of Rome.

CITRINUS, in natural hiftory, the name of a peculiar fpecies of fprig cryftal, which is of a beautiful yellow. Many of the common cryftals, when in the neighbourhood of lead-mines, are liable to be accidentally tinged yellow, by an admixture of the particles of that metal; and all thefe, whether finer or coarfer, have been too frequently confounded together under the name *citrine*: but Dr. Hill has afcertained this to be a peculiar fpecies of cryftal different from all the others in form as well as in colour; and diftinguifhed by the name of *ellipomacryftalum lucidum flavefcens, pyramide brevi*. It is never found colourlefs like the other cryftals, but has great variety of tinges, from that of the deeper ochres to a pale lemon-colour. It is very plentiful in the Weft Indies, and is fometimes found in Bohemia. Our jewellers have learned from the French and Italians, who are very fond of it, to call it *citrine*; and often cut ftones for rings out of it, particularly out of the pyramid, which is always finer than the column; and thefe, after they have paffed through two or three hands, are generally miftaken for topazes.

CITRON-TREE, in botany. See CITRUS.

CITRON-*Water*, a fort of ftrong water or cordial, which may be thus made: Take of fine thin lemon-peel, 18 ounces; of orange-peel, 9 ounces; nutmegs, 4 ounces; rectified fpirit of wine, 2 gallons and a half. Digeft thefe in balneo-mariæ for one night: then draw off with a flow fire, and add as much water as will juft make the matter milky (which will be about 7 quarts); and laftly, add two pounds of loaf fugar. Some add frefh elder flowers, or ambergris, by way of heightening the flavour.

CITRON-*Wood*, the wood of an American tree, called by the natives *candle-wood*; becaufe, being cut into fplinters, it burns like a candle. The tree is frequent in the Leeward Iflands, and grows to a confiderable fize: the leaves are like thofe of the bay-tree, but of a finer green; the flower is fweet, and much like thofe of the orange; the fruit fucceeding thefe is black, and of the fize of a pepper-corn. The trunk is fo like the yellow faunders in colour, that there was once an opinion that it was the fame tree, and much of it was imported into Europe, and fold as fuch: but they were foon found to be different; the faunders being of a fweet fcent, and but moderately heavy and refinous; but the citron-wood confiderably heavy, very oily, and of a ftrong fmell. It is of no known ufe in medicine; but is ufed in France and Germany by the turners, being a fine firm-grained wood, and taking a fine polifh, and with age becoming a very beautiful brown.

CITRUS, the CITRON-TREE; a genus of the polyadelphia order, belonging to the icofandria clafs of plants. The calyx is quinquefid; the petals oblong, and five in number; the antheræ 20, with their filaments grown together fo as to form various pencils. The fruit is an unilocular berry. The fpecies are:

1. The *Medica*, or Citron-tree, which hath an upright fmooth trunk, divided at top into a branchy ftrong-fhooting full head, from about 5 to 15 feet high, adorned with large oval, fpear-fhaped, thick leaves, having linear foot-ftalks, and numerous flowers from the fides of the branches, fucceeded by very large oblong oval, pointed, rough-rinded fruit. The varieties are citron-tree with four fruit; with fweet fruit; with long fruit; with warted fruit; with recurved fruit; and with blotched leaves.

2. The *Lima*, or Lemon-tree, hath an upright fmooth trunk, divided upward into a branchy regular head; from 12 to 15 feet high; large, oval, fpear-fhaped, pointed, flightly fawed leaves, on linear footftalks; and many flowers from the fides of the branches fucceeded by large oval fruit prominent at the top. The varieties are, the lemon-tree with four fruit; with fweetifh fruit; with very large fruit, called *Imperial Lemon*; with fpear-fhaped fruit; with furrowed fruit; with cluftered fruit; with childing fruit; with whitifh fruit; with tricolour ftriped fruit; with filver ftriped leaves; and with double flowers.

3. The *Aurantium*, or Orange tree, hath an upright trunk dividing upward into a branchy, regular head, from 5 to 10 or 12 feet high; oval, fpear-fhaped, entire leaves, having winged foot-ftalks and numerous white flowers at the fides of the branches, fucceeded by globular fruit compreffed at both

ends. The moſt noted varieties are, 1. The Seville orange. This is a very handſome tree, and the hardieſt of any; as in this country it ſhoots freely, produces large and beautiful leaves, flowers ſtronger, &c. The fruit is large, rough-rinded, and ſour, of excellent quality for œconomical uſes. 2. The China orange. This tree has moderately ſized leaves, and a ſmooth, thin-rinded, ſweet fruit, of which there are ſeveral varieties in warm countries, where they grow in the open ground. 3. The great Shaddock orange, or pumplemoes, grows larger and ſtronger than the foregoing, with large, thick, and ſomewhat ſerrated leaves, and very large fruit, having a reddiſh pulp. It derives the name of Shaddock from one of that name that firſt brought it from the Eaſt Indies. 4. The Forbidden-fruit tree (See plate 78.) in trunk, leaves, and flowers, very much reſembles the common orange tree; but the fruit, when ripe, is larger and longer than the biggeſt orange. It has ſomewhat the taſte of a ſhaddock; but far exceeds that, as well as the beſt orange, in its delicious taſte and flavour. 5. The Horned orange is a tree of moderate ſize, producing fruit which divides, and the rind runs out into diviſions like horns. 6. The Hermaphrodite orange is a common ſized tree, producing fruit ſhaped partly like an orange and partly like a citron. 7. The Dwarf orange tree, or nutmeg orange, has a long ſtem and ſmall buſhy head, growing two or three feet high; ſmall oval leaves in cluſters; and numerous flowers in cluſters, covering the branches, ſucceeded by very ſmall fruit. Theſe are the moſt remarkable varieties of the three foregoing ſpecies of citrus: but beſides theſe there are a great many others; and indeed, in thoſe countries where they grow naturally, the varieties may be multiplied without end, like thoſe of our apples and pears. The flowers of all the ſpecies and varieties are formed each of five ſpreading petals, appearing here principally in May and June; and the fruit continue ſetting in June and July, and ripen the year following.

4. The *Trifoliata*, or Japaneſe citron, is a thorny ſhrub, growing naturally in Japan, where it is likewiſe known by the names of Gees, and Karatals banna. The trunk, we are told by Kæmpfer, acquires by age and culture the thickneſs of a tree. The branches and ſhoots are unequal; in ſome parts compreſſed, in others ſwelling, eſpecially about the ſpines. Theſe proceed ſingly from the ſtem and branches; are ſtraight, run out from a broad baſe into a very ſharp point; and are protruded from the wood, with the common bark of which they are likewiſe inveſted. The wood is looſe and ſoft; the bark of a ſhining green, moiſt, and eaſily parting from the wood. The leaves are few in number, ſawed on the edges, veined, placed without order, but generally growing under the ſpines. They grow by threes, like thoſe of trefoil, upon the extremity of a common footſtalk which is furniſhed on each ſide with a membranaceous fringe or margin, ſomewhat reſembling the pedicles of the orange. The upper ſurface of the leaves is of a bright lucid green, the lower dark and herbaceous. The flowers, which reſemble thoſe of the medlar, proceed ſingly from the arm-pits of the leaves; are white, poſſeſſed of no great degree of fragrance, and conſiſt of five petals. The fruit is equally beautiful with a middle-ſized orange; their internal ſtructure is alſo pretty much the ſame; only the pulp is glutinous, of an unpleaſant ſmell, and a harſh diſagreeable taſte. The ſeeds have the ſame taſte with the pulp, and are ſhaped exactly like thoſe of the orange.

The three firſt ſpecies merit particular attention with regard to their culture. They are elegant evergreens, riſing in this country from about 5 to 10 feet in height; forming full and handſome heads, cloſely garniſhed with beautiful large leaves all the year round, and putting forth a profuſion of ſweet flowers in ſpring and early in ſummer; which even in this climate are often ſucceeded by abundance of fruit that ſometimes arrive at tolerable perfection. Though all the varieties were originally obtained by ſeed, yet the only certain method of continuing the approved varieties is by budding or inarching them on ſtocks raiſed from ſeed to a proper ſize. As the young trees, however, are brought in plenty from abroad, this method is ſeldom practiſed in this country.

The operation for budding is performed in the month of Auguſt, and is done in the common way; only the buds muſt be taken from trees of a good kind that bear well. As ſoon as the operation is finiſhed, the pots with their plants muſt be placed in the green-houſe, or in a glaſs caſe; or, where there is the convenience of a ſpare bark-pit, where the heat of the bark is almoſt exhauſted, the pots may be plunged therein for two or three weeks. In either caſe, however, the air muſt be admitted freely by opening the front glaſſes; allowing alſo a ſlight ſhade of mats in the middle of hot ſunſhine days, and ſupplying them with water every two or three days, during this kind of weather. In three or four weeks the buds will be united with the ſtock; when it will be proper to looſen the bandages, that they may have room to ſwell; the buds, however, will all remain dormant till the next ſpring. They may alſo be propagated by inarching, which is done in the common way; but the method of budding is found to produce much handſomer trees, and therefore is to be preferred. But the moſt cheap and expeditious method of procuring a collection of theſe kinds of trees is by having recourſe to ſuch as are imported from Spain, Italy, and Portugal. They are ſold in the Italian warehouſes in London, at prices from three ſhillings to a guinea each, according to their ſize; and they are generally advertiſed as ſoon as they arrive, which is early in the ſpring. They firſt are to be planted in pots filled with light rich earth; and plunged in a tan-bed, where they are to remain for three or four months; after which they are to be trained to the open air, but will not bear it longer than from the end of May till the middle or end of October.

Sometimes theſe trees, inſtead of being kept in pots or tubs, are planted in the full ground; and where this can be done, it is by far the moſt eligible method. Where this is intended, there muſt be frames erected for the ſupport of glaſs and other covers, to defend the plants during inclement weather; and in this ſituation the trees generally ſhoot ſtrong, produce large fruit, and may be trained either as wall or ſtandard trees. A ſouth wall, in a dry ſituation, is proper for training them as wall-trees; againſt which may be erected wooden frame-work ſloping, either fixed or moveable, for the ſupport of glaſs frames for winter; likewiſe for the greater protection of the trees in ſevere froſts, there may be a fire-place with a flue or two carried along a low wall in the fronts and ends. To have the trees as ſtandards, a more capacious and lofty glaſs-caſe ſhould be erected againſt the wall, in the manner of a hot-houſe, but higher; in this one or two rows of orange-trees may be planted, ſuffering them to run up as ſtandards with only ſome neceſſary pruning juſt to preſerve their regularity. In ſome places there are lofty moveable glaſs-caſes, ſo that two or three rows of trees are planted in a conſpicuous part of the pleaſure-ground. In winter the frame is put over them, and in ſummer wholly taken away; ſo that they appear like a little orange-grove growing in the open ground. The flowering and fruit-ſetting ſeaſon of all the ſorts of citrus is in June and July. They are often, eſpecially the orange-trees, greatly loaded with bloſſoms; and when theſe ſtand very thick, it is proper to thin them a little, taking off the ſmalleſt. It is alſo to be obſerved, that as the trees continue blowing and ſetting their fruit for three months; when a full crop of fruit is ſet, it is of benefit to the trees and fruit to gather off the ſuperabundant bloſſoms as they are produced; though ſome permit them to remain on account of their appearance.

The fruits of the citron, lemon, and orange trees, yield very

agreeable acid juices; which, befides the ufes to which they are commonly applied, anfwer fome purpofes in medicine. Commodore Anfon, Captain Cook, and other navigators, found thefe fruits of great fervice in curing their fhips' crews of the fcurvy after long voyages. Sir John Pringle profeffed himfelf more difpofed to rely on the exhibition of the juices themfelves, than on the extracts of them, which had been fuppofed moft efficacious in the fcurvy. The juice of lemons is very frequently ufed for neutralifing alkaline falts for faline draughts. The citron is feldom ufed in this country; though its peel, as well as that of the lemon, is candied, and fold as a fweetmeat. The yellow peel of the lemon is an agreeable aromatic, as is alfo that of the orange. The latter, however, is confiderably warmer than that of the lemon, and abounds more with effential oil; which is a reafon why it is ufually preferred in medicine. The flowers of the orange-tree were once efteemed as a perfume. They are highly odoriferous, of a fomewhat warm and bitter tafte; and yield their flavour by diftillation both to fpirit and water. The bitter matter is diffolved in water, and on evaporating the decoction remains entire in the extract. The diftilled water is called by foreign writers *aqua naphæ*. An oil diftilled from the flowers is brought from Italy under the name of *oleum* or *effentia neroli*.

CITTERN, a mufical inftrument much refembling the guitar, for which it has been frequently miftaken. Anciently it was called the *ciftrum*, and till lately was held in great contempt both in France and Britain. The practice on it being very eafy, it was formerly the amufement and recreation of lewd women and their vifitors; infomuch that in many of the old Englifh dramatic writers, it is made the fymbol of a woman that lived by proftitution. It was alfo the common amufement of waiting-cuftomers in barbers fhops, as being the moft eafy of all inftruments to play on, and therefore it was thought that almoft every body could make ufe of it.

CITY, according to Cowel, is a town corporate, which hath a bifhop and cathedral church; and it is called *civitas*, *oppidum*, and *urbs*: *civitas*, in regard it is governed by juftice and order of magiftracy; *oppidum*, becaufe it contains a great number of inhabitants; and *urbs*, becaufe it is in due form furrounded with walls. Kingdoms have been faid to contain as many cities as they have feats of archbifhops and bifhops: but, according to Blount, *city* is a word that hath obtained fince the conqueft; for, in the time of the Saxons, there were no cities, but all the great towns were called *burghs*, and even London was then called *Londonburgh*, as the capital of Scotland is called *Edinburgh*. And long after the conqueft the word *city* is ufed promifcuoufly with the *burgh*, as in the charter of Leicefter, where it is both called *civitas* and *burgus*; which fhows that thofe writers were miftaken who tell us every city was, or is, a bifhop's fee. And though the word *city* fignifies with us fuch a town corporate as hath ufually a bifhop and a cathedral church, yet it is not always fo.

As to the ancient ftate of the cities and villages, whilft the feudal policy prevailed, they held of fome great lord on whom they depended for protection, and were fubject to his arbitrary jurifdiction. The inhabitants were deprived of the natural and moft unalienable rights of humanity. They could not difpofe of the effects which their own induftry had acquired, either by a latter-will or by any deed executed during their life. They had no right to appoint guardians for their children during their minority. They were not permitted to marry without purchafing the confent of the lord on whom they depended. If once they had commenced a law-fuit, they durft not terminate it by an accommodation, becaufe that would have deprived the lord, in whofe court they pleaded, of the perquifites due to him on paffing his fentence. Services of various kinds no lefs difgraceful than oppreffive were exacted from them without mercy or moderation. The fpirit of induftry was checked in fome cities by abfurd regulations, and in others by unreafonable exactions; nor would the narrow and oppreffive maxims of a military ariftocracy have permitted it ever to rife to any degree of height or vigour.

The freedom of cities was firft eftablifhed in Italy, owing principally to the introduction of commerce. It afterwards made its way into France, where Louis the Grofs, in order to create fome power that might counterbalance thofe potent vaffals who controlled or gave law to the crown, firft adopted the plan of conferring new privileges on the towns fituated within his own domain. Thefe privileges were called *charters of community*, by which he enfranchifed the inhabitants, abolifhed all marks of fervitude, and formed them into corporations or bodies politic, to be governed by a council and magiftrates of their own nomination. The practice fpread quickly over Europe, and was adopted in Spain, England, and Scotland, and all the other feudal kingdoms.

In England, the eftablifhment of communities or corporations was pofterior to the Conqueft. The practice was borrowed from France, and the privileges granted by the crown were perfectly fimilar to thofe above enumerated. It is not improbable, that fome of the towns in England were formed into corporations under the Saxon kings; and that the charters granted by the kings of the Norman race were not charters of enfranchifement from a ftate of flavery, but a confirmation of privileges which they had already enjoyed. The Englifh cities, however, were very inconfiderable in the 12th century. A clear proof of this occurs in the hiftory juft referred to. Fitz-Stephen, a contemporary author, gives a defcription of the city of London in the reign of Henry II. and the terms in which he fpeaks of its trade, its wealth, and the number of its inhabitants, would fuggeft no inadequate idea of its ftate at prefent, when it is the greateft and moft opulent city in Europe. But all ideas of grandeur and magnificence are merely comparative. It appears from Peter of Blois, archdeacon of London, who flourifhed in the fame reign, and who had good opportunity of being informed, that this city, of which Fitz-Stephen gives fuch a pompous account, contained no more than 40,000 inhabitants. The other cities were fmall in proportion, and in no condition to extort any extenfive privileges. That the conftitution of the boroughs of Scotland in many circumftances refembled that of the towns of France and England, is manifeft from the *Leges Burgorum* annexed to the *Regiam Majeftatem*.

CIVET, a kind of perfume which bears the name of the animal it is taken from, and to which it is peculiar. See VIVERRA. Good civet is of a clear, yellowifh, or brownifh colour; not fluid nor hard, but about the confiftence of butter or honey, and uniform throughout; of a very ftrong fmell, quite offenfive when undiluted, but agreeable when only a fmall portion of civet is mixed with a large one of other fubftances. It unites eafily with oils both expreffed and diftilled, but not at all with water or fpirit of wine: nor can it be rendered mifcible with water by the mediation of fugar. It is rarely if ever employed for medicinal purpofes. The Italians make it an ingredient in perfumed oils, and thus obtain the whole of its fcent; for oils wholly diffolve the fubftance of it. It is very rare, however, to meet with civet unadulterated. The fubftances ufually mixed with it are lard and butter; which agreeing with it in its general properties, render all criteria for diftinguifhing the adulteration impoffible. A great trade of civet is carried on at Calicut, Baffora, and other parts of the Indies, and in Africa, where the animal that produces the perfume is found. Live civet-cats are to be feen alfo in France and Holland. The French keep them only as a rarity; but the Dutch draw the civet from them for fale.

Civet-Cat, the Engliſh name of the animal that produces the civet. See Viverra.

CIVIC crown, was a crown given by the ancient Romans to any ſoldier who had ſaved the life of a citizen in an engagement. The civic crown was reckoned more honourable than any other crown, though compoſed of no better materials than oak-boughs. Plutarch, in the life of C. M. Coriolanus, accounts as follows for uſing on this occaſion the branches of this tree before all others: becauſe, ſays he, the oaken wreath being ſacred to Jupiter, the great guardian of their city, they thought it the moſt proper ornament for him who had preſerved the life of a citizen. Pliny, ſpeaking of the honour and privileges conferred on thoſe who had merited this crown, ſays, "They who had once obtained it, might wear it always. When they appeared at the public ſpectacles, the ſenate and people roſe to do them honour, and they took their ſeats on theſe occaſions among the ſenators. They were not only perſonally excuſed from all troubleſome offices, but procured the ſame immunity for their father and grandfather by the father's ſide."

CIVIDAD-de-las-Palmas, the capital town of the iſland of Canary, with a biſhop's ſee, and a good harbour. The houſes are well built, two ſtories high, and flat-roofed. The cathedral is a very handſome ſtructure; and the inhabitants are gay and rich. The air is temperate, and free from extremes of heat and cold. It is defended by a ſmall caſtle ſeated on a hill. W. long. 14. 35. N. lat. 28. 0.

Cividad-*Real*, a town of Spain, in New Caſtile, and capital of La Mancha. The inhabitants are noted for dreſſing leather extremely well for gloves. W. long. 4. 15. N. lat. 39. 2.

Cividad-*Roderigo*, a ſtrong and conſiderable town of Spain, in the kingdom of Leon, with a biſhop's ſee. It is ſeated in a fertile country, on the river Aquada, in W. long. 6. 52. N. lat. 40. 38.

Cividad-*di-Friuli*, a ſmall but ancient town of Italy, in Friuli, and in the territory of Venice; ſeated on the river Natiſona. E. long. 13. 25. N. lat. 46. 15.

CIVIL, in a general ſenſe, ſomething that regards the policy, public good, or peace of the citizens or ſubjects of the ſtate; in which ſenſe we ſay, civil government, civil law, civil right, civil war, &c. In a popular ſenſe, this term is applied to a complaiſant and humane behaviour in the ordinary intercourſe of life.

Civil, in a legal ſenſe, is applied to the ordinary procedure in an action, relating to ſome pecuniary matter or intereſt; in which ſenſe it is oppoſed to criminal.

Civil *Death*, any thing that cuts off a man from civil ſociety; as a condemnation to the galleys, perpetual baniſhment, condemnation to death, outlawry, or excommunication.

Civil *Law*, is properly the peculiar law of each ſtate, country, or city: but what we uſually mean by the civil law, is a body of laws compoſed out of the beſt Roman and Grecian laws, compiled from the laws of nature and nations; and, for the moſt part, received and obſerved throughout all the Roman dominions for above 1200 years. See Law.

It was firſt brought over into England by Theobald a Norman abbot, who was elected to the ſee of Canterbury in 1138; and he appointed a profeſſor, viz. Roger firnamed *Vicarius*, in the univerſity of Oxford, to teach it to the people of this country. Nevertheleſs it gained ground very ſlowly. King Stephen iſſued a proclamation, prohibiting the ſtudy of it. And though the clergy were attached to it, the laity rather wiſhed to preſerve the old conſtitution. However, the zeal and influence of the clergy prevailed; and the civil law acquired great reputation from the reign of King Stephen to the reign of King Edward III. both incluſive. Many tranſcripts of Juſtinian's Inſtitutes are to be found in the writings of our ancient authors, particularly of Bracton and Fleta; and Judge Blackſtone obſerves, that the common law would have been loſt and over-run by the civil, had it not been for the incident of fixing the court of common pleas in one certain ſpot, and the forming the profeſſion of the municipal law into an aggregate body.

It is allowed that the civil law contains all the principles of natural equity; and that nothing can be better calculated to form good ſenſe and ſound judgment. Hence, though in ſeveral countries it has no other authority but that of reaſon and juſtice, it is every where referred to for authority. It is not received at this day in any nation without ſome alterations: and ſometimes the feudal law is mixed with it, or general and particular cuſtoms; and often ordinances and ſtatutes cut off a great part of it.

In Turkey, the Baſilics are only uſed. In Italy, the canon law, and cuſtoms, have excluded a good part of it. In Venice, cuſtom hath almoſt an abſolute government. In the Milaneſe, the feudal law, and particular cuſtoms, bear ſway. In Naples and Sicily, the conſtitutions and laws of the Lombards are ſaid to prevail. In Germany and Holland, the civil law is eſteemed to be the municipal law: but yet many parts of it are there grown obſolete; and others are altered, either by the canon law or a different uſage. In Friezeland, it is obſerved with more ſtrictneſs; but in the northern parts of Germany, the jus Saxonicum, Tubecenſe, or Culmenſe, is preferred before it. In Denmark and Sweden, it hath ſcarce any authority at all. In France, only a part of it is received, and that part is in ſome places as a cuſtomary law; and in thoſe provinces neareſt to Italy it is received as a municipal written law. In criminal cauſes, the civil law is more regarded in France; but the manner of trial is regulated by ordinances and edicts. In Spain and Portugal, the civil law is connected with the jus regium and cuſtom. In Scotland, the ſtatutes of the ſederunt, part of the regiæ majeſtatis, and their cuſtoms, controul the civil law. In England, it is uſed in the eccleſiaſtical courts, in the high court of admiralty, in the court of chivalry, in the two univerſities, and in the courts of equity; yet in all theſe it is reſtrained and directed by the common law.

Civil *Society*. The only true and natural foundations of civil ſociety, are the wants and fears of individuals. When mankind became too numerous to ſubſiſt conveniently in that paſtoral ſtate wherein the patriarchs appear to have lived, they became neceſſarily ſubdivided, and ſeparated into diſtinct nations. It is, in fact, the ſenſe of their weakneſs and imperfections that keeps mankind together; that demonſtrates the neceſſity for this union; and that, therefore, is the ſolid and natural foundation, as well as the cement of ſociety. And this is what is meant by the original contract of ſociety; namely, that the whole ſhould protect all its parts, and that every part ſhould pay obedience to the will of the whole. When ſociety is once formed, government reſults of courſe, as neceſſary to preſerve, and to keep that ſociety in order.

Civil *State*, in the Britiſh polity, one of the general diviſions of the Laity, comprehending all orders of men from the higheſt nobleman to the meaneſt peaſant that are not included under the Military or Maritime ſtates: though it may ſometimes include individuals of theſe as well as of the Clergy; ſince a nobleman, a knight, a gentleman, or a peaſant, may become either a divine, a ſoldier, or a ſeaman. The diviſion of this ſtate is into Nobility and Commonalty. See thoſe articles.

Civil *War*, a war between people of the ſame ſtate, or the citizens of the ſame city.

Civil *Year*, is the legal year, or annual account of time, which every government appoints to be uſed within its own dominions; and is ſo called in contradiſtinction to the natural

year, which is meafured exactly by the revolution of the heavenly bodies.

CIVILIAN, in general, denotes fomething belonging to the civil law; but more efpecially the doctors and profeffors thereof are called *Civilians*.

CIVITA-DI-PENNA, an ancient town of Italy, in the kingdom of Naples, and in the Farther Abruzzo, with a bifhop's fee. It is fituated near the river Salino, 25 miles north eaft of Aquila. E. long. 13. 3. N. lat. 42. 25.

CIVITA-*Caftellana*, a town of Italy, in St. Peter's patrimony, feated on a river, which, feven miles from thence, falls into the Tiber. E. long. 13. 5. N. lat. 42. 15.

CIVITA *Turchino*, a place in Italy, about two miles north of the town of Corneto in the patrimony of St. Peter. It is a hill of an oblong form, the fummit of which is almoft one continued plain. From the quantity of medals, intaglios, fragments of infcriptions, &c. that are occafionally found here, this is believed to be the very fpot where the ancient and powerful city of Tarquinii once ftood, though at prefent it is only one continued field of corn. This great fcene of antiquities is almoft entirely unknown, even in Rome. Mr. Jenkins, refident at Rome, was the firft Englifhman who vifited it.

CIVITA-*Vecchia*, a fea-port town of Italy in the patrimony of St. Peter, with a good harbour, and an arfenal. Here the Pope's galleys are ftationed, and it has lately been made a free port; but the air is very unwholefome. E. long. 12. 31. N. lat. 45. 5.

CIVOLI, or CIGOLI, (Lewis) an Italian painter, whofe family name was *Cardi*, was born at the caftle of Cigoli, in Tufcany, in the year 1559. His *ecce homo*, which he performed as a trial of fkill with Barochio and Michael Angelo da-Caravaggio, was judged better than thofe executed by them. He excelled in defigning, and was employed by the popes and princes of his time. He died at Rome in 1613.

CLACK, among countrymen. To *clack* wool, is to cut off the fheep's mark, which makes the weight lefs, and yields lefs cuftom to the king.

CLACKMANNAN, a borough of Clackmannanfhire in Scotland, on the north fhore of the frith of Forth, and at the bottom of a hill, on the top of which is feen an ancient caftle. A large fquare tower in this caftle derives its name from the illuftrious Robert Bruce, whofe great fword and cafque are here preferved. A large two-handed fword is alfo fhown, faid to have belonged to Sir John Graham, the faithful attendant of the heroic Wallace. It is 23 miles N. by E. of Glafgow. Lon. 3. 40. W. Lat. 56. 5. N.

CLACKMANNANSHIRE, a county of Scotland, bounded on the E. by Fifefhire, on the N. and W. by Perthfhire, and on the S. by the Forth. It is eight miles in length, and five in breadth. It produces good corn and pafture, and plenty of coal and falt. This fhire, with Kinrofs, fends one member to parliament.

CLAGENFURT, a ftrong town of Germany, and capital of Carinthia, fituated in E. long. 13. 56. N. lat. 46. 50.

CLAGET (William), an eminent and learned divine, born in 1646. He was preacher to the fociety of Gray's Inn; which employment he exercifed until he died in 1688, being then alfo one of the king's chaplains. Archbifhop Sharp gives him an excellent character; and bifhop Burnet has ranked him among thofe worthy men whofe lives and labours contributed to refcue the church from the reproaches which the follies of others had drawn upon it. Dr. Claget publifhed feveral things; but his principal work is his "Difcourfe concerning the Operations of the Holy Spirit:" nor muft it be forgotten that he was one of thofe excellent divines who made a noble ftand againft the defigns of James II. to introduce popery. Four volumes of his fermons were publifhed after his death, by his brother Nicholas Claget, archdeacon of Sudbury, father of Nicholas Claget afterwards bifhop of Exeter.

CLAIM, in law, a challenge of intereft in any thing that is in the poffeffion of another.

CLAIR OBSCURE. See CLARO *Obfcuro*.

CLAIRAULT (Alexis), of the French academy of fciences, was one of the moft illuftrious mathematicians in Europe. He read to the academy in 1726, when he was not 13 years old, "a memoir upon four new geometrical curves of his own invention;" and fupported the character he thus laid a foundation for by various publications from time to time. He publifhed, *Elémens de Géométrie*, 1741, in 8vo; *Elémens d'Algebre*, 1746, in 8vo; *Théorie de la Figure de la Terre*, 1743, in 8vo; *Tables de la Lune*, 1754, in 8vo. He was concerned alfo in the *Journal des Sçavans*, which he furnifhed with many excellent extracts. He died in 1765. He was one of the academicians who were fent into the north to determine the figure of the earth.

CLAM, in zoology, a fhell-fifh. See VENUS.

CLAMP, a piece of wood joined to another. The term is likewife ufed to fignify a pile of unburnt bricks built up for burning. Thefe clamps are built much after the fame manner as arches are built in kilns, viz. with a vacuity betwixt each brick's breadth for the fire to afcend by; but with this difference, that inftead of arching, they trufs over, or over-fpan; that is, the end of one brick is laid about half way over the end of another, and fo till both fides meet within half a brick's length, and then a binding brick at the top finifhes the arch.

CLAMP *in a fhip*, denotes a piece of timber applied to a maft or yard to prevent the wood from burfting; and alfo a thick plank lying fore and aft under the beams of the firft orlop, or fecond deck, and is the fame that the rifing timbers are to the deck.

CLAMP-*Nails*, fuch nails as are ufed to faften on clamps in the building or repairing of fhips.

CLAMPING, in joinery, is the fitting a piece of board with the grain to another piece of board crofs the grain. Thus the ends of tables are commonly clamped, to prevent their warping.

CLANS, in hiftory, and particularly in that of Scotland. The nations which over-ran Europe were originally divided into many fmall tribes; and when they came to parcel out the lands which they had conquered, it was natural for every chieftain to beftow a portion, in the firft place, upon thofe of his own tribe or family. Thefe all held their lands of him; and as the fafety of each individual depended on the general union, thefe fmall focieties clung together, and were diftinguifhed by fome common appellation, either patronimical or local, long before the introduction of furnames or enfigns armorial. But when thefe became common, the defcendants and relations of every chieftain affumed the fame name and arms with him: other vaffals were proud to imitate their example; and by degrees they were communicated to all thofe who held of the fame fuperior. Thus clanfhips were formed; and, in a generation or two, that confanguinity, which was at firft in a great meafure imaginary, was believed to be real. An artificial union was converted into a natural one: men willingly followed a leader, whom they regarded both as the fuperior of their lands and the chief of their blood; and ferved him not only with the fidelity of vaffals, but the affection of friends. Againft fuch men a king contended with great difadvantage; and that cold fervice, which money purchafes, or authority extorts, was not an equal match for their ardour and zeal.—Some imagine the word *clan* to be only a corruption of the Roman *colonia*; but Mr. Whittaker afferts it to be purely Britifh, and to fignify a *family*.

CLAP, in medicine, the firſt ſtage of the venereal diſeaſe, more uſually called a GONORRHOEA.

CLAP-*Net*, in birding, a ſort of net contrived for the taking of larks with a looking-glaſs, by the method called *daring* or *doring*. The nets are ſpread over an even piece of ground, and the larks are invited to the place by other larks faſtened down, and by a looking-glaſs compoſed of five pieces, and fixed in a frame ſo that it is turned round very ſwiftly backwards and forwards, by means of a cord pulled by a perſon at a conſiderable diſtance behind a hedge. See DORING.

CLAR, or CLAER, in metallurgy, bone-aſhes perfectly calcined, and finely powdered, kept purpoſely for covering the inſides of COPPELS.

CLARAMONT-POWDER, a kind of earth, called *terra de Baira*, from the place where it is found: it is famous at Venice, for its efficacy in ſtopping hemorrhages of all kinds, and in curing malignant fevers.

CLARE, (*Nuns of St.*) were founded at Aſſiſa in Italy, about the year 1212. Theſe nuns obſerved the rule of St. Francis, and wore habits of the ſame colour with thoſe of the Franciſcan friars: and hence were called *Minoreſſes*; and their houſe, without Aldgate, the Minories, where they were ſettled when firſt brought over into England, about the year 1293. They had only three houſes beſides this.

CLARE, St. a ſmall iſland, or rather rock, one of the Canaries, between Lancerota and Allagranza.

CLARE, a town of Suffolk, with a market on Monday. It is ſeated near the Stour. The ruins of a caſtle and of a collegiate church are ſtill viſible. They have a manufacture of bays. It is 15 miles S. of St. Edmund's Bury, and 56 N. E. of London. Long. 0. 36. E. Lat. 52. 12. N.

CLARE, a town of Ireland, capital of a county of the ſame name, 17 miles N. W. of Limerick. Lon. 8. 46. W. Lat. 52. 52. N.

CLARE, a county of Ireland, in the province of Munſter, 55 miles in length, and 38 in breadth; bounded on the E. and S. by the Shannon, which ſeparates it from Tipperary, Limerick, and Kerry; on the W. by the Ocean, and on the N. by Galway. It contains two market-towns and 76 pariſhes, and ſends four members to parliament.

CLARENCIEUX, the ſecond king at arms, ſo called from the duke of Clarence, to whom he firſt belonged: for Lionel, 3d ſon to Edward III. having by his wife the honour of Clare in the county of Thomond, was afterwards declared duke of Clarence; which dukedom afterwards eſcheating to Edward IV. he made this earl a king at arms. His office is to marſhal and diſpoſe of the funerals of all the lower nobility, as baronets, knights, eſquires, on the ſouth ſide of the Trent; whence he is ſometimes called *ſurroy* or *ſouth-roy*, in contradiction to *norroy*.

CLARENDON (Conſtitutions of), certain conſtitutions made in the reign of Henry II. A. D. 1164, in a parliament held at Clarendon; whereby the king checked the power of the pope and his clergy, and greatly narrowed the total exemption they claimed from ſecular juriſdiction.

CLARENDON (Earl of). See HYDE.

CLARENZA, the capital of a duchy of the ſame name in the Morea: it is a ſea-port town, ſituated on the Mediterranean. E. long. 21. 40. N. lat. 37. 40.

CLARET, a name given by the French to ſuch of their red wines as are not of a deep or high colour. See WINE.

CLARICHORD, or MANICHORD, a muſical inſtrument in form of a ſpinet. It has 49 or 50 ſtops, and 70 ſtrings, which bear on five bridges: the firſt whereof is the higheſt, the reſt diminiſhing in proportion. Some of the ſtrings are in uniſon, their number being greater than that of the ſtops. There are ſeveral little mortiſes for paſſing the jacks, armed with braſs hooks, which ſtop and raiſe the chords inſtead of the feather uſed in virginals and ſpinets: but what diſtinguiſhes it moſt is, that the chords are covered with pieces of cloth, which render the ſound ſweeter, and deaden it ſo that it cannot be heard at any conſiderable diſtance: whence it comes to be particularly in uſe among the nuns, who learn to play, and are unwilling to diſturb the ſilence of the dormitory.

CLARIFICATION, the act of clearing or fining any fluid from all heterogeneous matter or fæculence. The ſubſtances uſually employed for clarifying liquors, are whites of eggs, blood, and iſinglaſs. The two firſt are uſed for ſuch liquors as are clarified whilſt boiling hot; the laſt for thoſe which are clarified in the cold, ſuch as wines, &c. The whites of eggs are beat up into a froth, and mixed with the liquor, upon which they unite with and entangle the impure matters that float in it; and preſently growing hard by the heat, carry them up to the ſurface in form of a ſcum no longer diſſoluble in the liquid. Blood operates in the ſame manner, and is chiefly uſed in purifying the brine from which ſalt is made. Great quantities of iſinglaſs are conſumed for fining turbid wines. For this purpoſe ſome throw an entire piece, about a quarter of an ounce, into a wine caſk; by degrees the glue diſſolves, and forms a ſkin upon the ſurface, which at length ſubſiding, carries down with it the fæculent matter which floated in the wine. Others previouſly diſſolve the iſinglaſs; and having brought it to a ſlimy conſiſtence, mix it with the liquor, roll the caſk about, and then ſuffer it to ſtand to ſettle.

CLARIGATIO, in Roman antiquity, a ceremony that always preceded a formal declaration of war. It was performed in this manner: firſt, four heralds, crowned with vervain, were ſent to demand ſatisfaction for the injuries done to the Roman ſtate. Theſe heralds taking the gods to witneſs that their demands were juſt, one of them, with a clear voice, demanded reſtitution within a limited time, commonly 33 days; which being expired without reſtitution made, then the *pater patratus*, or prince of the heralds, proceeded to the enemy's frontiers, and declared war.

CLARION, a kind of trumpet, whoſe tube is narrower, and its tone acuter and ſhriller than that of the common trumpet. It is ſaid that the clarion now uſed among the Moors and Portugueſe, who borrowed it from the Moors, ſerved anciently for a treble to ſeveral trumpets, which ſounded tenor and baſs.

CLARISSES, an order of nuns ſo called from their founder St. Clara or St. Clare. (See CLARE.) She was in the town of Aſſiſa in Italy; and having renounced the world to dedicate herſelf to religion, gave birth to this order in the year 1212; which comprehends not only thoſe nuns that follow the rule of St. Francis, according to the ſtrict letter, and without any mitigation, but thoſe likewiſe who follow the ſame rule ſoftened and mitigated by ſeveral popes. It is at preſent one of the moſt flouriſhing orders of nuns in Europe. After Ferdinand Cortez had conquered Mexico for the king of Spain, Iſabella of Portugal, wife of the emperor Charles V. ſent thither ſome nuns of the order of St. Clara, who made ſeveral ſettlements there. Near their monaſteries were founded communities of Indian young women, to be inſtructed by the Clariſſes in religion, and ſuch works as were ſuitable to perſons of their ſex. Theſe communities are ſo conſiderable, that they uſually conſiſt of four or five hundred.

CLARKE (Dr. Samuel), a very celebrated Engliſh divine, was the ſon of Edward Clarke, Eſq. alderman of Norwich, and one of its repreſentatives in parliament for ſeveral years; and born there Oct. 11, 1675. His writings are numerous, and well known in the literary world. He died May 17th, 1729, in his 54th year. Dr. Clarke married Catharine, the daughter of the Rev. Mr. Lockwood, rector of Little Miſſingham in Norfolk; in whoſe good ſenſe and unblamable behaviour he was

happy to his death. By her he had feven children, two of whom died before him, and one a few weeks after him. A well drawn though concife delineation of the character of this great divine appeared fome years fince in the Gentleman's Magazine.

CLARO OBSCURO, or CLAIR-OBSCURE, in painting, the art of diftributing to advantage the light and fhadow of a piece, both with refpect to the eafing of the eye, and the effect of the whole piece. See PAINTING.

CLARO *Obfcuro*, or *Chiaro-fcuro*, is alfo ufed to fignify a defign confifting only of two colours, moft ufually black and white, but fometimes black and yellow; or it is a defign wafhed only with one colour, the fhadows being of a dufky brown, and the lights heightened up by white. The word is alfo applied to prints of two colours taken off at twice, whereof there are volumes in the cabinets of thofe who are curious in prints.

CLARY, in botany. See SALVIA.

CLASMIUM, in natural hiftory, the name of a genus of foffils, of the clafs of the gypfums; the characters of which are, that they are of a foft texture, and of a dull opaque look, being compofed, as all the other gypfums, of irregularly arranged flat particles. The word is derived from the Greek κλασμα, a fragment or fmall particle; from the flaky fmall particles of which thefe bodies are compofed. Of this genus there is only one known fpecies: this is of a tolerably regular and even ftructure; though very coarfe and harfh to the touch. It is of a very lively and beautiful red colour; and is found in thick roundifh maffes, which, when broken, are to be feen compofed of irregular arrangements of flat particles; and emulating a ftriated texture. It will neither give fire with fteel nor ferment with acids; but calcines very freely and eafily, and affords a very valuable plafter of Paris, as do all the purer gypfums. It is common in Italy, and is greatly efteemed there; it is alfo found in fome parts of England, particularly Derbyfhire, but there it is not much regarded.

CLASPERS, or TENDRILS. See CIRRUS.

CLASS, an appellation given to the moft general fubdivifions of any thing: thus, *animal* is fubdivided into the claffes of quadrupeds, birds, fifhes, &c. which are again fubdivided into feriefes or orders; and thefe laft into genera. See BOTANY and ZOOLOGY.

CLASS is alfo ufed in fchools, in a fynonymous fenfe with *form*, for a number of boys all learning the fame thing.

CLASSIC, or CLASSICAL, an epithet chiefly applied to authors read in the claffes at fchools. This term feems to owe its origin to Tullius Servius, who, in order to make an eftimate of every perfon's eftate, divided the Roman people into fix bands, which he called *claffes*. The eftate of the firft clafs was not to be under 200l. and thefe, by way of eminence, were called *claffici*, "claffics": hence authors of the firft rank came to be called *claffics*, all the reft being faid to be *infra claffem*: thus Ariftotle is a claffic author in philofophy; Aquinas in fchool divinity, &c.

CLASSICUM was the alarm for battle, given by the Roman generals; and founded by trumpets and other martial mufic throughout the army.

CLATHRI, in antiquity, bars of wood or iron, ufed in fecuring doors and windows. There was a goddefs called *Clathra*, that prefided over the clathri.

CLAVARIA, CLUB-TOP; a genus belonging to the cryptogamia clafs of plants, and of the order of fungi; the 58th in the natural method. The fungus is fmooth and oblong. The hemotades, or oak leather club top, exactly refembles tanned leather, except that it is thinner and fofter. It is of no determinate form. It grows in the clefts and hollows of old oaks, and fometimes on afh in Ireland and in fome places of England, &c. In Ireland it is ufed to drefs ulcers, and in Virginia to fpread plafters upon, inftead of leather. The militaris, and one or two other fpecies, are remarkable for only growing on the head of a dead infect in the nympha ftate. Mr. Miller has afferted the whole genus of clavaria to belong to the tribe of *zoophytes*, that is, to the animal, and not to the vegetable kingdom. According to his method, he ranks them among the Vermes, under a fubdivifion which he terms *Fungofa ofculis atomiferis*; thereby underftanding them to be compound animals with many orifices on their furface, from which are protruded atoms or animalcules which have a vifible fpontaneous motion, fomething fimilar to what is now acknowledged to be a fact with regard to a numerous clafs of marine bodies termed *corallines*. This motion, however, has not been obferved by other naturalifts. Schæffer has figured the feeds of feveral clavariæ as they appeared to him through the microfcope; and none of thefe fungi, when burnt, emit the ftrong difagreeable fmell peculiar to animal fubftances.

CLAVARIUM, in antiquity, an allowance the Roman foldiers had for furnifhing nails to fecure their fhoes with. They raifed frequent mutinies, demanding largeffes of the emperors under this pretence.

CLAVATA VESTIMENTA, in antiquity, habits adorned with purple clavi, which were either broad or narrow. See CLAVUS.

CLAUDE *of* LORRAIN, or *Claude Gelée*, a celebrated landfcape painter, and a ftriking example of the efficacy of induftry to fupply, or at leaft to call forth, genius. Claude was born in 1600; and being dull and heavy at fchool, was put apprentice to a paftry-cook: he afterwards rambled to Rome to feek a livelihood; but being very ill-bred, and unacquainted with the language, nobody cared to employ him. Chance threw him at laft in the way of Auguftino Traffo, who hired him to grind his colours, and to do all his houfehold drudgery, as he kept no other fervant. His mafter hoping to make him ferviceable to him in fome of his greateft works, taught him by degrees the rules of perfpective and the elements of defign. Claude at firft did not know what to make of thofe principles of art; but being encouraged, and not failing in application, he came at length to underftand them. Then his foul enlarged itfelf apace, and cultivated the art with wonderful eagernefs. He exerted his utmoft induftry to explore the true principles of painting by an inceffant examination of nature, that genuine fource of excellence; for which purpofe, he made his ftudies in the open fields; where he very frequently continued from funrife till the dufk of the evening compelled him to withdraw himfelf from his contemplations. It was his cuftom to fketch whatever he thought beautiful or ftriking; and every curious tinge of light, on all kinds of objects, he marked in his fketches with a fimilar colour; from which he perfected his landfcapes with fuch a look of real nature, and gave them fuch an appearance of truth, as proved fuperior to any artift that ever painted in that ftyle.

The beauties of his paintings are derived from nature herfelf, which he examined with uncommon affiduity; and Sandrat relates, that Claude ufed to explain to him, as they walked through the fields, the caufes of the different appearances of the fame profpect at different hours of the day, from the reflections or refractions of light, from dews or vapours, in the evening or morning, with all the precifion of a philofopher. He worked on his pictures with great care, endeavouring to bring them to perfection, by touching them frequently over again; and if any performance did not anfwer his idea, it was cuftomary with him to alter, to deface, and repaint it again feveral times over, till it correfponded with that image pictured in his mind. But whatever ftruck his imagination, while he obferved nature abroad, it was fo ftrongly impreffed on his memory, that, on his return to his work, he never failed to make the happieft ufe of it.

His ſkies are warm and full of luſtre, and every object is properly illumined. His diſtances are admirable, and in every part a delightful union and harmony not only excite our applauſe but our admiration. His invention is pleaſing, his colouring delicate, and his tints have ſuch an agreeable ſweetneſs and variety, as have been but imperfectly imitated by the beſt ſubſequent artiſts, but were never equalled. He frequently gave an uncommon tenderneſs to his finiſhed trees by glazing; and in his large compoſitions, which he painted in freſco, he was ſo exact that the diſtinct ſpecies of every tree might readily be diſtinguiſhed. As to his figures, if he painted them himſelf, they are very indifferent; and he was ſo conſcious of his deficiency in this reſpect, that he uſually engaged other artiſts who were eminent, to paint them for him; of which number were Courtois and Philippo Laura. His pictures are now very rare, eſpecially ſuch as are undamaged; and thoſe are at this time ſo valued, that no price, however great, is thought to be ſuperior to their merit. In order to avoid a repetition of the ſame ſubject, and alſo to detect ſuch copies of his works as might be injurious to his fame, by being ſold for originals, it was his cuſtom to draw (in a paper-book prepared for this purpoſe) the deſigns of all thoſe pictures which were tranſmitted to different countries; and on the back of the drawings, he wrote the name of the perſon who had been the purchaſer. That book, which he titled *Libro di Verita*, is now in the poſſeſſion of the duke of Devonſhire.

CLAUDIA, a veſtal virgin at Rome, who being ſuſpected of unchaſtity, is ſaid to have been cleared from that imputation in the following manner: the image of Cybele being brought out of Phrygia to Rome in a barge, and it happening to ſtick ſo faſt in the river Tyber that it could not be moved, ſhe tying her girdle, the badge of chaſtity, to the barge, drew it along to the city, which a thouſand men were unable to do.

Claudia *Lex, de Comitiis*, was enacted by M. Cl. Marcellus in the year of Rome 702. It ordained, that at public elections of magiſtrates, no notice ſhould be taken of the votes of ſuch as were abſent. Another, *de Uſurâ*, which forbad people to lend money to minors on condition of payment, after the deceaſe of their parents. Another, *de Negotiatione*, by Q. Claudius the tribune, 535. It forbad any ſenator or father of a ſenator to have any veſſel containing above 300 amphoræ, for fear of their engaging themſelves in commercial ſchemes. The ſame law alſo forbad the ſame thing to the ſcribes and the attendants of the quæſtors, as it was naturally ſuppoſed that people who had any commercial connections could not be faithful to their truſt, nor promote the intereſt of the ſtate. Another, 576, to permit the allies to return to their reſpective cities, after their names were inrolled. Liv. 41. c. 9. Another to take away the freedom of the city of Rome from the colóniſts which Cæſar had carried to Novicomum.

CLAUDIANUS (Claudius), a Latin poet, flouriſhed in the 4th century, under the emperor Theodoſius, and under his ſons Arcadius and Honorius.

CLAVES insulæ, a term uſed in the iſle of Man; where all weighty and ambiguous cauſes are referred to a jury of twelve, who are called *claves inſulæ*, the keys of the iſland.

CLAVICHORD, and Clavicitherium, two muſical inſtruments uſed in the 16th century. They were of the nature of the ſpinet, but of an oblong figure. The firſt is ſtill uſed by the nuns in convents; and that the practitioners may not diſturb the ſiſters in the dormitory, the ſtrings are muffled with ſmall bits of fine woollen cloth.

CLAVICLE. See Anatomy, page 166.

CLAVICYMBALUM, in antiquity, a muſical inſtrument with 30 ſtrings. Modern writers apply the name to our harpſichords.

CLAVI vestium, were flowers or ſtuds of purple interwoven with, or ſewed upon the garments of knights or ſenators; only, for diſtinction, the former uſed them narrow, the latter broad.

CLAVIS properly ſignifies a key; and is ſometimes uſed in Engliſh to denote an explanation of ſome obſcure paſſages of any book or writing.

CLAVIUS (Chriſtopher), a German Jeſuit born at Bamberg, excelled in the knowledge of the mathematics, and was one of the chief perſons employed to rectify the kalendar; the defence of which he alſo undertook againſt thoſe who cenſured it, eſpecially Scaliger. He died at Rome in 1612, aged 75. His works have been printed in five volumes folio; the principal of which is his commentary on Euclid's elements.

CLAUSE, in grammar, denotes a member of a period or ſentence. *Clauſe* ſignifies alſo an article or particular ſtipulation in a contract, a charge or condition in a teſtament, &c.

CLAUSENBURG, a large city of Tranſilvania, ſituated on the river Samos, in E. long. 20. 50. N. lat. 47. 10.

CLAVUS, in antiquity, an ornament upon the robes of the Roman ſenators and knights; which was more or leſs broad according to the dignity of the perſon: hence the diſtinction of tunica anguſti-clavia, and lati-clavia.

Clavus, in old writers on medicine and ſurgery, is a term uſed in ſeveral ſignifications: 1. Clavus hyſtericus, means a ſhooting pain in the head, between the pericranium and cranium. 2. Clavus oculorum, according to Celſus, is a callous tubercle on the white of the eye, taking its denomination from its figure. 3. Clavus alſo imports indurated tubercles of the uterus. 4. It alſo imports a chirurgical inſtrument of gold, mentioned by Amatus Luſitanus, deſigned to be introduced into an ulcerated palate, for the better articulation of the voice. And 5. It ſignifies a callus, or corn on the foot.

Clavus *Annalis*, in antiquity. So rude and ignorant were the Romans towards the riſe of their ſtate, that the driving or fixing a nail was the only method they had of keeping a regiſter of time; for which reaſon it was called *clavus annalis*. There was an ancient law, ordaining the chief prætor to fix a nail every year on the Ides of September; it was driven into the right ſide of the temple of Jupiter Opt. Max. towards Minerva's temple. This cuſtom of keeping an account of time by means of fixing nails, was not peculiar to the Romans; for the Etrurians uſed likewiſe to drive nails into the temple of their goddeſs Nortia with the ſame view.

CLAW, among zoologiſts, denotes the ſharp-pointed nails with which the feet of certain quadrupeds and birds are furniſhed.

CLAY, in natural hiſtory, a ſort of earth to which former chemiſts gave the name of argillaceous, but which has ſince received the title of *alumine*. See Chemistry, page 427.

The principal natural ſpecimens of argillaceous earth are clays, properly ſo called, marles, boles, ſlates or ſchiſtus, and mica. In none of theſe, except the ſlag-ſtone, does the argillaceous earth amount to ſo much as half their weight, though their predominating qualities appear to depend upon it. The moſt obvious characters of this earth are, an adheſion to the tongue, or any wet and ſoft body, in the more ſolid ſpecimens; and a remarkable tenacity, ductility, or kneadability ſerve to diſtinguiſh moiſtened clays in a moſt eminent degree. It is ſoluble in acids; but alkalis act much leſs upon it, either in the dry or moiſt way, than they do on ſiliceous earth. Alum is a combination of argillaceous earth with vitriolic acid. If the concrete volatile alkali be added to a ſolution of pure alum, the alkali and acid unite, while the clay falls to the bottom, united only with a ſmall quantity of fixed air. The fluid muſt be abſtracted by decantation, and the precipitate waſhed with diſtilled water, and dried.

Clays may be eaſily diffuſed and ſuſpended in water, but are

not ſoluble in any ſenſible degree. The ſudden application of ſtrong heat hardens their external parts, which afterwards burſt by the exploſion of the moiſture within. By a more gradual heat pure clay contracts very much, becomes hard, and full of cracks or fiſſures. The preſence of ſiliceous earth in common clays, where it uſually conſtitutes above half the weight, renders the contraction more uniform throughout, and prevents the cracks; probably in no other way than by rendering them more numerous, and too ſmall to be perceived. When thus baked, it conſtitutes all the varieties of bricks, pottery, and porcelain. Theſe, if baked in a ſtrong heat, give fire with ſteel; a property that may be attributed to the ſiliceous earth they contain, which cannot act on the ſteel unleſs firmly ſet in the hardened clay. The dimenſions of pottery are leſs, the greater the heat to which the article has been ſubjected. On this property is conſtructed a thermometer for meaſuring the heat of furnaces, by igniting a ſmall brick of known dimenſions therein, and afterwards meaſuring its contraction. Baked clay is no longer kneadable with water, though as finely pulverized as mechanical means can go. Hence it has been inferred, that clays owe their ductility to a kind of gluten, which is ſuppoſed to be diſſipated by heat. They recover that property, however, by a ſolution in an acid and precipitation; whence it ſhould ſeem to depend either on a minute portion of acid contained in clays, or the ſmallneſs of the particles when precipitated. The principal ſpecies of the argillaceous earths or clays naturaliſts have heretofore deſcribed thus:

1. The *argilla aërata*, or *lac lunæ*. It is generally found in ſmall cakes of the hardneſs of chalk; like which, alſo, it marks white. Its hardneſs is nearly like that of the ſteatites, and it feels leſs fat than clays commonly do. It is of a ſnow-white colour, and about the ſpecific gravity of 1.669.

2. The *argilla apyra*, porcelain clay, the kaolin of the Chineſe, is very refractory in the fire, and cannot in any common ſtrong fire be brought into fuſion farther than to acquire a tenacious ſoftneſs without loſing its form. When broken, it has then a dim ſhining appearance, and is of a ſolid texture; ſtrikes fire with ſteel; and has conſequently the beſt chemical properties of any ſubſtance whereof veſſels can be made. It is found of an excellent quality in Japan, and likewiſe in different parts of Europe.

3. Clays combined with phlogiſton, and including the white tobacco-pipe clay, with others of a grey, black, or violet colour. Mr. Kirwan obſerves, that many of the white clays become grey in a low degree of heat, becauſe the mineral oil with which they are mixed burns to a kind of coal, and tinges them; but this being conſumed in a ſtronger heat, they again become white.

4. The *lithomarga*, or ſtone-marrow, when dry, feels as fat and ſlippery as ſoap, but is not wholly diffuſible in water. When mixed with this fluid, it falls to pieces either in larger or ſmaller maſſes, ſo as to aſſume the appearance of curds. In the fire it readily melts into a white or reddiſh frothy ſlag; which, in conſequence of its internal vacuities, is then of a larger volume than it formerly was. In the maſs it breaks into irregular ſcaly pieces. This kind is called fuller's earth *(waklera)* in Sweden. In Crim Tartary it is called *keffekil*; and is ſaid to be uſed there inſtead of ſoap, for waſhing. It is alſo found in the Auſtrian Flanders in the barony of Hierges. To this ſpecies alſo belongs the yellowiſh brown earth called *terra lemnia*; which is of a ſhining texture, and falls to pieces in water with a crackling noiſe. According to Mr. Bergman, this is a compound of the argillaceous, ſiliceous, and magneſian earths. Its component parts are the ſame as thoſe of the talc, but looſer, and in different proportions. M. Cronſtedt remarks, that "the terra lemnia cannot properly be called a fuller's earth, as it is never uſed in the fulling buſineſs, nor is likely to be applicable to it, as being beſides very ſcarce. The true fuller's earth of England agrees entirely with the deſcription of the ſtone-marrow already given, and in colour and texture reſembles that from Sweden, which is compoſed of coarſe particles. The Hampſhire fuller's earth is of a duſky brown, inclining to green, with veins of a faint yellow; and contains a ſmall portion of muriatic acid, and of a yellow oily matter. Every fine clay that does not communicate a colour, is in general fit for the buſineſs of fulling; even the excrements of hogs, mixed with human urine, are uſed for this purpoſe in various woollen manufactures. The properties required in a good fuller's earth are, that it ſhall carry off the oily impurities of the woollen cloth, and at the ſame time thicken it by cauſing the hairs or fibres to curl up. The beſt is compoſed of fine ſiliceous earth with argilla, and a little calcareous earth without vitriolic acid: a little martial calx, however, is not hurtful, if unattended with any active menſtruum. The terra lemnia is ſo called from the iſland of Lemnos, now Statimane, in the Ægean Sea, from whence it is procured.

5. *Bolus*, bole, or iron-clay, is a fine and denſe clay of various colours, containing a large quantity of iron; ſo that it is very difficult, or even impoſſible, to know the natural and ſpecific qualities of the bole itſelf. It is not ſo eaſily ſoftened in water when indurated as the porcelain and common clays; but either falls to pieces in the form of ſmall grains, or repels the water, and cannot be made ductile. In the fire it grows black, and is then attracted by the loadſtone. Mr. Kirwan thinks the term *bole* a word of ſuch uncertain ſignification, that it ought to be baniſhed from common uſe, or at leaſt from every mineralogical treatiſe. The ſoft boles are of various colours, as red, yellow, green, grey, and blueiſh grey. The red kind is that named *Armenian bole*; an indurated kind of which affords the material for the red pencils. The indurated bole or ſlate is of a reddiſh brown or grey colour, and is found in moſt collieries between the ſeams of coals.

6. With ſcaly particles, the *horn-blende* of the Swedes. This is called *horn rock-ſtone* by Wallerius, who places it among the apyrous ſtones; but Linnæus has put it among the calcareous ſtones by the name of *horn-ſlag*, *talcum corneum*. It is named *talcum ſtriatum* by Rinman, and has the following properties: Its ſpecific gravity is never leſs than 2.660, but frequently 3.880. It has a ſtrong earthy ſmell, which is particularly ſenſible on breathing upon it, or pouring hot water on it. It poſſeſſes a toughneſs or viſcidity, which is perceived on pounding it in a mortar, as is the caſe with mica and horn; from which laſt it derives its name. When pounded it affords a greeniſh grey powder. Laſtly, it is ſaid to be fuſible *per ſe*; though Mr. Kirwan informs us, that he could never melt this ſtone even by the aſſiſtance of a blow-pipe. This ſtone is frequently mixed with pyrites. It is diſtinguiſhed from the martial glimmer of mica by the ſcales being leſs ſhining, thicker, and rectangular. It is of two kinds, black and greeniſh. The former, when rubbed fine, affords a green powder. It is the *corneum nitens* of Wallerius, and is either of a lamellated or granular texture; the former being ſometimes ſo ſoft as to be ſcraped with the nail, and its ſurface frequently as gloſſy as if it had been greaſed; the ſpecific gravity being from 3600 to 3880.

7. The *zeolite* was firſt diſcovered by Cronſtedt, and by him reckoned a genus diſtinct from every other; but on a proper chemical analyſis, both Kirwan and Bergman have reckoned them among the argillaceous earths; and here M. Magellan obſerves, that "it is not ſo much the quantity as the intenſity or predominance of property that ſhould in general direct us in the claſſification of mineral bodies; not to mention, that if the rule reſpecting *quantity* were rigorouſly adhered to, the two primitive earths, magneſia and argil, would not be found

among the earths; which would doubtless be an absurdity, as Bergman has rightly observed."

The properties of zeolite are these: It is a little harder than the fluors, and other calcareous spars; but is scratched by steel, and does not strike fire with it. It melts easily in the fire, with an ebullition like borax, into a white frothy slag. It dissolves more readily in the fire by the help of mineral alkali, than that of borax or microcosmic salt. It does not ferment with the latter as lime does, nor with the former as those of the gypseous kind. It dissolves very slowly, and without effervescence, in acids, as oil of vitriol and spirit of nitre. Lastly, the fusible kinds, in the very moment of fusion, emit a phosphoric light. In general the zeolites are of a very crystalline form, composed of imperfect pyramids turned towards a common centre; their form is sometimes globular, but seldom prismatic. To the species of zeolite also belongs the lapis lazuli, from which ultramarine is made.

The *sparry* zeolite resembles a calcareous spar; but is of a more irregular figure, as well as more brittle. It is found in Sweden of a light red or orange colour. The *crystallized* zeolites are met with in greater plenty than the other kinds; and are found in Sweden of various forms and colours. Brunich informs us, that in the north, the countries of the zeolites and of the chalcedony and casholong, pieces are shown as curiosities, in which the zeolite is inclosed in the chalcedony; but this is not sufficient to prove that the one was produced from the other. Cronstedt observes, that the zeolites have nearly the same qualities in the fire as the boles.

8. *Tripoli*, used in polishing hard substances. See Tripoli.

9. The common, or *brick clay*, has the following properties: It acquires a red colour, more or less deep in the fire. It melts pretty easily into a greenish glass. It consists of a mixture of alumine or pure clay, with siliceous and martial earth, containing also a small quantity of vitriolic acid. It is found in a state of purity of various colours, as red, pale-red, grey, and blue. In some provinces of Sweden a white kind is met with, often in a slaty form, with fine sand between its strata; which when burnt is of a paler colour than any of the preceding, and does not cake well in the fire; it is also more fusible than any of them. In this country also is found a species called, by Cronstedt, *fermenting clay, argilla intumescens*. It is very like the preceding as to the external appearance and other qualities. This kind of clay is also found mixed with calcareous earth, in which case it is called Marle. It is also found in an indurated state, and that either pure or mixed with phlogiston and a large quantity of vitriolic acid: in which case it constitutes the ore of alum. It is also found in this state mixed with calcareous earth, forming stone marle.

10. *Argillaceous fossile stones*. The most remarkable of these are, 1. The *schistus tegularis*, or common house slate, which, according to Mr. Kirwan, contains 26 parts of argillaceous earth; 46 of siliceous; 8 of magnesia; 4 of calcareous earth; and 14 of iron. Part of the iron seems to be phlogisticated by a mineral oil united with it; and part dephlogisticated, or in a red calx. This last is united to the argillaceous part as well as to the siliceous, and cannot be separated without great difficulty. The colour of this slate varies to the pale, to the slightly purple, and to the blueish. The laminæ of the last are thicker, their texture coarser, and they contain more siliceous earth and less iron than the foregoing. Other stones are also made use of for covering houses; but their laminæ are much thicker, their surface more uneven, and their texture coarser. They belong chiefly to the sand stones, or to the calcareous kinds. 2. The *pyritaceous schistus*, to which also belongs that from which alum is made, is of a grey, blue, brown, or black colour; and is more or less decomposable by its exposure to air, according to the quantity of the pyrites, and the state of the iron in it. When the iron is in a semi-phlogisticated state, the schistus will be easily decomposed; but much more slowly, if at all, when the calx is much dephlogisticated. 3. The *bituminous schistus* is generally black, of a lamellar texture, and various degrees of hardness. It never gives fire with steel, but emits a strong smell when heated, and sometimes without being heated. When scraped it does not produce any white mark like the other schistus. M. Magellan mentions a specimen found in Yorkshire which burned like coal, with a strong smell of bitumen.—There are various other species of argillaceous earths, as the flag-stone, sand or free stone, toadstone, &c. for a description of which see those articles.

Clays are of very extensive use in common life. Some varieties of the porcelain clay become perfectly white in the fire; and it is not to be doubted but these are used in the porcelain manufactories. The indurated porcelain clay, however, cannot be easily heated without cracking; and therefore we can go no great length in hardening it. The boles have lost their value as medicines; but are still employed to make bricks, potter's ware, &c. Tripoli is of indispensable use in the business of polishing, and is likewise, on many occasions, used for making moulds to cast metals in.

In agriculture, clay is indispensably necessary; excepting, however, according to Cronstedt, the white and fermenting clays above mentioned, for which no use has yet been discovered. By its coherence, clay retains humidity; on which perhaps its chief power of promoting vegetation depends. Clay is also used in the refining of sugar; for which no other property is requisite than that it may not dry too soon: but that species used in fulling must, if we were to judge *à priori*, besides the fineness of its particles, be of a dry nature, or such as attracts oils; though this quality perhaps may not be found in all those clays that are now employed in the business. According to Fabroni, the pure white clay being calcined in a strong heat, acquires a phosphorescent quality.

Clay, a town of Norfolk in England, seated on an arm of the sea between two rivers 20 miles N. W. of Norwich, in E. long. 0. 30. N. lat. 47. 28.

Clay-*Lands*, those abounding with clay, whether black, blue, yellow, white, &c. of which the black and the yellow are the best for corn. See Husbandry.

CLAYTONIA, in botany; a genus of the monogynia order, belonging to the pentandria class of plants: and in the natural method ranking under the 13th order, *Succulentæ*. The calyx is bivalved; the corolla pentapetalous; the stigma trifid; the capsule trivalved, unilocular, and trispermous. There are two species, natives of America. They are very low herbaceous plants, with white flowers; and are possessed of no remarkable property.

CLEANTHES, a stoic philosopher, disciple of Zeno, flourished 240 years before Christ. He maintained himself in the day by working in the night: being questioned by the magistrates how he subsisted, he brought a woman for whom he kneaded bread, and a gardener for whom he drew water; and refused a present from them. He composed several works, of which there are now only a few fragments remaining.

CLEAR, as a naval term, is variously applied to the weather, the sea-coasts, cordage, navigation, &c. The weather is said to be clear when it is fair and open, as opposed to cloudy or foggy. The sea-coast is called clear when the navigation is not interrupted, or rendered dangerous by rocks, sands or breakers, &c. It is expressed of cordage, cables, &c. when they are unembarrassed or disentangled, so as to be ready for immediate service. It is usually opposed to *foul* in all these senses.

CLEATS, in naval affairs, pieces of wood having one or

two projecting ends whereby to faften the ropes: fome of them are faftened to the fhrouds below for this purpofe, and others nailed to different places of the fhip's deck or fides.

CLECHE, in heraldry, a kind of crofs, charged with another crofs of the fame figure, but of the colour of the field.

CLEDGE, among miners, denotes the upper ftratum of fuller's earth.

CLEDONISM, Cledonismus, a kind of divination, in ufe among the ancients. The word is formed from κληδων, which fignifies two things, *rumor* "a report," and *avis* "a bird." In the firft fenfe, cledonifm fhould denote a kind of divination drawn from words occafionally uttered. Cicero obferves, that the Pythagoreans made obfervation not only of the words of the gods, but of thofe of men; and accordingly believed the pronouncing of certain words, e. g. *incendium*, at a meal, very unhappy. Thus, inftead of prifon, they ufed the word *domicilium*; and to avoid *erinnys*, furies, faid *eumenides*. In the fecond fenfe, *cledonifm* fhould feem a divination drawn from birds; the fame with ornithomantia.

CLEEVERS, in botany. See Galium.

CLEF, or Cliff, in mufic, derived from the Latin word *clavis*, "a key:" becaufe by it is expreffed the fundamental found in the diatonic fcale, which requires a determined fucceffion of tones or femitones, whether major or minor, peculiar to the note from whence we fet out, and refulting from its pofition in the fcale. Hence, as it opens a way to this fucceffion, and difcovers it, the technical term *key* is ufed with great propriety. But clefs rather point out the pofition of different mufical parts in the general fyftem, and the relations which they bear one to another. A clef, fays Rouffeau, is a character in mufic placed at the beginning of a ftave, to determine the degree of elevation occupied by that ftave in the general claviary or fyftem, and to point out the names of all the notes which it contains in the line of that clef.

Anciently the letters by which the notes of the gamut had been fignified were called *clefs*. Thus the letter A was the clef of the note *la*, C the clef of *ut*, E the clef of *mi*, &c. In proportion as the fyftem was extended, the embarraffment and fuperfluity of this multitude of clefs were felt. Gui d'Arezzo, who had inverted them, marked a letter or clef at the beginning of each line in the ftave; for as yet he had placed no notes in the fpaces. In procefs of time they marked no more than one of the feven clefs at the beginning of one of the lines only; and this was fufficient to fix the pofition of all the reft, according to their natural order: at laft, of thefe feven lines or clefs they felected four, which were called *claves fignatæ*, or *difcriminating clefs*; becaufe they fatisfied themfelves with marking one of them upon one of the lines, from which the powers of all the others might be recognized. Prefently afterwards they even retrenched one of thefe four, viz. the gamma, of which they made ufe to mark the *fol* below, that is to fay, the hypoproflambanomene added to the fyftem of the Greeks.

In reality Kircher afferts, that if we underftood the characters in which the ancient mufic was written, and examined minutely the forms of our clefs, we fhould find that each of them reprefents the letter a little altered in its form, by which the note was originally named. Thus the clef of *fol* was originally a G, the clef of *ut* a C, and the clef of *fa* F.

We have then three clefs, one a fifth above the other: the clef of F, or *fa*, which is the loweft; the clef of *ut*, or C, which is a fifth above the former; and the clef of *fol* or G, which is a fifth above that of *ut* (See Plate 79). It is neceffary to remark, that according to ancient practice, the clef is always placed upon a line, and never in a fpace. It deferves notice alfo, that the clef of *fa* is marked in three different ways: one in mufic, which is printed; another in mufic, which is written or engraven; and a third, in the full harmony of the chorus. By adding four lines above the clef of *fol*, and three lines beneath the clef of *fa*, which gives both above and below the greateft extent of permanent or eftablifhed lines, it appears, that the whole fcale of notes which can be placed upon the gradations relative to thefe clefs amounts to 24; that is to fay, three octaves and a fourth from the F, or *fa*, which is found beneath the firft line, to the *fi*, or B, which is found above the laft, and all this together forms what we call the *general claviary*; from whence we may judge, that this compafs has, for a long time, conftituted the extent of the fyftem. But as at prefent it is continually acquiring new degrees, as well above as below, the degrees are marked by leger lines, which are added above or below as occafion requires.

Inftead of joining all the lines, as has been done by Rouffeau in his Dictionary, plate A, fig. 5, to mark the relation which one clef bears to another, they feparate them five by five; becaufe it is pretty nearly within the degrees to which the compafs of ordinary voices extends. This collection of five lines is called a *ftave*; and in thefe they place a clef, to determine the names of the notes, the pofitions of femitones, and to fhew what ftation the ftave occupies in the claviary or general fcale.

In whatever manner we take five fucceffive lines in the claviary, we fhall find one clef comprehended; nay, fometimes two; in which cafe one may be retrenched, as ufelefs. Cuftom has even prefcribed which of the two fhould be retrenched, and which retained; it is this likewife which has determined the number of pofitions affigned to each clef. If I form a ftave of the firft five lines in the claviary, beginning from below, I find the clef of *fa* in the fourth line. This then is one pofition of the clef, and this pofition evidently relates to the loweft note; thus likewife it is that of the bafs clef. If I wifh to gain a third in afcent, I muft add a line above; I muft then obliterate one below, otherwife the ftave will contain more than five lines. The clef of *fa* then is found transferred from the fourth to the third, and the clef of *ut* is likewife found upon the fifth; but as two clefs are ufelefs, they retrench here that of *ut*. It is evident, that the ftave of this clef is a third higher than the former.

By throwing away ftill one line below to gain another above, we have a third kind of ftave, where the clef of *fa* will be found upon the fecond line, and that of *ut* upon the fourth. Here we leave out the clef of *fa*, and retain that of *ut*. We have now gained another third above, and loft it below. By continuing thefe alterations from line to line, we pafs fucceffively through four different pofitions of the clef of *ut*. Having arrived at that of *fol*, we find it placed upon the fecond line, and then upon the firft. This oppofition includes the five higheft lines, and gives the fharpeft diapafon which the clefs can fignify. Our readers may fee in Rouffeau's Mufical Dictionary, plate A. fig. 5, this fucceffion of clefs from the loweft to the higheft; which in all conftitutes eight ftaves, clefs, or different pofitions of clefs.

Whatever may be the character and genius of any voice or inftrument, if its extent above or below does not furpafs that of the general claviary, in this number may be found a ftation and clef fuitable to it; and there are, in reality, clefs determined for all the parts in mufic. If the extent of a part is very confiderable, fo that the number of lines neceffary to be added above or below may become inconvenient, the clef is then changed in the courfe of the mufic. It may be plainly perceived by the figure, what clef is neceffary to choofe, for raifing or depreffing any part, under whatever clef it may be actually placed. It will likewife appear, that, in order to adjuft one clef to another, both muft be compared by the general cla-

viary, by means of which we may determine what every note under one of the clefs is with respect to the other. It is by this exercise repeated that we acquire the habit of reading with ease all the parts.

From this manœuvre it follows, that we may place whatever note we please of the gamut upon any line or space whatever of the stave, since we have the choice of eight different positions, which is equal to the number of notes in the octave. Thus you may mark a whole tune upon the same line, by changing the clef at each gradation. The 7th fig. of the same plate in Rousseau's Musical Dictionary, to which we formerly referred, shows by the series of clefs the order of the notes, *re, fa, la, ut, mi, sol, si, re*, rising by thirds, although all placed upon the same line. The fig. following represents upon the order of the same clefs the note *ut*, which appears to descend by thirds upon all the lines of the stave, and further; which yet, by means of changing the clef, still preserves its unison. It is upon such examples as this, that scholars ought to exercise themselves, in order to understand at the first glance the powers of all the clefs, and their simultaneous effect. There are two of their positions, viz. the clef of *sol* upon the first line, and that of *fa* upon the third, which seem daily to fall more and more into desuetude. The first of these may seem less necessary, because it produces nothing but a position entirely similar to that of *fa* upon the fourth line, from which however it differs by two octaves. As to the clef of *fa*, it is plain, that in removing it entirely from the third line, we shall no longer have any equivalent position, and that the composition of the claviary, which is at present complete, will by these means become defective.

Thus much for Rousseau's account of clefs. He proceeds to explain their transposition; but as this would render this article too long and intricate, we refer to his *Musical Dictionary*, vol. 1. page 162. See also *Malcom's Dissertation on Music*.

CLEFT, in a general sense, is a space made by the separation of parts. Green timber is very apt to split and cleave in several places, after it is wrought into form; and these cracks in it are very disagreeable to the sight. A common piece of knavery with the country carpenters is to fill up these cracks with a mixture of grease and saw-dust; so that the deficiency is hardly seen.

Clefts, or *Cracks*, in farriery, appear most commonly on the pasterns, and are caused by a sharp and malignant humour. See Farriery.

CLEMA, in antiquity, a twig of the vine, which serves as a badge of the Centurion's office.

CLEMATIS, virgin's-bower; a genus of the polygynia order, belonging to the polyandria class of plants; and in the natural method ranking under the 26th order, *Multisiliquæ*. There is no calyx; the petals are four, rarely five; the seeds have a train. There are twelve species; all of which, except two, are shrubby climbing plants, very hardy, and adorned with quadrupetalous flowers of red, blue, purple, white, and greenish colours. They are very easily propagated by layers or cuttings. The vitis alba, one of the species, is very acrid to the taste, and without any smell. Surgeons have used it as a caustic, and for cleansing old ulcers. The root is said to be purgative. The leaves of all the species bruised and applied to the skin, burn it as it were into carbuncles; and if applied to the nostrils in a sultry day immediately after being cropped, will cause the same uneasy sensation as a flame applied to that part would occasion. Hence the title of *flammula*, or "little flame," by which this genus of plants was formerly distinguished.

CLEMENTINE, a term used among the Augustins, who apply it to a person who, after having been nine years a superior, ceases to be so, and becomes a private monk, under the command of a superior. The word has its rise hence; that pope Clement, by a bull, prohibited any superior among the Augustins from continuing above nine years in office.

Clementines, in the canon law, are the constitutions of pope Clement V. and the canons of the council of Vienne.

CLENARD (Nicholas), a celebrated grammarian in the 16th century, was born at Diest; and after having taught humanity at Louvain, travelled into France, Spain, Portugal and Africa. He wrote in Latin, 1. Letters relating to his Travels, which are very curious and scarce. 2. A Greek Grammar, which has been revised and corrected by many grammarians; and other works. He died at Grenoble in 1542.

CLEOBIS and BITON, two youths, sons of Cydippe the priestess of Juno at Argos. When oxen could not be procured to draw their mother's chariot to the temple of Juno, they put themselves under the yoke, and drew it 45 stadia to the temple, amidst the acclamations of the multitude, who congratulated the mother on account of the piety of her sons. Cydippe entreated the goddess to reward the piety of her sons with the best gift that could be granted to a mortal. They went to rest and awoke no more; and by this the goddess showed that death is the only true happy event that can happen to a man. The Argives raised them statues at Delphi.

CLEOME, in botany; a genus of the siliquosa order belonging to the tetradynamia class of plants; and in the natural method ranking under the 25th order, *Putamineæ*. There are three nectariferous glandules, one at each sinus of the calyx except the lowest; the petals all rising upwards; the siliqua unilocular and bivalved. There are 15 species; all of them, except two, natives of warm climates. They are herbaceous plants rising from one to two feet high; and are adorned with flowers of various colours, as red, yellow, flesh colour, &c. They are propagated by seeds, and require no other care than what is common to other exotics which are natives of warm countries.

CLEON, the name of several noted men of antiquity. 1. Of an Athenian, who, though originally a tanner, became general of the armies of the state by his intrigues and eloquence. He took Thoron in Thrace, and was killed at Amphipolis in a battle with Brasidas the Spartan general, Olymp. 89th. 2. A general of Messenia, who disputed with Aristodemus for the sovereignty. 3. A statuary. 4. A poet who wrote a poem on the Argonauts. 5. An orator of Halicarnassus who composed an oration for Lysander, in which he intimated the propriety of making the kingdom of Sparta elective. 6. A Magnesian who wrote some commentaries, in which he speaks of portentous events, &c.

CLEOPATRA, the celebrated queen of Egypt, was daughter of Ptolemy Auletes. By her extraordinary beauty, she subdued the two renowned Roman generals Julius Cæsar and Marc Antony: the latter of whom, it is thought, lost the empire of Rome by his attachment to her. At length, Marc Antony being subdued by Octavius Cæsar, she tried the force of her declining charms upon the conqueror, but in vain; upon which expecting no mercy from him, she poisoned herself, 30 years before Christ. According to some authors, she was the restorer of the Alexandrian library, to which she added that of Pergamos; and it is said, that she studied philosophy to console her for the absence of Antony. With her death ended the family of the Ptolemies in Egypt, after it had reigned from the death of Alexander 294 years: for Egypt, after this, was reduced to a Roman province; in which dependence it remained till it was taken from them by the Saracens, A. D. 641.

CLEOSTRATUS, a celebrated astronomer born in Tenedos, was, according to Pliny, the first who discovered the signs of the zodiac; others say, that he only discovered the signs Aries and Sagittarius. He also corrected the errors of the Grecian year about the 306th before Christ.

CLEPSYDRA, an instrument or machine serving to measure time by the fall of a certain quantity of water. The word comes from κλεπτω, *condo*, υδωρ, *aqua*, "water;" though there have likewise been clepsydræ made with mercury. The Egyptians, by this machine, measured the course of the sun. Tycho Brahe, in our days, made use of it to measure the motion of the stars, &c. and Dudley used the same contrivance in making all his maritime observations. The use of clepsydræ is very ancient; they were invented in Egypt under the Ptolemies; as were also sun-dials. Their use was chiefly in the winter; the sun-dials served in the summer. They had two great defects; the one, that the water ran out with a greater or less facility, as the air was more or less dense; the other, that the water ran more readily at the beginning than towards the conclusion. M. Amontons has invented a clepsydra free from both these inconveniences; and which has these three grand advantages, of serving the ordinary purpose of clocks, of serving in navigation for the discovery of the longitude, and of measuring the motion of the arteries. For a description and figure of a Clepsydra, see HYDROSTATICS.

CLERC (John le), called *Chevalier*, an eminent historical painter, was born at Nanci in 1587, but studied in Italy, where he resided for twenty years; and was a disciple of Carlo Venetiano, with whom he worked a long time, and whose style he so effectually studied and imitated, that several of the pictures which were finished by le Clerc were taken for the work of Venetiano. He was most highly esteemed at Venice for his extraordinary merit; and as a token of public respect, he was made a knight of St. Mark. His freedom of hand was remarkable; he had a light pencil; and in his colouring he resembled his master. He died in 1633.

CLERC (Sebastian le), engraver and designer in ordinary to the French king, was born at Metz in 1637. After having learnt designing, he applied himself to mathematics, and was engineer to the marshal de la-Ferté. He went to Paris in 1665, where he applied himself to designing and engraving with such success, that M. Colbert gave him a pension of 600 crowns. In 1672 he was admitted into the royal academy of painting and sculpture; and in 1680 was made professor of geometry and perspective in the same academy. He published, besides a great number of designs and prints, 1. A Treatise on theoretical and practical Geometry. 2. A Treatise on Architecture; and other works: and died in 1714.—He was an excellent artist, but chiefly in the petit style. His pictures seldom exceed the dimensions of six inches. Within those limits he could draw up 20,000 men with great dexterity. No artist, except Callot and Della Bella, could touch a small figure with so much spirit.

CLERC (George le) count de Buffon, a celebrated naturalist, was born at Montbard, in Burgundy, the 7th of September 1707: his father was a counsellor of the parliament of Dijon, and the son was destined to the same office, if science had not drawn him away from the law. He studied at Dijon; and his eager activity, his acuteness, penetration, and robust constitution, fitted him to pursue business and pleasure with equal ardour. His early passion was for astronomy, and the young le Clerc was never without Euclid in his pocket. At the age of twenty, he went with an English nobleman and his governor to Italy; but he overlooked the choicest remains of art, and, amidst the ruins of an elegant and luxurious people, he first felt the charms of natural history, whose zealous and successful admirer he afterwards proved. On his return to France, he fought, on some occasional quarrel, with an Englishman, whom he wounded, and was obliged to retire to Paris. He there translated Newton's Fluxions, from the Latin, and Hales's Statics from the English, into the French language. He afterwards came to England, at the age of twenty-five; and this journey concluded his travels: he staid here about three months. At the age of twenty-one, he succeeded to the estate of his mother, which was valued at about 300,000 livres (above 12,000 pounds sterling); and he was one of those whose easy or affluent circumstances urge on literary pursuits, and clear the path of some of its thorns. Perhaps this was the period of his retirement to Montbard, where he spent much time, and where his leisure was little interrupted; while, in the capital, his office of intendant of the king's garden and cabinet engaged much of his time. He loved much company, and was partial to the fair; but he loved glory more. He spent 14 hours every day in study; and, when we examine the extent of his knowledge, and the number of his works, we wonder at his having executed so much even in this time. At five in the morning he retired to a pavilion in his vast gardens, and he was then inaccessible. This was, as prince Henry of Prussia called it, the cradle of natural history; but she was indifferently accommodated. The walls were naked: an old writing-table, with pen, ink, and paper, and an elbow chair of black leather, were the only furniture of his study. His manuscripts were in a cabinet in another building, and he went occasionally from one to the other. The eras of Buffon's works are pretty well known. When each was finished, it was put aside, in order that he might forget it, and he then returned to it with the severity of a critic. He was anxious to have it perspicuous: and if those to whom he read his works hesitated a moment, he changed the passage. The works of others he read like Magliabechi, the titles, the contents, and the most interesting parts; but he read M. Necker's Compte Rendu, and the Administration of the Finances at length: he spoke of them also with no little enthusiasm. His favourite authors were Fenelon, Montesquieu, and Richardson.

M. de Buffon's conversation was unadorned, rarely animated, but sometimes very cheerful. He was exact in his dress, particularly in dressing his hair. He sat long at table, and then seemed at his ease. His conversation was, at this time, unembarrassed, and his guests had frequently occasion to notice some happy turn of phrase, or some deep reflection. His complaisance was very considerable: he loved praise, and even praised himself; but it was with so much frankness, and with so little contempt of others, that it was never disagreeable. Indeed, when we consider the extent of his reputation, the credit of his works, and the attention with which they were always received, we do not wonder that he was sensible of his own value. It would perhaps have displayed a stronger mind to have concealed it. His father lived to 93, and almost adored his son; his grandfather to 87; and the subject of the present article exceeded only 80. He died in April 1788. Fifty-six stones were found in his bladder; but if he had consented to the operation, he might probably have lived longer. One son remains; who near a high tower in the gardens of Montbard has placed a low column, with a concise inscription to his memory.

CLERGY, a general name given to the body of ecclesiastics of the Christian church, in contradistinction to the laity. See LAITY. The distinction of Christians into clergy and laity was derived from the Jewish church, and adopted into the Christian by the apostles themselves. Whenever any number of converts was made, as soon as they were capable of being formed into a congregation or church, a bishop or presbyter, with a deacon, were ordained to minister to them. Of the bishops, priests, and deacons, the clergy originally consisted; but in the third century, many inferior orders were appointed, as subservient to the office of deacon, such as ACOLUTHISTS, READERS, &c.

The Clergy have large privileges allowed them by our municipal laws; and had formerly much greater, which were abridged at the time of the reformation. The personal exemptions indeed for the most part continue: a clergyman cannot be

compelled to ſerve on a jury, nor to appear at a court-leet, or view of frank-pledge, which almoſt every other perſon is obliged to do: but if a layman is ſummoned on a jury, and before the trial takes orders, he ſhall notwithſtanding appear and be ſworn. Neither can he be choſen to any temporal office, as bailiff, reeve, conſtable, or the like; in regard of his own continual attendance on the ſacred function. During his attendance on divine ſervice, he is privileged from arreſts in civil ſuits. In caſes alſo of felony, a clerk in orders ſhall have the benefit of his clergy, without being branded in the hand; and may likewiſe have it more than once: in both which particulars he is diſtinguiſhed from a layman. But, as they have their privileges, ſo they have alſo their diſabilities, on account of their ſpiritual avocations. Clergymen are incapable of ſitting in the houſe of commons; and by ſtatute 21 Hen. VIII. c. 13. are not in general allowed to take any lands or tenements to farm, upon pain of 10l. per month, and total avoidance of the leaſe; nor, upon like pain, to keep any tap-houſe or brew-houſe; nor ſhall engage in any manner of trade, nor ſell any merchandize, under forfeiture of treble the value; which prohibition is conſonant to the canon law.

Benefit of CLERGY, was an ancient privilege of the Church, where one in orders claimed to be delivered to his ordinary, to purge himſelf of a felony; and after much contention between the eccleſiaſtical and temporal courts, it was at length agreed, that all *clerks* (among whom were reckoned *every perſon who could read*) who were indicted for any felony ſhould firſt be arraigned in the ſecular juriſdiction, and then claim his benefit of clergy, either by way of declinatory plea, or in arreſt of judgment. When this claim was allowed, the clerk was delivered to the ordinary to make his *purgation*, which was done by exculpating himſelf on his own oath, and the oaths of twelve *compurgators*; and by this purgation, as it was called, the party eaſily obtained his liberty. By the 4 Hen. 7. c. 13. a perſon convicted of felony, not being in *holy orders*, ſhall be burned in the brawn of the left thumb, before he is delivered to the ordinary, and not be admitted to clergy a ſecond time. But by 18. Eliz. c. 7. inſtead of being delivered to the ordinary, he ſhall be diſcharged or detained in priſon at diſcretion, not longer than *one year*. By 5 Ann. c. 6. the neceſſity of being able to read, in order to entitle a perſon to claim the benefit of clergy, is taken away; and if his clergy be allowed for any *theft* or *larceny*, he ſhall, beſides being burned in the hand, be confined to h[illegible]d labour, not leſs than ſix months, nor more than two years. But by 4 Geo. 1. c. 11. and 6 Geo. 1. c. 23. when any perſon is convicted of any larceny, whether petit, grand, or compound larceny, who is entitled to clergy, and only liable to burning in the hand, or whipping, the court, *inſtead* of ſuch puniſhment, may tranſport the offender for ſeven years. By 19 Geo. 3. c. 74. the practice of burning in the hand is aboliſhed, and inſtead thereof, except in the caſe of *manſlaughter*, the court may order the offender to be whipped in the manner the act directs.

In deſcribing the benefit of clergy, we have pointed out the judgment which thoſe offenders may receive to whom the benefit of clergy is allowed; but upon a capital charge, where the benefit of clergy is taken away, when the jury have brought in their verdict "GUILTY," in the preſence of the priſoner, he is either immediately, or at a convenient time ſoon after, aſked by the court if he has any thing to offer, why judgment ſhould not be awarded againſt him; and in this ſtage of the proceeding it is that motion muſt be made in arreſt of judgment, either by pointing out ſome blemiſh upon the face of the record, praying benefit of clergy, or pleading a pardon; but if all theſe reſources fail, the court proceeds to judgment.

CLERK (*clericus*), a word formerly uſed to ſignify a learned man, or man of letters. The word comes from the Greek κληρος, uſed for *clergy*; but more properly ſignifying *lot* or *heritage*, in regard the lot and portion of clerks or eccleſiaſties is to ſerve God. Accordingly *clerus* was at firſt uſed to ſignify one who had a particular attachment to the ſervice of God. The origin of the expreſſion is derived from the Old Teſtament, where the tribe of Levi is called the *lot heritage*, κληρος, and God is reciprocally called *their portion*; by reaſon that tribe was conſecrated to the ſervice of God, and lived on the offerings made to God, without any other ſettled proviſion as the reſt had. Thus, Paſquier obſerves, the officers of the counts (*comites*) were anciently created under the title of *clerks of accompts*; and ſecretaries of ſtate were called *clerks of the ſecret*. So *clericus domini regis*, in the time of Edward I. was engliſhed, *the king's ſecretary*, or *clerk of his council*. The term was applied indifferently to all who made any profeſſion of learning; or who knew how to manage the pen: though originally it was appropriated to eccleſiaſtics. As the nobility and gentry were uſually brought up to the exerciſe of arms, there were none but the clergy left to cultivate the ſciences: hence, as it was the clergy alone who made any profeſſion of letters, a very learned man came to be called a *great clerk*, and a ſtupid ignorant man a *bad clerk*.

CLERK is alſo applied to ſuch as by their courſe of life exerciſe their pens in any court or office; of which there are various kinds: thus

CLERK *of the Bails*, an officer in the court of king's bench, whoſe buſineſs is to file all bail-pieces taken in that court, where he always attends.

CLERK *of the Check*, an officer belonging to the king's court; ſo called, becauſe he has the check and controlment of the yeomen that belong to the king, queen, or prince. He likewiſe, by himſelf or deputy, ſets the watch in the court. There is alſo an officer in the navy of the ſame name, belonging to the king's yards.

CLERK *of the Crown*, an officer in the king's bench, who frames, reads, and records all indictments againſt offenders there arraigned or indicted of any public crime. He is likewiſe termed *clerk of the crown-office*, in which capacity he exhibits information by order of the court for various offences.

CLERK *of the Crown*, in chancery, an officer whoſe buſineſs it is conſtantly to attend the lord chancellor in perſon or by deputy; to write and prepare for the great ſeal ſpecial matters of ſtate by commiſſion, both ordinary and extraordinary, viz. commiſſions of lieutenancy, of juſtices of aſſize, oyer and terminer, gaol-delivery, and of the peace; all general pardons, granted either at the king's coronation or in parliament: the writs of parliament, with the names of the knights, citizens, and burgeſſes, are alſo returned into his office. He alſo makes out ſpecial pardons and writs of execution on bonds of ſtatute-ſtaple forfeited.

CLERK *of the Deliveries of the Ordnance*. See ORDNANCE.

CLERK *of the Errors*, in the court of common pleas, an officer who tranſcribes and certifies into the king's bench the tenor of the record of the action on which the writ of error, made out by the curſitor, is brought there to be determined. In the king's bench, the clerk of the errors tranſcribes and certifies the records of cauſes, by bill, in that court, into the exchequer. And the buſineſs of the clerk of the errors in the exchequer is to tranſcribe the records certified thither out of the king's bench, and to prepare them for judgment in the exchequer-chamber.

CLERK *of the Eſſoins*, in the court of common pleas, keeps the eſſoin roll, or enters eſſoins: he alſo provides parchment, cuts it into rolls, marks the number on them, delivers out all the rolls to every officer, and receives them again when written. See ESSOIN.

CLERK *of the Eſtreats*, an officer in the exchequer, who every term receives the eſtreats out of the lord treaſurer's re-

membrancer's office, and writes them out to be levied for the crown.

Clerk *of the Green-cloth,* formerly an officer in chancery, but now aboliſhed.

Clerk *of the Hamper,* or *Hanaper,* an officer in chancery, whoſe buſineſs is to receive all money due to the king for the ſeals of charters, letters patent, commiſſions, and writs; alſo the fees due to the officers for enrolling and examining them.

Clerk-*Comptroller of the King's Houſehold,* an officer of the king's court, authoriſed to allow or diſallow the charges of purſuivants, meſſengers of the green cloth, &c, to inſpect and controll all defects of any of the inferior officers; and to ſit in the counting-houſe with the lord ſteward and other officers of the houſehold for regulating ſuch matters.

Clerk *of the King's Silver,* an officer of the common pleas, to whom every fine is brought, after it has paſſed the office of the *cuſtos brevium*; and who enters the effect of writs of covenant, into a book kept for that purpoſe, according to which all the fines of that term are recorded in the rolls of the court.

Clerk *of the Market,* an officer of the king's houſe, to whom is given the charge of the king's meaſures and weights, the ſtandards of thoſe that ought to be uſed all over England.

Clerk *of the Nichils* or *Nihils,* an officer of the exchequer, who makes a roll of all ſuch ſums as are nichilled by the ſheriffs upon their eſtreats of green wax, and delivers them in to the remembrancer of the treaſury, to have execution done upon them for the king. See Nihil.

Clerk *of the Ordnance.* See Ordnance.

Clerk *of the Outlawries,* an officer of the common pleas, and deputy to the attorney-general, for making out all writs of *capias utlegatum* after outlawry, to which there muſt be the king's attorney's name.

Clerk *of the Paper-office,* an officer belonging to the king's bench, whoſe buſineſs is to make up the paper-books of ſpecial pleadings in that court.

Clerk *of the Peace,* an officer belonging to the ſeſſions of the peace, whoſe buſineſs is to read indictments, inroll the proceedings, and draw the proceſs: he likewiſe certifies into the king's bench, tranſcripts of indictments, outlawries, attainders, and convictions had before the juſtices of peace, within the time limited by ſtatute, under a certain penalty. This office is in the gift of the *cuſtos rotulorum,* and may be executed by deputy.

Clerk *of the Pells,* an officer that belongs to the exchequer, whoſe buſineſs is to enter every teller's bill into a parchment-roll called *pellis receptorum*; and to make another roll of payments called *pellis exituum.*

Clerk *of the petty Bag,* an officer of the court of chancery, whereof there are three, the maſter of the rolls being the chief: their buſineſs is to record the return of all inquiſitions out of every ſhire; to make out patents of cuſtomers, gangers, comptrollers, &c.; liberates upon extent of ſtatutes-ſtaple; *congé d'elires* for biſhops; ſummons of the nobility, clergy, and burgeſſes to parliament; and commiſſions directed to knights and others of every ſhire, for aſſeſſing ſubſidies and taxes.

Clerk *of the Pipe,* an officer of the exchequer, who having the accounts of all debts due to the king, delivered out of the remembrancer's office, charges them in a great roll folded up like a pipe. He writes out warrants to ſheriffs, to levy the ſaid debts on the goods and chattels of the debtors; and if they have no goods, then he draws them down to the treaſurer's remembrancer to write eſtreats againſt their lands.

Clerk *of the Pleas,* an officer of the exchequer, in whoſe office all the officers of the court, having ſpecial privilege, ought to ſue or be ſued in any action. In this office alſo actions at law may be proſecuted by other perſons, but the plaintiff ought to be tenant or debtor to the king, or ſome way accountable to him. The under clerks are attornies in all ſuits.

Clerks *of the Privy-ſeal,* four officers that attend the lord privy ſeal, for writing and making out all things that are ſent by warrant from the ſignet to the privy ſeal, and to be paſſed the great ſeal; and likewiſe to make out privy ſeals, upon ſpecial occaſions of his majeſty's affairs, as for loan of money, or the like.

Clerk *of the Rolls,* an officer of the chancery, whoſe buſineſs is to make ſearches after, and copies of deeds, officers, &c.

Clerk *of the Signet,* an officer continually attending upon his majeſty's principal ſecretary, who has the cuſtody of the privy ſignet, as well for ſealing the king's private letters as thoſe grants which paſs the king's hand by bill ſigned. There are four of theſe officers, who have their diet at the ſecretary's table.

Six Clerks, officers in chancery next in degree below the twelve maſters, whoſe buſineſs is to inroll commiſſions, pardons, patents, warrants, &c. which paſs the great ſeal. They were anciently *clerici,* and forfeited their places if they married. Theſe are alſo attorneys for parties in ſuits depending in the court of chancery.

Clerk *of the Treaſury,* an officer belonging to the court of common pleas, who has the charge of keeping the records of the court, makes out all records of *niſi prius,* and likewiſe all exemplifications of records being in the treaſury. He has the fees due for all ſearches; and has under him an under keeper, who always keeps one key of the treaſury-door.

Clerk *of the Warrants,* an officer of the common pleas, whoſe buſineſs is to enter all warrants of attorney for plaintiff, and defendants in ſuit; and to inroll deeds of bargain and ſales that are acknowledged in court, or before a judge. His office is likewiſe to eſtreat into the exchequer all iſſues, fines, eſtreats, and amercements, which grow due to the crown in that court.

CLERKE (Captain Charles), a celebrated Engliſh navigator, was bred up in the navy from his youth, and was preſent in ſeveral actions during the war of 1755. In that between the Bellona and Courageux he was in great danger; for having been ſtationed in the mizen-top on board the former, the maſt was carried overboard by a ſhot, and he fell into the ſea along with it; but, however, was taken up without receiving any injury. When Commodore Byron made his firſt voyage round the world, Mr. Clerke ſerved on board his ſhip in the quality of a midſhipman; and was afterwards on the American ſtation. In the year 1768, he ſailed round the world a ſecond time in the Endeavour, on board of which he ſerved in the ſtation of maſter's mate; but, during the voyage, ſucceeded to a lieutenancy. He returned in 1775, and was ſoon after appointed maſter and commander. When Captain Cook undertook his laſt voyage, Mr. Clerke was appointed Captain of the Diſcovery; and in conſequence of the death of Captain Cook, naturally ſucceeded to the ſupreme command. He did not, however, long enjoy his new dignity. Before his departure from England, he had manifeſt ſymptoms of a conſumption. Of this diſeaſe he lingered during the whole of the voyage; and his long reſidence in the cold northern climates cut off all hopes of recovery; but though ſenſible that the only chance he had of prolonging his life was by a ſpeedy return to a warmer climate, his attention to his duty was ſo great, that he perſevered in ſearch of a paſſage between the Aſiatic and American continents until every one of the officers was of opinion that it was impracticable. He bore his diſtemper with great firmneſs and equanimity, retain-

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ing a good flow of ſpirits to the laſt; and died on the 22d of Auguſt 1778, in the 38th year of his age, the ſhip being then within view of the coaſt of Kamſchatka.

Clerk's *Iſland* lies on the weſtern ſide of the American continent, in N. lat. 63. 15. and W. long. 170. 30. It was diſcovered by Captain Cook in his laſt voyage, but a landing could not be effected. At a diſtance it appeared to be of conſiderable extent, and to have ſeveral hills connected with the low grounds in ſuch a manner as to make it look like a group of iſlands. Near its eaſtern extremity is a little iſland remarkable for having three elevated rocks upon it. Both the large and ſmall iſland are uninhabited.

CLERMONT, a town of France in the department of Meuſe and late territory of Barrois, 127 miles N. W. of Paris. Long. 5. 9. E. Lat. 49. 34. N.

Clermont, a town of France, in the department of Oiſe and late province of the Iſle of France, 37 miles N. of Paris. Lon. 2. 25. E. Lat. 49. 25. N.

Clermont, a conſiderable, rich, and populous town of France, in the department of Puy de Dome and late province of Auvergne, with a biſhop's ſee. It is ſeated on an eminence, and is alſo called Clermont Ferrand, ever ſince it was united, under the name of a ſuburb, to the town of Mount Ferrand, about a mile diſtant to the N. E. The cathedral, public ſquares, and walks, are very fine; but the ſtreets are narrow, crooked, badly paved, and lined with houſes built of ſtones of a ſombre hue. Many Roman antiquities are found in the neighbourhood, and ſome mineral ſprings. That of the ſuburb, St. Allyre, has formed a natural bridge over the brook into which it falls: it is called the Mineral Bridge, and carriages may paſs over it. Clermont has manufactures of ratteens, druggets, ſerges, and leather. It was the birth-place of the celebrated Paſchal; and is 300 miles S. of Paris. Lon. 3. 10. E. Lat. 45. 47. N.

Clermont *Manuſcript*, is a copy of St. Paul's Epiſtles, found in the monaſtery of Clermont in France, and uſed by Beza, together with the Cambridge MS. in preparing his edition of the New Teſtament. This copy is in the octavo form, and is written on fine vellum in Greek and Latin, with ſome mutilations. Beza ſuppoſes that it is of equal antiquity with the Cambridge copy; but both were probably written by a Latin ſcribe in a later period than he aſſigns to them. The various readings of this MS. were communicated to archbiſhop Uſher, and they are preſerved by Walton. The MS. itſelf was in the poſſeſſion of Morinus; and after his death depoſited among the MS. copies of the Royal Library at Paris, No. 2245.

CLEROMANCY, a kind of divination performed by throwing of dice, or little bones; and obſerving the points, or marks turned up. The word comes from κλῆρος, "lot," and μαντεια, "divination." At Bura, a city of Achaia, was a temple and celebrated oracle of Hercules; where ſuch as conſulted the oracle, after praying to the idol, threw four dies, the points whereof being well ſcanned by the prieſt, he was ſuppoſed to draw the anſwer from them. Something of this kind ſeems to have been practiſed with regard to Jonah.

CLESIDES, a Greek painter, about 276 years before Chriſt, in the reign of Antiochus I. He revenged the injuries he had received from queen Stratonice by repreſenting her in the arms of a fiſherman. However indecent the painter might repreſent the queen, ſhe was drawn with ſuch perſonal beauty, that ſhe preſerved the piece, and liberally rewarded the artiſt.

CLETHRA, in botany; a genus of the monogynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 18th order, *Bicornes*. The calyx is quinquepartite: the petals five; the ſtigma trifid; the capſule trilocular and three-valved. There is but one ſpecies, *viz*. the Alnifolia. This is a native of Virginia and Carolina, where it grows in moiſt places, and near the ſides of rivulets, riſing near eight or ten feet high. The leaves are ſhaped like thoſe of the alder-tree, but longer; theſe are placed alternately upon the branches: the flowers are produced in cloſe ſpikes at the extremities of the branches; they are white, compoſed of five petals, and have ten ſtamina in each, nearly of the ſame length with the petals. This is hardy enough to bear the open air in Britain, and is one of the moſt beautiful flowering ſhrubs. Its ſeaſon is commonly about the beginning of July; and, if the ſeaſon is not very hot, there will be part of the ſpikes in beauty till the middle of September. This ſhrub will thrive beſt in moiſt land, and requires a ſheltered ſituation, where it may be defended from ſtrong winds, which frequently break off the branches where they are too much expoſed to their violence. It is propagated by layers, but they are generally two years before they take root. It may alſo be propagated by ſuckers, which are ſent out from the roots: if theſe are carefully taken off with fibres in the autumn, and planted in a nurſery-bed, they will be ſtrong enough in two years to be tranſplanted where they are to remain.

CLEVELAND, a diſtrict in the north riding of Yorkſhire in England, from whence the noble family of Fitzroy took the title of Duke, but which is now extinct.

Cleveland (John), an Engliſh poet of ſome eminence in his time, who during the civil war under Charles I. engaged as a literary champion in the royal cauſe againſt the parliamentarians. He died in 1658, and was much extolled by his party. His works, which conſiſted of poems, characters, orations, epiſtles, &c. were printed in octavo in 1677.

CLEVES, a handſome town of Germany, capital of a duchy of the ſame name. It is ſeated on a hill, three miles from the Rhine, near a wood, through which are ſeveral fine walks; 12 miles S. E. of Nimeguen. Lon. 5. 50. E. Lat. 51. 45. N.

Cleves, the duchy of, one of the fineſt countries of Germany, in the circle of Weſtphalia, divided into two parts by the Rhine. It is ſubject to the king of Pruſſia, and Cleves is the capital.

CLIENT, among the Romans, a citizen who put himſelf under the protection of ſome great man, who in reſpect of that relation was called *patron*. This patron aſſiſted his client with his protection, intereſt, and goods; and the client gave his vote for his patron, when he ſought any office for himſelf or his friends. Clients owed reſpect to their patrons, as theſe owed them their protection. The right of patronage was appointed by Romulus, to unite the rich and poor together in ſuch a manner as that one might live without contempt, and the other without envy; but the condition of a client, in courſe of time, became little elſe but a moderate ſlavery. The term *Client* is now uſed to denote a party in a law-ſuit, who has turned over the cauſe into the hands of a counſellor or ſolicitor.

CLIFFORTIA, in botany, a genus of the polyandria order, belonging to the diœcia claſs of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The male calyx is triphyllous; no corolla; the ſtamina near 30 in number; the female calyx is triphyllous, ſuperior to the receptacle of the fruit; no corolla; two ſtyles; with a bilocular capſule; and a ſingle ſeed. There are three ſpecies, all of them natives of Africa; requiring to be kept in a green-houſe when cultivated in this country. Their flowers make no great appearance; but the plants themſelves are very ornamental evergreens. They grow to the height of four or five feet; and are propagated by cuttings, which muſt be young ſhoots of five or ſix inches length. If theſe are planted in pots in ſpring or ſummer, and plunged in a hot-bed, they will readily take root. They muſt be watered plentifully in ſummer, but very ſparingly in winter.

CLIMACTERIC, among phyficians (from *climacter*, "a ladder"), a critical year in a perfon's life. According to fome, this is every feventh year; but others allow only thofe years produced by multiplying 7 by the odd number 3, 5, 7, and 9, to be climacterical. Thefe years, they fay, bring with them fome remarkable change with refpect to health, life, or fortune: the grand climacteric is the 63d year; but fome, making two, add to this the 81ft: the other remarkable climacterics are the 7th, 21ft, 35th, 49th, and 56th.

CLIMATE, or CLIME, in geography, a part of the furface of the earth, bounded by two circles parallel to the equator; and of fuch a breadth, as that the longeft day in the parallel nearer the pole exceeds the longeft day in that next the equator by fome certain fpaces, viz. half an hour. The word comes from the Greek κλιμα, "inclinamentum," an *inclination*.

The *beginning* of the climate is a parallel circle wherein the day is the fhorteft. The *end* of the climate is that wherein the day is the longeft. The climates therefore are reckoned from the equator to the pole; and are fo many bands, or zones, terminating by lines parallel to the equator: though, in ftrictnefs, there are feveral climates in the breadth of one zone. Each climate only differs from its contiguous ones, in that the longeft day in fummer is longer or fhorter by half an hour in the one place than in the other. As the climates commence from the equator, the firft climate at its beginning has its longeft day precifely 12 hours long; at its end, 12 hours and a half: the fecond, which begins where the firft ends, viz. at 12 hours and a half, ends at 13 hours; and fo of the reft, as far as the polar circles, where, what the geographers call *hour-climates* terminate, and *month-climates* commence. As an hour-climate is a fpace comprifed between two parallels of the equator, in the firft of which the longeft day exceeds that in the latter by half an hour; fo the month climate is a fpace terminated between two circles parallel to the polar circles, whofe longeft day is longer or fhorter than that of its contiguous one by a month or 30 days.

The ancients, who confined the climates to what they imagined the habitable parts of the earth, only allowed of feven. The firft they made to pafs through Meroe, the fecond through Sienna, the third through Alexandria, the fourth through Rhodes, the fifth through Rome, the fixth through Pontus, and the feventh through the mouth of the Boryfthenes. The moderns, who have failed further toward the poles, make 30 climates on each fide; and, in regard the obliquity of the fphere makes a little difference in the length of the longeft day, inftead of half an hour, fome of them only make the difference of climates a quarter.

Vulgarly the term *climate* is beftowed on any country or region differing from another either in refpect of the feafons, the quality of the foil, or even the manners of the inhabitants; without any regard to the length of the longeft day.

CLIMAX, or GRADATION, in rhetoric, a figure wherein the word or expreffion which ends the firft member of a period begins the fecond, and fo on; fo that every member will make a diftinct fentence, taking its rife from the next foregoing, till the argument and period be beautifully finifhed; as in the following gradation of Dr. Tillotfon: "After we have practifed good actions a while, they become eafy; and when they are eafy, we begin to take pleafure in them; and when they pleafe us, we do them frequently; and by frequency of acts a thing grows into a habit; and confirmed habit is a kind of fecond nature; and fo far as any thing is natural, fo far it is neceffary; and we can hardly do otherwife; nay, we do it many times when we do not think of it."

CLINCH, in the fea language, that part of a cable which is bended about the ring of the anchor, and then feized or made faft.

CLINCHING, in the fea-language, a kind of flight caulking ufed at fea, in a profpect of foul weather, about the pofts: it confifts in driving a little oakum into their feams, to prevent the water coming in at them.

CLINIC, a term applied by the ancient church-hiftorians to thofe who received baptifm on their death-bed.

CLINICAL, in *Medicine*, a term particularly ufed to fignify the treating fick perfons in bed, for the more exact difcovery of all the fymptoms of their difeafes. Thus a *clinical* lecture, is a lecture delivered by the bed-fide of the patient, and in which the lecturer refers his pupils to the actual fituation of the patient.

CLINOPODIUM, FIELD BASIL; a genus of the gymnofpermia order, belonging to the didynamia clafs of plants; and in the natural method ranking under the 41ft order, *Afperifoliæ*. The involucrum confifts of many fmall briftles under the verticillus or whorl of flowers. There are fix fpecies, all of them herbaceous plants, growing from one to two feet high. They are remarkable only for their ftrong odour, being fomewhat between marjoram and bafil.

CLIO, in pagan mythology, the firft of the mufes, daughter of Jupiter and Mnemofyne. She prefided over hiftory. She is reprefented crowned with laurels, holding in one hand a trumpet, and a book in the other. Sometimes fhe holds a plectrum or quill with a lute. Her name fignifies honour and reputation, κλεος, *gloria*; and it was her office faithfully to record the actions of brave and illuftrious heroes. She had Hyacintha by Pierius, fon of Magnes.

CLIO, in zoology, a genus of infects belonging to the order of vermes mollufca. See plate 78. The body is oblong, and fitted for fwimming; and it has two membranaceous wings placed oppofite to each other. The fpecies are three, principally diftinguifhed by the fhape of their vagina, and are all natives of the ocean.

CLISTHENES, a famous Athenian magiftrate, the author of the mode of banifhing ambitious citizens by oftracifm, or writing their names upon a fhell: the intention was patriotic, but it was abufed like all other human inftitutions; fome of the worthieft citizens of Athens being thus exiled. He died 510 years before Chrift.

CLITOMACHUS, the philofopher, flourifhed about 140 years before Chrift. He was born at Carthage; quitted his country at 40 years of age; and went to Athens, where he became the difciple and fucceffor of Carneades. He compofed many books, but they are all loft.

CLITORIA, in botany; a genus of the decandria order, belonging to the diadelphia clafs of plants; and in the natural method ranking under the 32d order, *Papilionaceæ*. The corolla is fupine, or turned down fide up; with the vexillum or flag-petal very large, patent, and almoft covering the alæ or wing-petals. There are four fpecies, all of them herbaceous perennials, or annuals, of the kidney-bean kind, growing naturally in both the Indies. The ftalk is climbing, flender, and of the height of a man. The leaves are winged, placed alternately, and confift of two, three, or five pair of lobes, terminated by an odd one. The flowers, which are elegant, ftand fingly, each on its proper foot ftalk. They are very large, and generally of a deep blue, but fometimes of a white colour. From the fruit of this plant is diftilled an eye-water. The beans reduced to powder, and taken in broth, to the quantity of two drams, prove a gentle purge; and Grimmius remarks, in his *Labor Ceyl.* that the powder of the dried beans, being mixed with the milk of the cocoa nut, or with broth, and adminiftered in quantity from one to three drams, not only mitigates colic pains, but is very ufeful and much ufed in Ceylon, in all diforders of the ftomach and bowels. Thefe plants are propagated by feeds; and, in this country, muft be kept continually in a ftove.

CLITORIS, in anatomy, is a part of the external pudenda, ſituated at the angle which the nymphæ form with each other. Like the penis it has an erection, and it is thought to be the principal ſeat of venereal pleaſure. The clitoris is of different ſizes in different women; but in general it is ſmall, and hid by the labia. The preternaturally enlarged clitoris is what con ſtitutes an hermaphrodite. See ANATOMY, p. 209.

CLITUS, brother to Alexander the Great's nurſe, followed that prince in his conqueſts, and ſaved his life by cutting off the hand of Roſaces, which held an ax lifted up to kill him at the paſſage of the Granicus. Alexander, who had a great regard for him, ſome time after invited him to ſupper; when Clitus, at the end of the repaſt, being heated with wine, diminiſhed the exploits of that prince, in order to magnify thoſe of Philip his father. This ſo enraged Alexander, that he killed him with his own hand; but he was afterwards ſo afflicted at it, that he attempted his own life.

CLIVE (Robert) lord, ſon of Richard Clive, Eſq. of Styche near Drayton in Salop, was born in 1725. Toward the cloſe of the war in 1741, he was ſent as a writer in the Eaſt India ſervice to Madras; but being fonder of the camp than the counting-houſe, he ſoon availed himſelf of an opportunity to exchange his pen for a pair of colours. He firſt diſtinguiſhed himſelf at the ſiege of Pondicherry in 1748; acted under major Laurence at the taking of Devi Cotta in Tanjore, who wrote of his military talents in high terms; commanded a ſmall party for the taking of Arcot, and afterwards defended that place againſt the French; and performed many other exploits, which, conſidering the remoteneſs of the ſcene of action, would require a long detail to render ſufficiently intelligible. He was, however, in brief, looked upon and acknowledged as the man who firſt rouſed his countrymen to ſpirited action, and raiſed their reputation in the Eaſt: ſo that when he came over to England in 1753, he was preſented, by the court of directors, with a rich ſword ſet with diamonds, as an acknowledgment of paſt, and an incitement to future ſervices. Captain Clive returned to India in 1755, as governor of Fort St. David, with the rank of lieutenant-colonel in the king's troops; when as commander of the company's troops, he, in conjunction with admiral Watſon, reduced Angria the pirate, and became maſter of Geria, his capital, with all his accumulated treaſure. On the loſs of Calcutta and the well known barbarity of the ſoubah Surajah Dowla, they failed to Bengal; where they took fort William, in January 1757; and colonel Clive defeating the ſoubah's army ſoon after, accelerated a peace. Surajah Dowla's perfidy, however, ſoon produced freſh hoſtilities, which ended in his ruin; he being totally defeated by colonel Clive at the famous battle of Plaſſey. The next day the conqueror entered Muxadabad in triumph; and placed Jaffier Ally Cawn, one of the principal generals, on the throne: the depoſed ſoubah was ſoon after taken, and privately put to death by Jaffier's ſon. Admiral Watſon died at Calcutta; but colonel Clive commanded in Bengal the two ſucceeding years. He was honoured by the Mogul with the dignity of an Omrah of the empire; and was rewarded by the new ſoubah with a grant of lands, or a jaghire, producing 27,000l. a-year. In 1760 he returned to England, where he received the unanimous thanks of the company, was elected member of parliament for Shrewſbury, and was raiſed to an Iriſh peerage by the title of Lord Clive, Baron of Plaſſey In 1764, freſh diſturbances taking place in Bengal, Lord Clive was eſteemed the only man qualified to ſettle them, and was accordingly again appointed to that preſidency; after being honoured with the order of the Bath, and with the rank of major general. When he arrived in India, he exceeded the moſt ſanguine expectation, in reſtoring tranquillity to the province without ſtriking a blow, and fixed the higheſt ideas of the Britiſh power in the minds of the natives. He returned home in 1767; and, in 1772, when a parliamentary inquiry into the conduct of the Eaſt India company was agitated, he entered into an able juſtification of himſelf in a maſterly ſpeech in the houſe of commons. He died *ſuddenly* towards the cloſe of the year 1774.

CLIVERS, or GOOSE GRASS, in botany; a ſpecies of Galium. See GALIUM.

CLOACÆ, in antiquity, the common ſewers of Rome, to carry off the dirt and ſoil of the city into the Tiber; juſtly reckoned among the grand works of the Romans. The firſt common ſewer, called *Cloaca Maxima*, was built by Tarquinius, ſome ſay Priſcus, others Superbus, of huge blocks of ſtone joined together without any cement, in the manner of the edifices of thoſe early times; conſiſting of three rows of arches one above another, which at length conjoin and unite together; meaſuring in the clear 18 palms in height, and as many in width. Under theſe arches they rowed in boats; which made Pliny ſay that the city was ſuſpended in air, and that they failed beneath the houſes. Under theſe arches alſo were ways through which carts loaded with hay could paſs with eaſe. It began in the Forum Romanum; meaſured 300 paces in length; and emptied itſelf between the temple of Veſta and the Pons Senatorius. There were as many principal ſewers as there were hills. Pliny concludes their firmneſs and ſtrength from their ſtanding for ſo many ages the ſhocks of earthquakes, the fall of houſes, and the vaſt loads and weights moved over them.

CLOACINA, the goddeſs of jakes and common ſewers, among the Romans.

CLOCK, a machine conſtructed in ſuch a manner, and regulated ſo by the uniform motion of a pendulum, as to meaſure time, and all its ſubdiviſions, with great exactneſs. The invention of pendulum-clocks is owing to the happy induſtry of the laſt age: the honour of it is diſputed by Huygens and Galileo. But be the inventor who he will, it is certain the invention never flouriſhed till it came into Huygens's hands, who inſiſts on it, that if ever Galileo thought of ſuch a thing, he never brought it to any degree of perfection. The firſt pendulum-clock made in England was in the year 1662, by Mr. Fromantil a Dutchman.

The firſt figure of plate 82. is a profile of a clock: P is a weight that is ſuſpended by a rope that winds about the cylinder or barrel C, which is fixed upon the axis *a*,*a*; the pivots *b*,*b*, go into holes made in the plates TS, TS, in which they turn freely. Theſe plates are made of braſs or iron, and are connected by means of *four pillars* Z,Z; and the whole together is called the *frame*. The weight P, if not reſtrained, would neceſſarily turn the barrel C with an uniform accelerated motion, in the ſame manner as if the weight was falling freely from a height. But the barrel is furniſhed with a ratchet wheel K,K, the right ſide of whoſe teeth ſtrikes againſt the click, which is fixed with a ſcrew to the wheel DD, as repreſented in fig. 2. ſo that the action of the weight is communicated to the wheel DD, the teeth of which act upon the teeth of the ſmall wheel *d* which turns upon the pivots *cc*. The communication or action of one wheel with another is called the *pitching*; a ſmall wheel like *d* is called a *pinion*, and its teeth are leaves of the pinion. Several things are requiſite to form a good pitching, the advantages of which are obvious in all machinery where teeth and pinions are employed. The teeth and pinion leaves ſhould be of a proper ſhape, and perfectly equal among themſelves: the ſize alſo of the pinion ſhould be of a juſt proportion to the wheel acting into it; and its place muſt be at a certain diſtance from the wheel, beyond or within which it will make a bad pitching.

The wheel EE, is fixed upon the axis of the pinion *d*; and the motion communicated to the wheel DD by the weight is

tranfmitted to the pinion *d*, confequently to the wheel EE, as likewife to the pinion *e* and wheel FF, which moves the pinion *f*, upon the axis of which the crown or balance wheel GH is fixed. The pivots of the pinion *f* play in holes of the plates LM, which are fixed horizontally to the plates TS. In a word, the motion begun by the weight is tranfmitted from the wheel GH to the palettes IK, and by means of the fork UX riveted on the palettes communicates motion to the pendulum AB, which is fufpended upon the hook A. The pendulum AB defcribes, round the point A, an arc of a circle alternately going and returning. If then the pendulum be once put in motion by a pufh of the hand, the weight of the pendulum at B will make it return upon itfelf, and it will continue to go alternately backward and forward till the refiftance of the air upon the pendulum, and the friction at the point of fufpenfion at A, deftroys the original impreffed force. But as, at every vibration of the pendulum, the teeth of the balance-wheel GH act fo upon the palettes IK (the pivots upon the axis of thefe palettes play in two holes of the potence *st*), that after one tooth H has communicated motion to the palette K, that tooth efcapes; then the oppofite tooth G acts upon the palette I, and efcapes in the fame manner; and thus each tooth of the wheel efcapes the palettes IK, after having communicated their motion to the palettes in fuch a manner that the pendulum, inftead of being ftopped, continues to move. The wheel EE revolves in an hour; the pivot *c* of this wheel paffes through the plate, and is continued to *r*; upon the pivot is a wheel NN with a long focket faftened in the centre; upon the extremity of this focket *r* the minute hand is fixed. The wheel NN acts upon the wheel O; the pinion of which *p* acts upon the wheel *gg*, fixed upon a focket which turns along with the wheel N. This wheel *gg* makes its revolution in 12 hours, upon the focket of which the hour-hand is fixed.

From the above defcription it is eafy to fee, 1. That the weight *p* turns all the wheels, and at the fame time continues the motion of the pendulum. 2. That the quicknefs of the motion of the wheels is determined by that of the pendulum. 3. That the wheels point out the parts of time divided by the uniform motion of the pendulum.

When the cord upon which the weight is fufpended is entirely run down from off the barrel, it is wound up again by means of a key, which goes on the fquare end of the arbor at Q, by turning it in a contrary direction from that in which the weight defcends. For this purpofe, the inclined fide of the teeth of the wheel K (fig. 2.) removes the click C, fo that the ratchet-wheel R turns while the wheel D is at reft; but as foon as the cord is wound up, the click falls in between the teeth of the wheel D, and the right fide of the teeth again act upon the end of the click, which obliges the wheel D to turn along with the barrel; and the fpring A keeps the click between the teeth of the ratchet-wheel R.

We fhall now explain how time is meafured by the motion of the pendulum; and how the wheel E, upon the axis of which the minute-hand is fixed, makes but one precife revolution in an hour. The vibrations of a pendulum are performed in a fhorter or longer time in proportion to the length of the pendulum itfelf. A pendulum of 3 feet $8\frac{1}{2}$ French lines in length, makes 3600 vibrations in an hour: *i. e.* each vibration is performed in a fecond of time, and for that reafon it is called a *fecond pendulum*. But a pendulum of 9 inches $2\frac{1}{4}$ French lines makes 7200 vibrations in an hour, or two vibrations in a fecond of time, and is called *a half fecond pendulum*. Hence in conftructing a wheel whofe revolution muft be performed in a given time, the time of the vibrations of the pendulum which regulates its motion muft be confidered. Suppofing, then, that the pendulum AB makes 7200 vibrations in an hour, let us confider how the wheel E fhall take up an hour in making one revolution. This entirely depends on the number of teeth in the wheels and pinions. If the balance-wheel confifts of 30 teeth, it will turn once in the time that the pendulum makes 60 vibrations: for at every turn of the wheel, the fame tooth acts once on the palette I, and once on the palette K, which occafions two feparate vibrations in the pendulum; and the wheel having 30 teeth, it occafions twice 30, or 60 vibrations. Confequently this wheel muft perform 120 revolutions in an hour; becaufe 60 vibrations, which it occafions at every revolution, are contained 120 times in 7200, the number of vibrations performed by the pendulum in an hour. Now, in order to determine the number of teeth for the wheels E F and their pinions *e f*, it muft be remarked, that one revolution of the wheel E muft turn the pinion *e* as many times as the number of teeth in the pinion is contained in the number of teeth in the wheel. Thus, if the wheel E contains 72 teeth, and the pinion *e* 6, the pinion will make 12 revolutions in the time that the wheel makes 1; for each tooth of the wheel drives forward a tooth of the pinion, and when the 6 teeth of the pinion are moved, a complete revolution is performed; but the wheel E has by that time only advanced 6 teeth, and has ftill 66 to advance before its revolution be completed, which will occafion 11 more revolutions of the pinion. For the fame reafon, the wheel F having 60 teeth, and the pinion *f* 6, the pinion will make 10 revolutions while the wheel performs 1. Now, the wheel F being turned by the pinion *e*, makes 12 revolutions for one of the wheel E; and the pinion *f* makes 10 revolutions for one of the wheel F; confequently, the pinion *f* performs 10 times 12 or 120 revolutions in the time the wheel E performs one. But the wheel G, which is turned by the pinion *f*, occafions 60 vibrations in the pendulum each time it turns round; confequently the wheel G occafions 60 times 120 or 7200 vibrations of the pendulum while the wheel E performs one revolution; but 7200 is the number of vibrations made by the pendulum in an hour, and confequently the wheel E performs but one revolution in an hour; and fo of the reft.

From this reafoning, it is eafy to difcover how a clock may be made to go for any length of time without being wound up. 1. By increafing the number of the teeth in the wheels. 2. By diminifhing the number of teeth in the pinions. 3. By increafing the length of the cord that fufpends the weight. 4. By increafing the length of the pendulum. And, 5. By adding to the number of wheels and pinions. But, in proportion as the time is augmented, if the weight continues the fame, the force which it communicates to the laft wheel G H will be diminifhed.

It only remains to take notice of the number of teeth in the wheels which turn the hour and minute hands. The wheel E performs one revolution in an hour; the wheel N N, which is turned by the axis of the wheel E, muft likewife make only one revolution in the fame time; and the minute-hand is fixed to the focket of this wheel. The wheel N has 30 teeth, and acts upon the wheel O, which has likewife 30 teeth, and the fame diameter; confequently the wheel O takes one hour to a revolution: now the wheel O carries the pinion *p*, which has 6 teeth, and which acts upon the wheel *q q* of 72 teeth; confequently the pinion *p* makes 12 revolutions while the wheel *q q* makes one, and of courfe the wheel *q q* takes 12 hours to one revolution; and upon the focket of this wheel the hour-hand is fixed. All that has been faid here concerning the revolutions of the wheels, &c. is equally applicable to watches as to clocks.

The ingenious Dr. Franklin has contrived a clock to fhow the hours, minutes, and feconds, with only three wheels and two pinions in the whole movement. The dial-plate (fig. 3.) has the hours engraven upon it in fpiral fpaces along two diameters of a circle containing four times 60 minutes. The index A goes round in four hours, and counts the minutes from

any hour by which it has passed to the next following hour. The time, therefore, in the position of the index shown in the figure is either 32½ minutes past XII. III. or VIII.; and so in every other quarter of the circle it points to the number of minutes after the hour which the index last left in its motion. The small hand B, in the arc at top, goes round once in a minute, and shows the seconds. The wheel-work of this clock may be seen at fig. 4. A is the first or great wheel, containing 160 teeth, and going round in four hours with the index A in fig. 3. let down by a hole on its axis. This wheel turns a pinion B of 10 leaves, which therefore goes round in a quarter of an hour. On the axis of this pinion is the wheel C of 120 teeth; which goes round in the same time, and turns a pinion D of eight leaves round in a minute, with the second-hand B of fig. 3. fixed on its axis, and also the common wheel E of 30 teeth for moving a pendulum (by palettes) that vibrates seconds, as in a common clock. This clock is wound up by a line going over a pulley on the axis of the great wheel, like a common thirty-hour clock. Many of these admirably simple machines have been constructed, which measure time exceedingly well. It is subject, however, to the inconvenience of requiring frequent winding by drawing up the weight, and likewise to some uncertainty as to the particular hour shown by the index A. Mr. Ferguson has proposed to remedy these inconveniences by the following construction: In the dial-plate of his clock (fig. 5.) there is an opening *a b c d* below the centre: through which appears part of a flat plate, on which the 12 hours, with their divisions into quarters, are engraved. This plate turns round in 12 hours; and the index A points out the true hour, &c. B is the minute hand, which goes round the large circle of 60 minutes whilst the plate *a b c d* shifts its place one hour under the fixed index A. There is another opening *e f g h* through which the seconds are seen on a flat moveable ring at the extremity of a fleur-de-lis engraved on the dial-plate. A in fig. 6. is the great wheel of this clock, containing 120 teeth, and turning round in 12 hours. The axis of this wheel bears the plate of hours, which may be moved by a pin passing through small holes drilled in the plate, without affecting the wheel-work. The great wheel A turns a pinion B of 10 leaves round in an hour, and carries the minute-hand B on its axis round the dial-plate in the same time. On this axis is a wheel C of 120 teeth, turning round a pinion D of six leaves in three minutes; on the axis of which there is a wheel E of 90 teeth, that keeps a pendulum in motion, vibrating seconds by palettes, as in a common clock, when the pendulum-wheel has only 30 teeth, and goes round in a minute. In order to show the seconds by this clock, a thin plate must be divided into three times 60, or 180 equal parts, and numbered 10, 20, 30, 40, 50, 60, three times successively; and fixed on the same axis with the wheel of 90 teeth, so as to turn round near the back of the dial-plate; and these divisions will show the seconds through the opening *e f g h*, fig. 5. This clock will go a week without winding, and always show the precise hour; but this clock, as Mr. Ferguson candidly acknowledges, has two disadvantages from which Dr. Franklin's clock is free. When the minute-hand B is adjusted, the hour-plate must also be set right by means of a pin; and the smallness of the teeth in the pendulum-wheel will cause the pendulum-ball to describe but small arcs in its vibrations; and therefore the momentum of the ball will be less, and the times of the vibrations will be more affected by an unequal impulse of the pendulum-wheel on the palettes. Besides, the weight of the flat ring on which the seconds are engraved will load the pivots of the axis of the pendulum-wheel with a great deal of friction, which ought by all possible means to be avoided. To remedy this inconvenience, the second plate might be omitted.

A clock, showing the apparent diurnal motions of the sun and moon, the age and phases of the moon, with the time of her coming to the meridian, and the times of high water, by having only two wheels and a pinion added to the common movement, was contrived by Mr. Ferguson, and is described in his Select Exercises.

To this article we shall subjoin a brief account of two curious contrivances. The first, for giving motion to the parts of a clock by making it to descend along an inclined plane, is the invention of Mr. Maurice Wheeler; and the clock itself may be seen in Don Saltero's coffee-house at Chelsea. DE, fig. 7. is the inclined plane on which the clock ABC descends; this consists externally of a hoop about an inch broad, and two sides or plates standing out beyond the hoop about one eighth of an inch all round, with indented edges, that the clock may not slide, but turn round whilst it moves down. One of these plates is inscribed with the twenty-four hours, which pass successively under the index LP, fig. 8. which is always in a position perpendicular to the horizon, and shows the hour on the top of the machine: for this reason the lower part of the index, or HL, is heaviest, that it may preponderate the other HP, and always keep it pendulous, with its point to the vertical hour, as the movement goes on. Instead of this index, an image may be fixed for ornament on the axis *g*, which with an erected finger performs the office of an index. In order to describe the internal part or mechanism of this clock, let L E T Q be the external circumference of the hoop, and *f f* the same plate, on which is placed the train of wheel-work 1, 2, 3, 4, which is much the same as in other clocks, and is governed by a balance and regulator as in them. But there is no need of a spring and fusee in this clock; their effects being otherwise answered, as we shall see. In this machine the great wheel of 1 is placed in the centre, or upon the axis of the movement, and the other wheels and parts towards one side, which would therefore prove a bias to the body of the clock, and cause it to move, even on the horizontal plane, for some short distance; this makes it necessary to fix a thin plate of lead at C, on the opposite part of the hoop, to restore the equilibrium of the movement. This being done, the machine will abide at rest in any position on the horizontal plane H H; but if that plane be changed into the inclined plane D E, it will touch it in the point D; but it cannot rest there, because the centre of gravity at M acting in the direction M I, and the point T having nothing to support it, must continually descend, and carry the body down the plane. But now if any weight P be fixed on the other side of the machine, such as shall remove the centre of gravity from M to the point V in the line L D which passes through the point D, it will then rest upon the inclined plane, as in the case of the rolling cylinder. If this weight P be supposed not fixed, but suspended at the end of an arm, or vectis, which arm or lever is at the same time fastened to a centrical wheel 1, moving on the axis M of the machine, which wheel by its teeth shall communicate with the train of wheels, &c. on the other side, and the power of the weight be just equal to the friction or resistance of the train, it will remain motionless as it did before when it was fixed; and consequently the clock also will be at rest on the inclined plane. But supposing the power of the weight P to be superior to the resistance of the train, it will then put it into motion, and of course the clock likewise; which will then commence a motion down the plane; while the weight P, its vectis P M, and the wheel 1, all constantly retain the same position which they have at first when the clock begins to move. Hence it is easy to understand, that the weight P may have such an intrinsic gravity, as shall cause it to act upon the train with any required force, so as to produce a motion in the machine of any required velocity; such, for instance, as shall carry it once round in twenty-four hours: then, if the diameters of the plates ABC be four inches, it will

deſcribe the length of their circumference, viz. 12,56 in one natural day; and therefore, if the plane be of a ſufficient breadth, ſuch a clock may go ſeveral days, and would furniſh a perpetual motion, if the plane were infinitely extended. Let SD be drawn through M perpendicular to the inclined plane in the point D; alſo let LD be perpendicular to the horizontal line HH, paſſing through D; then is the angle HDE=LDS =DMT; whence it follows that the greater the angle of the plane's elevation is, the greater will be the arch DT; and conſequently the further will the common centre of gravity be removed from M; therefore the power of P will be augmented, and of courſe the motion of the whole machine accelerated. Thus it appears, that by duly adjuſting the intrinſic weight of P, at firſt to produce a motion ſhowing the mean time as near as poſſible, the time may be afterwards corrected, or the clock made to go faſter or ſlower by raiſing or depreſſing the plane, by means of the ſcrew at S. The angle to which the plane is firſt raiſed is about ten degrees. The marquis of Worceſter is alſo ſaid to have contrived a watch that moved on a declivity. See farther Phil. Tranſ. Abr. vol. i. p. 468, &c. or N° 161.

The other contrivance is that of M. de Gennes for making a clock aſcend on an inclined plane. To this end let ABC (fig. 9.) be the machine on the inclined plane EDE, and let it be kept at reſt upon it, or in equilibrio by the weight P at the end of the lever PM. The circular area CF is one end of the ſpring barrel in the middle of the movement, in which is included a ſpring as in a common watch. To this end of the barrel the arm or lever PM is fixed upon the centre M; and thus, when the clock is wound up, the ſpring moves the barrel, and therefore the lever and weight P in the ſituation PM. In doing this, the centre of gravity is conſtantly removed farther from the centre of the machine, and therefore it muſt determine the clock to move upwards, which it will continue to do as long as the ſpring is unbending itſelf; and thus the weight and its lever PM will preſerve the ſituation they firſt have, and do the office of a chain and fuſee. Phil. Tranſ. N° 140. or Abridg. vol. i. p. 467.

By ſtat. 9 and 10 W. III. cap. 28. § 2. no perſon ſhall export, or endeavour to export out of the kingdom, any outward or inward box-caſe or dial plate, of which gold, ſilver, braſs, or other metal, for a clock or watch, without the movement in or with every ſuch box, &c. made up fit for uſe, with the maker's name engraven thereon; nor ſhall any perſon make up any clock or watch without putting his name and place of abode or freedom, and no other name or place, on every clock or watch; on penalty of forfeiting every ſuch box, caſe, and dial-plate, clock and watch, not made up and engraven as aforeſaid; and 20l. one moiety to the king, the other to thoſe who ſhall ſue for the ſame.

Clocks, *portable*, or *pocket*, commonly denominated *Watches*. See the article Watch.

Clock-*Work*, properly ſo called, is that part of the movement which ſtrikes the hours, &c. on a bell; in contradiſtinction to that part of the movement of a clock or watch which is deſigned to meaſure and exhibit the time on a dial-plate, and which is termed *Watch-work*.

I. Of the *Clock*-part. The wheels compoſing this part are: The great or firſt wheel H, plate 83. fig. 10. which is moved by the weight or ſpring at the barrel G; in ſixteen or thirty-hour clocks: this has uſually pins, and is called the *pin-wheel*; in eight-day pieces, the ſecond wheel I is commonly the pin-wheel, or ſtriking-wheel, which is moved by the former. Next to the ſtriking-wheel is the detent-wheel, or hoop-wheel K, having a hoop almoſt round it, wherein is a vacancy at which the clock locks. The next is the third or fourth wheel, according to its diſtance from the firſt, called the *warning-wheel* L. The laſt is the flying pinion Q, with a fly or fan, to gather air, and ſo bridle the rapacity of the clock's motion. To theſe muſt be added the pinion of report; which drives round the locking-wheel, called alſo the *count-wheel*; ordinarily with eleven notches in it, unequally diſtant, to make the clock ſtrike the hours. Beſides the wheels, to the clock part belongs the raſh or ratch; a kind of wheel with twelve large fangs, running concentrical to the dial-wheel, and ſerving to lift up the detents every hour, and make the clock ſtrike: the detents or ſtops, which being lifted up and let fall, lock and unlock the clock in ſtriking; the hammer, as S, which ſtrikes the bell R; the hammer-tails, as T, by which the ſtriking pins draw back the hammers; latches, whereby the work is lifted up and unlocked; and lifting-pieces, as P, which lift up and unlock the detents.

The method of calculating the numbers of a piece of clock-work having ſomething in it very entertaining, and at the ſame time very eaſy and uſeful, we ſhall give the reader the rules relating thereto: 1. Regard here needs only be had to the counting-wheel, ſtriking-wheel, and the detent-wheel, which move round in this proportion: the count-wheel commonly goes once round in 12 or 24 hours; the detent-wheel moves round every ſtroke the clock ſtrikes, or ſometimes but once in two ſtrokes: wherefore it follows, that, 2. As many pins as are in the pin-wheel, ſo many turns hath the detent-wheel in the one turn of the pin-wheel; or, which is the ſame, the pins of the pin-wheel are the quotients of that wheel divided by the pinion of the detent-wheel. But if the detent-wheel move but once round in two ſtrokes of the clock, then the ſaid quotient is but half the number of pins. 3. As many turns of the pin-wheel as are required to perform the ſtrokes of 12 hours (which are 78), ſo many turns muſt the pinion of report have to turn round the count-wheel once: or thus, the quotient of 78, divided by the number of ſtriking-pins, ſhall be the quotient for the pinion of report and the count-wheel; and this is in caſe the pinion of report be fixed to the arbor of the pin-wheel, which is commonly done.

An example will make all plain: The locking-wheel being 48, the pinion of report 8, the pin-wheel 78, the ſtriking pins are 13, and ſo of the reſt. Note alſo, that 78 divided by 13 gives 6, the quotient of the pinion of report. As for the warning-wheel and fly-wheel, it matters little what numbers they have; their uſe being only to bridle the rapidity of the motion of the other wheels.

8) 48 (6.
____
6) 78 (13.
6) 60 (10.
6) 48 (8.

II. Of the *Watch*-part of a clock or watch. This is that part of the movement which is deſigned to meaſure and exhibit the time on a dial-plate; in contradiſtinction to that part which contributes to the ſtriking of the hour, &c.

The ſeveral members of the watch-part are, 1. The balance, conſiſting of the rim, which is its circular part; and the verge, which is its ſpindle; to which belong two palettes or leaves, that play in the teeth of the crown-wheel. 2. The potence, or pottance, which is the ſtrong ſtud in pocket-watches, whereon the lower pivot of the verge plays, and in the middle of which one pivot of the balance-wheel plays; the bottom of the pottance is called the foot, the middle part the noſe, and the upper part the ſhoulder. 3. The cock, which is the piece covering the balance. 4. The regulator, or pendulum ſpring, which is the ſmall ſpring, in the new pocket-watches underneath the balance. 5. The pendulum (fig. 10); whoſe parts are, the verge *x*, palettes 5,5, cocks *yyy*, the rod, the fork *z*, the flatt 2, the bob or great ball 3, and the corrector or regulator 4, being a contrivance of Dr. Derham for bringing the pendulum to its nice vibrations. 6. The wheels, which are the crowned wheel F in pocket pieces, and ſwing-wheel in pendulums; ſerving to drive the balance or pendulum. 7. The contrate wheel E, which is that next the crown-wheel, &c. and whoſe teeth and

Fig. 1. Profile of a Clock.

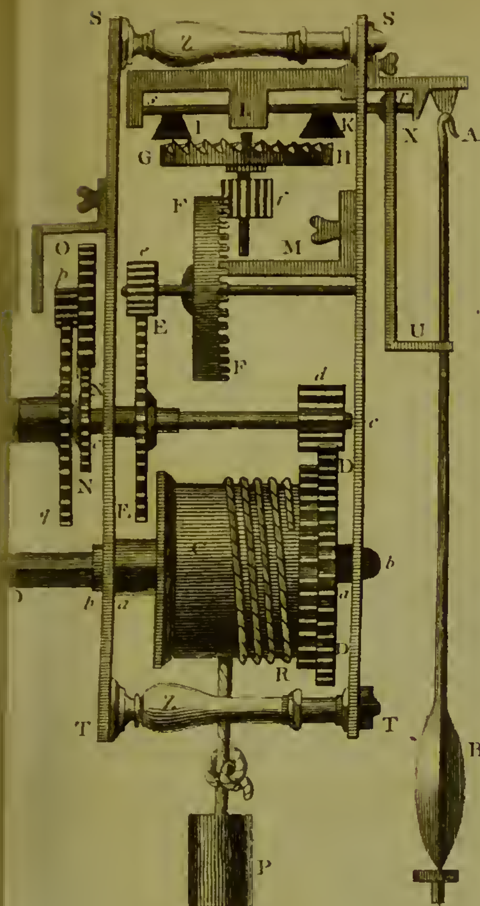


Fig. 3. Dr. Franklin's Clock.

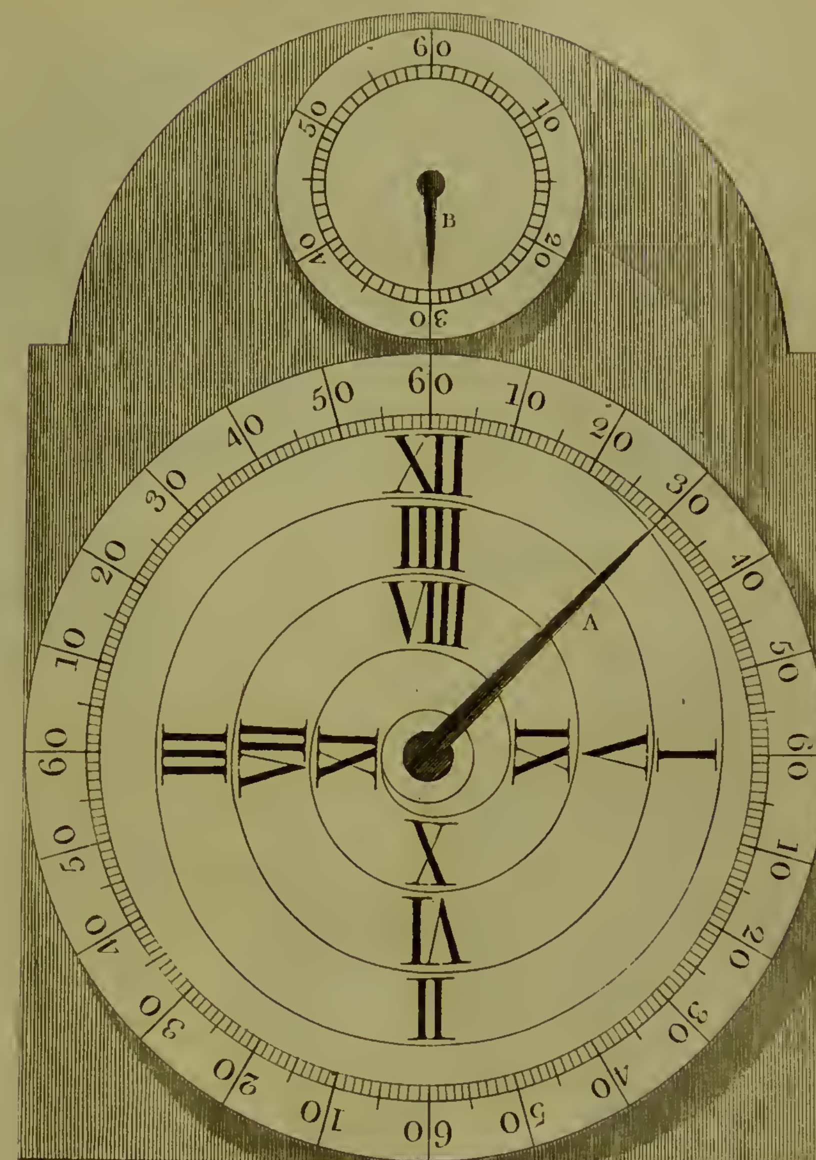


Fig. 2.

Fig. 4.

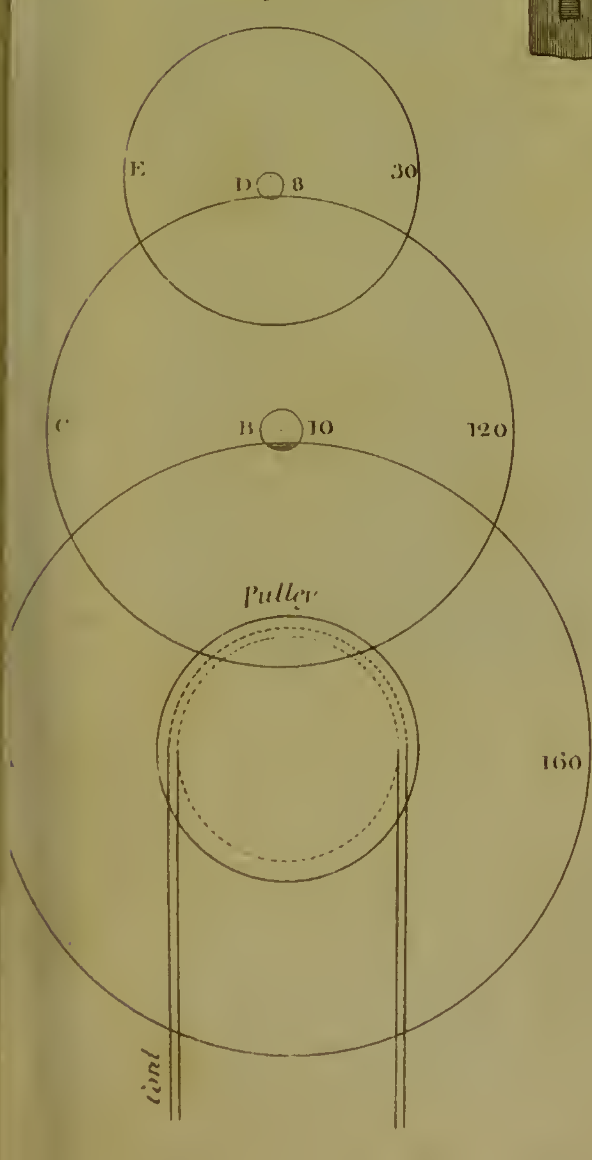


Fig. 5. Ferguson's Improvement.

Fig. 6.

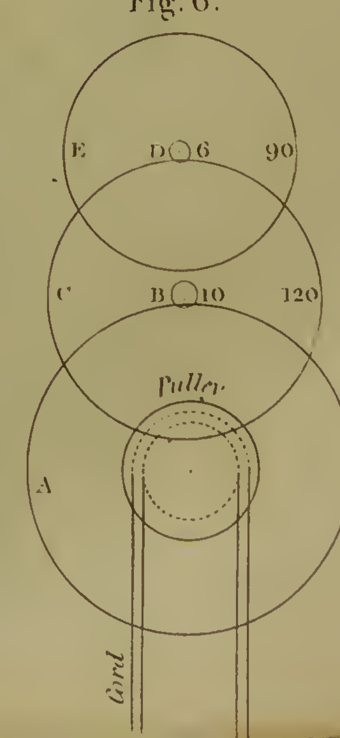


Fig. 9.

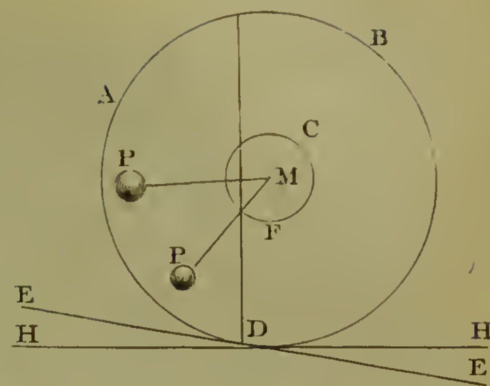


Fig. 7.

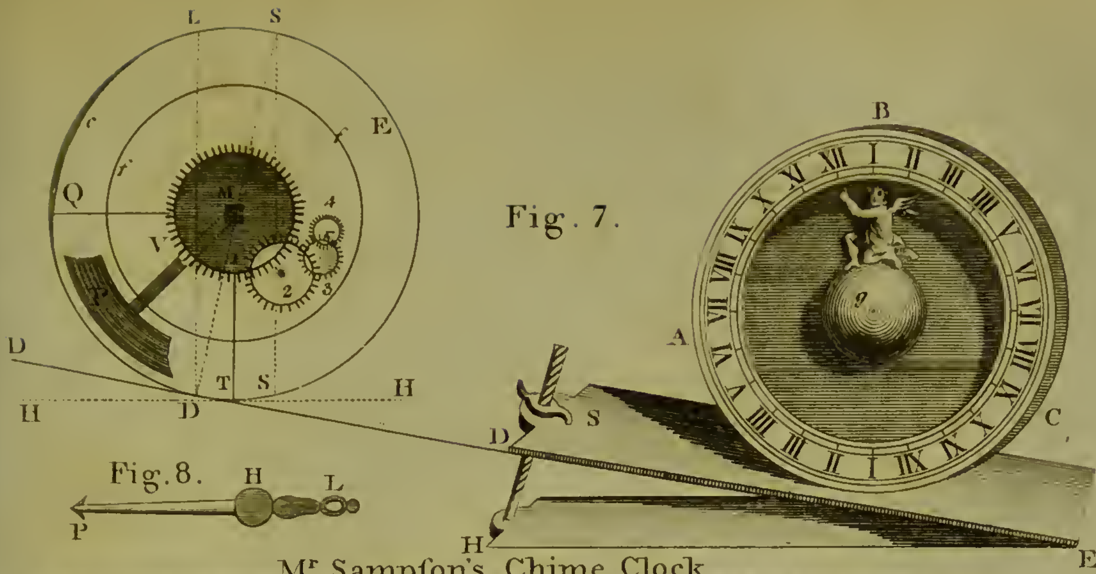


Fig. 8.

Mr. Sampson's Chime Clock.

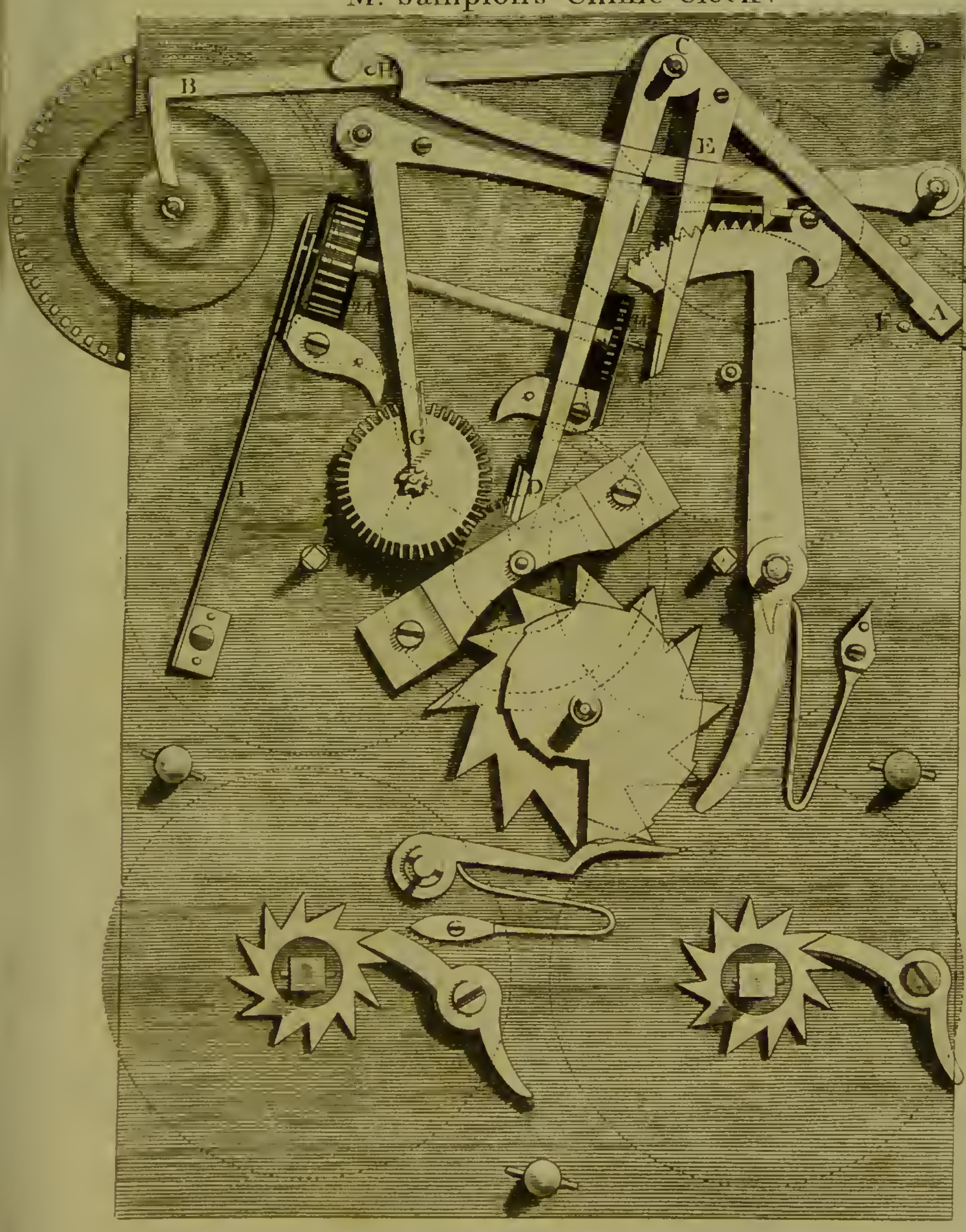
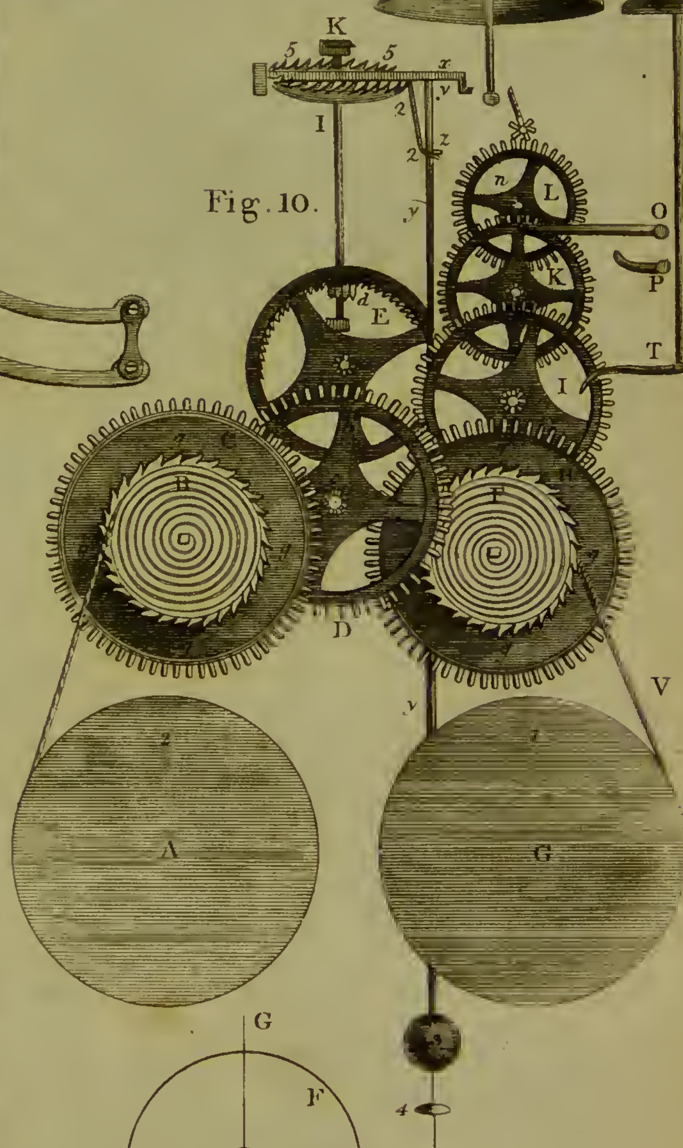


Fig. 10.



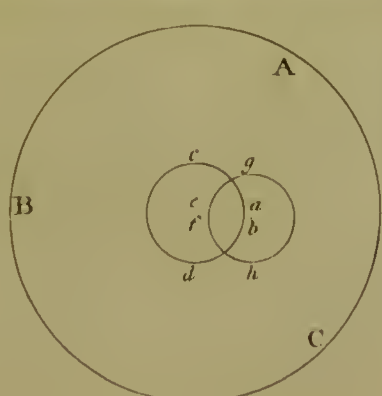


Fig. 11.

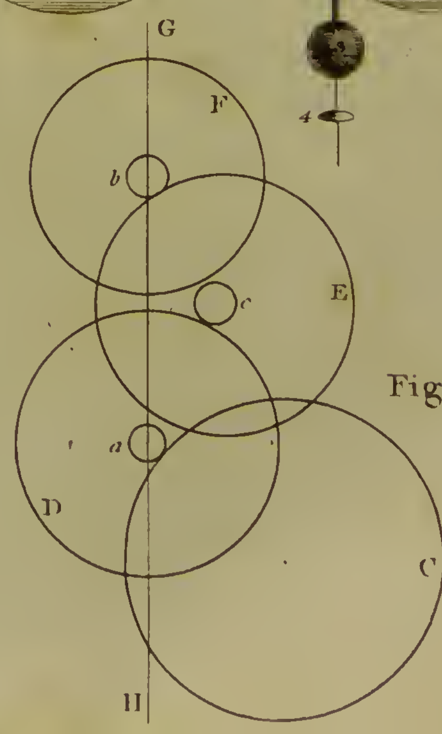


Fig. 12.

hoop lie contrary to thofe of other wheels; whence the name. 8. The great, or firft wheel C; which is that the fufee B, &c. immediately drives, by means of the chain or ftring of the fpring-box or barrel A; after which are the fecond wheel D, third wheel, &c. Laftly, between the frame and dial-plate, is the pinion of report, which is that fixed on the arbor of the great wheel; and ferves to drive the dial-wheel, as that ferves to carry the hand.

For the illuftration of this part of the work which lies concealed, let ABC (fig. 11.) reprefent the uppermoft fide of the frame plate, as it appears when detached from the dial-plate: the middle of this plate is perforated with a hole, receiving that end of the arbor of the centre-wheel which carries the minute hand; near the plate is fixed the pinion of report *ab* of 10 teeth; this drives a wheel *cd* of 40 teeth; this wheel carries a pinion *ef* of 12 teeth; and this again drives a wheel *gb* with 36 teeth.

As in the body of the watch the wheels every where divide the pinions; here, on the contrary, the pinions divide the wheels, and by that means diminifh the motion, which is here neceffary: for the hour hand, which is carried on a focket fixed on the wheel *gb*, is required to move but once round, while the pinion *ab* moves 12 times round. For this purpofe the motion of the wheel *cd* is $\frac{1}{4}$ of the pinion *ab*. Again, while the wheel *cd*, or the pinion *ef*, goes once round, it turns the wheel *gb* but $\frac{1}{3}$ part round; confequently the motion of *gb* is but $\frac{1}{3}$ of $\frac{1}{4}$ of the motion of *ab*; but $\frac{1}{3}$ of $\frac{1}{4}$ is $\frac{1}{12}$; *i. e.* the hour-wheel *gb* moves once round in the time that the pinion of report, on the arbor of the centre or minute wheel, makes 12 revolutions, as required. Hence the ftructure of that part of a clock or watch which fhows the time may be eafily underftood. The cylinder A (fig. 10.) put into motion by a weight or inclofed fpring moves the fufee B, and the great wheel C, to which it is fixed by the line or cord that goes round each, and anfwers to the chain of a watch.

The method of calculation is eafily underftood: for, fuppofe the great wheel C goes round once in 12 hours, then if it be a royal pendulum clock, fwinging feconds, we have $60 \times 60 \times 12 = 43200$ feconds or beats in one turn of the great wheel. But becaufe there are fixty fwings or feconds in one minute, and the feconds are fhown by an index on the end of the arbor of the fwing-wheel, which in thofe clocks is in an horizontal pofition; therefore, it is neceffary that the fwing-wheel F fhould have thirty teeth; whence $\frac{43200}{60} = 720$, the number to be broken into quotients for finding the number of teeth for the other wheels and pinions.

In fpring-clocks, the difpofition of the wheels in the watch-part is fuch as is reprefented in the figure, where the crown-wheel F is in an horizontal pofition; the feconds not being fhown there by an index, as is done in the large pendulum clocks. Whence in thefe clocks the wheels are difpofed in a different manner, as reprefented in fig. 11. where C is the great wheel, and D the centre or minute wheel, as before: but the contrate-wheel E is placed on one fide, and F the fwing-wheel is placed with its centre in the fame perpendicular line GH with the minute-wheel, and with its plane perpendicular to the horizon, as are all the others. Thus the minute and hour hands turn on the end of the arbor of the minute wheel at *a*, and the fecond hand on the arbor of the fwing-wheel at *b*.

It is requifite for thofe who make nice aftronomical obfervations, to have watches that make fome exact number of beats *per* fecond, without any fraction; but we feldom find a watch that does. As four beats *per* fecond would be a very convenient number, we fhall here give the train for fuch a watch, which would (like moft others) go 30 hours, but is to be wound up once in 24 hours.

The fufee and firft wheel to go round in four hours. This wheel has 48 teeth, and it turns a pinion of 12 leaves, on whofe axis is the fecond wheel, which goes round in one hour, and carries the minute-hand. This wheel has 60 teeth, and turns a pinion of 10 leaves; on whofe axis is the third wheel of 60 teeth, turning a pinion of 6 leaves; on whofe axis is the fourth (or contrate) wheel, turning round in a minute, and carrying the fmall hand that fhows the feconds, on a fmall circle on the dial-plate, divided into 60 parts; this contrate wheel has 48 teeth, and turns a pinion of fix leaves; on whofe axis is the crown or balance-wheel of 15 teeth, which makes 30 beats in each revolution. The crown-wheel goes 480 times round in an hour, and 30 times 480 make 14400, the number of beats in an hour. But one hour contains 3600 feconds; and 14400 divided by 3600 quotes 4, the required number of beats in a fecond. The fufee muft have $7\frac{1}{2}$ turns, to fet the chain go fo many times round it. Then, as 1 turn is to 4 hours, fo is $7\frac{1}{2}$ turns to 30 hours, the time the watch would go after it is wound up. See further the articles Movement, Turn, and Watch.

Chime-Clock; a kind of clock furnifhed with mufical bells. See Chimes *of a clock*. In the Tranfactions of the Society for the Encouragement of Arts, &c. for 1786, is given a defcription of an improved piece of mechanifm of this kind, invented by Mr. Sampfon. The fame duty can be fafely performed by one train of wheels in this clock as it can by two trains of wheels in the common one; becaufe in this clock, the wheels of communication are pufhed into their place before the clock gives warning, and that warning makes it fafe, for the locking cannot drop into its place again, therefore the clock muft chime and ftrike: but in common chime clocks the ufual way of difcharging the chime is by a flirt, which in many inftances has been known to fail. The pieces A, B, D and E, plate 83, all move together on the centre C. The wheels of communication marked 24 each, are both on one arbor, and communicate motion from the pin wheel in the ftriking train to the chime barrel. When the pin in the minute wheel begins to lift the piece D, confequently the piece E will pufh the wheel 24 into the teeth of the pin wheel now at reft before the clock gives warning. Alfo B will be lifted out of the locking plate, and A will be moved over the detent on which is the hammer tail F, and thereby pump it off the pins in the pin wheel, and prevent it from ftriking the hour bell while the mufic is playing. When the rack is difcharged, and the warning piece G has dropped off the pin in the other minute wheel, the ftriking train will be in motion, and turn the chime barrel, which while it is playing, the pin at H prevents the hook from gathering up the rack. When the chime has done playing, the fmall fpring I pufhes the wheels 24 out of the teeth of the pin wheel; and the pieces A, B, D, and E, return into the places as reprefented in the callipers, and then the clock ftrikes the hour.

CLODIUS (Publius), a Roman defcended of an illuftrious family; and famous for his licentioufnefs, avarice and ambition. He was the inveterate enemy of Cato and of Cicero, and by his influence banifhed the latter from Rome. Clodius was fome time after murdered by Milo.

CLOGHER, an epifcopal town and borough of Ireland, in the county of Tyrone. Long. 6. 50. W. Lat. 54. 30. N.

CLOISTER, *Clauftrum*, a habitation furrounded with walls, and inhabited by canons or religious, &c. In a more general fenfe, cloifter denotes a monaftery of religious of either fex. In a more reftrained fenfe, cloifter is ufed for the principal part of a regular monaftery, confifting of a fquare built around; ordinarily between the church, the chapter-houfe, and the refectory; and over which is the dormitory. The cloifters ferved for feveral purpofes in the ancient monafteries. Petrus Blefenfis obferves, that it was here the monks held their lectures:

the lecture of morality on the north side, next the church; the school on the west, and the chapter on the east; spiritual meditation, &c. being reserved for the church. Lanfranc observes, that the proper use of the cloister was for the monks to meet in, and converse together, at certain hours of the day. The form of the cloister was square; and it had its name *claustrum*, from *claudio*, "I shut or close;" as being inclosed on its four sides with buildings. Hence, in architecture, a building is still said to be in form of a cloister, when there are buildings on each side of the four sides of the court.

CLONMEL, a borough of Ireland, in the county of Tipperary, seated on the river Sure, 19 miles S. E. of Tipperary. Lon. 7. 27. W. Lat. 52. 14. N.

CLOSE, in heraldry. When any bird is drawn in a coat of arms with its wings close down about it (*i. e.* not displayed), and in a standing posture, they blazon it by this word *close*; but if it be flying, they call it *volant*. See VOLANT.

CLOSE, in music. See CADENCE.

CLOSE-*Hauled*, in navigation, the general arrangement or trim of a ship's sails when she endeavours to make a progress in the nearest direction possible towards that point of the compass from which the wind blows. In this manner of sailing, the keel commonly makes an angle of six points with the line of the wind; but sloops and some other small vessels are said to sail almost a point nearer. All vessels, however, are supposed to make nearly a point of lee-way when close-hauled, even when they have the advantage of a good sailing breeze and smooth water. The angle of lee-way, however, increases in proportion to the increase of the wind and sea. In this disposition of the sails, they are all extended sideway on the ship, so that the wind, as it crosses the ship obliquely toward the stern from forwards, may fill their cavities. But as the current of winds also enters the sails in an oblique direction, the effort of it to make the ship advance is considerably diminished: she will therefore make the least progress when sailing in this manner. The ship is said to be close-hauled, because at this time her *tacks*, or lower corners of the principal sails, are drawn close down to her side to windward, the sheets hauled close-aft, and all the bow-lines drawn to their greatest extension to keep the sails steady.

CLOSE-*Quarters*, certain strong barriers of wood, stretching across a merchant-ship in several places. They are used as places of retreat when a ship is boarded by her adversary, and are therefore fitted with several small loop-holes through which to fire small arms, and thereby annoy the enemy and defend themselves. They are likewise furnished with several caissons, called *powder-chests*, which are fixed upon the deck, and filled with powder, old nails, &c. and may be fired at any time from the close-quarters upon the boarders.

CLOT BIRD: a species of FRINGILLA.

CLOTH, in commerce, a manufacture made of wool, wove in the loom. Cloths are of various qualities, fine or coarse. The goodness of cloth, according to some, consists in the following particulars: 1. That the wool be of a good quality, and well dressed. 2. It must be equally spun, carefully observing that the thread of the warp be finer and better twisted than that of the wool. 3. The cloth must be well wrought, and beaten on the loom, so as to be every where equally compact. 4. The wool must not be finer at one end of the piece than the rest. The lists must be sufficiently strong, of the same length with the stuff, and must consist of good wool, hair, or ostrich-feathers; or, what is still better, of Danish dog's hair. 6. The cloth must be free from knots and other imperfections. 7. It must be well scoured with fuller's earth, well fulled with the best white soap, and afterwards washed in clear water. 8. The hair or nap must be well drawn out with the teazel, without being too much opened. 9. It must be shorn close without making it thread-bare. 10. It must be well dried. 11. It must be tenter-stretched to force it to its just dimensions. 12. It must be pressed cold, not hot pressed, the latter being very injurious to woollen cloth.

Manufacturing of white Cloths which are intended for dyeing. The best wools for manufacturing of cloth are those of England and Spain, especially those of Lincolnshire and Segovia. To use those wools to the best advantage, they must be scoured, by putting them into a liquor somewhat more than lukewarm, composed of three parts fair water and one of urine. After the wool has continued long enough in the liquor to soak, and dissolve the grease, it is drained and well washed in running water. When it feels dry, and has no smell but the natural one of the sheep, it is said to be duly scoured. After this, it is hung to dry in the shade; the heat of the sun making it harsh and inflexible: when dry, it is beat with rods upon hurdles of wood, or on cords, to cleanse it from dust and the grosser filth; the more it is thus beat and cleansed, the softer it becomes, and the better for spinning. After beating, it must be well picked, to free it from the rest of the filth that has escaped the rods.

It is now in a proper condition to be oiled, and carded on large iron cards placed slopewise. Olive oil is esteemed the best for this purpose; one fifth of which should be used for the wool intended for the woof, and a ninth for that designed for the warp. After the wool has been well oiled, it is given to the spinners, who first card it on the knee with small fine cards, and then spin it on the wheel, observing to make the thread of the warp smaller by one third than that of the woof, and much compacter twisted.

The thread thus spun, is reeled, and then made into skeins. That designed for the woof is wound on little tubes, pieces of paper, or rushes, so disposed as that they may be easily put in the eye of the shuttle. That for the warp is wound on a kind of large wooden bobbins, to dispose it for warping. When warped, it is stiffened with size; the best of which is that made of shreds of parchment; and when dry, is given to the weavers, who mount it on the loom. The warp thus mounted, the weavers, who are two to each loom, one on each side, tread alternately on the treddle, first on the right step, and then on the left, which raises and lowers the threads of the warp equally; between which they throw transversely the shuttle from the one to the other: and every time that the shuttle is thus thrown, and a thread of the woof inserted within the warp, they strike it conjunctly with the same frame, wherein is fastened the comb or reed, between whose teeth the threads of the warp are passed, repeating the stroke as often as is necessary. The weavers having continued their work till the whole warp is filled with the woof, the cloth is finished: it is then taken off the loom by unrolling it from the beam whereon it had been rolled in proportion as it was wove; and now given to be cleansed of the knots, ends of threads, straws, and other filth, which is done with iron nippers.

In this condition it is carried to the fullery, to be scoured with urine, or a kind of potter's clay, well steeped in water, put along with the cloth in the trough wherein it is fulled. The cloth being again cleared from the earth or urine, is returned to the former hands to have the lesser filth, small straws, &c. taken off as before: then it is returned to the fuller to be beat and fulled with hot water, wherein a suitable quantity of soap has been dissolved; after fulling, it is taken out to be smoothed or pulled by the lists lengthwise, or to take out the wrinkles, crevices, &c. The smoothing is repeated every two hours, till the fulling be finished, and the cloth brought to its proper breadth: after which it is washed in clear water, to purge it of the soap, and given wet to the carders to raise the hair or nap on the right side with the thistle or weed. After this preparation the cloth-worker takes the cloth, and gives it

its first cut or shearing: then the carders resume it, and, after wetting, give it as many more courses with the teazle as the quality of the stuff requires, always observing to begin against the grain of the hair, and to end with it; as also to begin with a smoother thistle, proceeding still with one sharper and sharper, as far as the sixth degree. After these operations, the cloth being dried is returned to the cloth-worker, who sheers it a second time, and returns it to the carders, who repeat their operation as before, till the nap be well ranged on the surface of the cloth, from one end of the piece to the other.

The cloth thus wove, scoured, napped, and shorn, is sent to the dyer; when dyed, it is washed in fair water, and the worker takes it again wet as it is, lays the nap with a brush on the table, and hangs it on the tenters, where it is stretched both in length and breadth sufficiently to smooth it, set it square, and bring it to its proper dimensions, without straining it too much; observing to brush it afresh, the way of the nap, while a little moist, on the tenters. When quite dry, the cloth is taken off the tenters, and brushed again on the table, to finish the laying of the nap: after which it is folded, and laid cold under a press, to make it perfectly smooth and even, and give it a gloss. Lastly, the cloth being taken out of the press, and the papers, &c. for glossing it removed, it is in a condition for sale or use. With regard to the manufacture of mixed cloths, or those wherein the wools are first dyed, and then mixed, spun, and wove of the colours intended, the process, except what relates to the colour, is mostly the same with that just represented.

CLOTH *made from Vegetable Filaments*. See BARK and FILAMENTS.

Incombustible CLOTH. See ASBESTOS.

CLOTHO, the youngest of the three Parcæ, daughters of Jupiter and Themis. She was supposed to preside over the moment of man's birth. She held the distaff in her hand, and spun the thread of life, whence her name κλωθω "to spin." She was represented wearing a crown with seven stars, and covered with a variegated robe.

CLOUD, a collection of vapours suspended in the atmosphere and rendered visible.

Although it be generally allowed that the clouds are formed from the aqueous vapours, which before were so closely united with the atmosphere as to be invisible, it is, however, not easy to account for the long continuance of some very opaque clouds without dissolving; or to assign a reason why the vapours, when they have once begun to condense, do not continue to do so till they at last fall to the ground in the form of rain or snow, &c. It is now known that a separation of the latent heat from the water of which vapour is composed is attended with a condensation of that vapour in some degree; in such case, it will first appear as a smoke, mist, or fog; which, if interposed between the sun and earth, will form a cloud; and the same causes continuing to operate, the cloud will produce rain or snow. It is however abundantly evident that some other cause besides mere heat or cold is concerned in the formation of clouds, and the condensation of atmospherical vapours. This cause is esteemed in a great measure the electrical fluid; indeed electricity is now so generally admitted as an agent in all the great operations of nature, that it is no wonder to find the formation of clouds attributed to it; and this has accordingly been given by Beccaria as the cause of the formation of all clouds whatsoever, whether of thunder, rain, hail, or snow.

But whether the clouds are produced, that is, the atmospheric vapours rendered visible, by means of electricity or not, it is certain that they do often contain the electric fluid in prodigious quantities, and many terrible and destructive accidents have been occasioned by clouds very highly electrified. The most extraordinary instance of this kind perhaps on record happened in the island of Java, in the East-Indies, in August 1772. On the 11th of that month, at midnight, a bright cloud was observed covering a mountain in the district called Cheribou, and several reports like those of a gun were heard at the same time. The people who dwelt upon the upper parts of the mountain not being able to fly fast enough, a great part of the cloud, eight or nine miles in circumference, detached itself under them, and was seen at a distance, rising and falling like the waves of the sea, and emitting globes of fire so luminous, that the night became as clear as the day. The effects of it were astonishing; every thing was destroyed for 20 miles round; the houses were demolished; plantations were buried in the earth; and 2140 people lost their lives, besides 1500 head of cattle, and a vast number of horses, goats, &c. Another remarkable instance of the dreadful effects of electric clouds, which happened at Malta the 29th of October 1757, is related in Brydone's Tour through Malta.

The height of the clouds is not usually great: the summits of high mountains being commonly quite free from them, as many travellers have experienced in passing these mountains. It is found that the most highly electrified clouds descend lowest, their height being often not more than 7 or 800 yards above the ground; and sometimes thunder-clouds appear actually to touch the ground with one of their edges: but the generality of clouds are suspended at the height of a mile, or little more, above the earth.

The motions of the clouds, though often directed by the wind, are not always so, especially when thunder is about to ensue. In this case they are seen to move very slowly, or even to appear quite stationary for some time. The reason of this probably is, that they are impelled by two opposite streams of air nearly of equal strength; and in such cases it seems that both the aërial currents ascend to a considerable height; for Mess. Charles and Robert, when endeavouring to avoid a thunder cloud, in one of their aërial voyages with a balloon, could find no alteration in the course of the current, though they ascended to the height of 4000 feet above the earth. In some cases the motions of the clouds evidently depend on their electricity, independent of any current of air whatever. Thus, in a calm and warm day, small clouds are often seen meeting each other in opposite directions, and setting out from such short distances, that it cannot be supposed that any opposite winds are the cause. Such clouds, when they meet, instead of forming a larger one, become much smaller, and sometimes quite vanish; a circumstance most probably owing to the discharge of opposite electricities into each other. And this serves also to throw some light on the true cause of the formation of clouds; for if two clouds, the one electrified positively, and the other negatively, destroy each other on contact, it follows that any quantity of vapour suspended in the atmosphere, while it retains its natural quantity of electricity, remains invisible, but becomes a cloud when electrified either plùs or minus.

The shapes of the clouds are also probably owing to their electricity; for in those seasons in which a great commotion has been excited in the atmospherical electricity, the clouds are seen assuming strange and whimsical shapes, that are continually varying. This, as well as the meeting of small clouds in the air, and vanishing upon contact, is a sure sign of thunder.

The uses of the clouds are evident, as from them proceeds the rain that refreshes the earth, and without which, according to the present state of nature, the whole surface of the earth must become a mere desert. They are likewise useful as a screen interposed between the earth and the scorching rays of the sun, which are often so powerful as to destroy the grass and other tender vegetables. In the more secret operations of na-

ture too, where the electric fluid is concerned, the clouds bear a principal ſhare; and chiefly ſerve as a medium for conveying that fluid from the atmoſphere into the earth, and from the earth into the atmoſphere: in doing which, when electrified to a great degree, they ſometimes produce very terrible effects; an inſtance of which is related above.

CLOVE-TREE, in botany. See CARYOPHYLLUS.

CLOVE, a term uſed in the weights of wool. Seven pounds make a clove. In Eſſex, eight pounds of cheeſe and butter go to the clove.

CLOVE, *July-flower*. See DIANTHUS.

CLOVER-GRASS, in botany. See TRIFOLIUM; and HUSBANDRY.

CLOUGH, or DRAUGHT, in commerce, an allowance of two pounds in every hundred weight for the turn of the ſcale, that the commodity may hold out weight when ſold out by retail.

CLOVIO (Giorgio Giulio), a hiſtory and portrait painter, was born in Sclavonia in 1498. Having in the early part of his youth applied himſelf to literature, his genius prompted him to purſue the art of painting for a profeſſion: and at 18 years of age he went to Rome, where he ſpent three years to perfect his hand in drawing, and devoted himſelf entirely to painting in miniature. His knowledge of colouring was eſtabliſhed by the inſtructions of Julio Romano, and his taſte of compoſition and deſign was founded on the obſervations he made on the works of Michael Angelo Buonaroti. By thoſe aſſiſtances he proceeded to ſuch a degree of excellence in portrait as well as in hiſtory, that in the former he was accounted equal to Titian, and in the latter not inferior to Buonaroti. He died in 1758. His works are exceedingly valuable, and are at this day numbered among the curioſities of Rome.

CLOUTS, in gunnery, are thin plates of iron nailed on that part of the axle-tree of a gun-carriage which comes through the nave, and through which the linſpin goes.

CLOYNE, an epiſcopal town and borough of Ireland, in the county of Cork, 16 miles E. of Cork. Lon. 8. 0. W. Lat. 51. 54. N.

CLUE OF A SAIL, the lower corner; and hence

CLUE-*Garnets*, a ſort of tackles faſtened to the clues, or lower corners of the main-ſail or fore-ſail, to truſs them up to the yard as occaſion requires, which is uſually termed *clueing up the ſails*.

CLUE-*Lines* are for the ſame purpoſe as clue garnets: only that the latter are confined to the courſes, whereas the former are common to all the ſquare ſails. See farther on this head under the article SHIP.

CLUNY, or CLOGNY, a celebrated abbey of Benedictine monks, in a city of that name; being the head or chief of a congregation denominated from them. It is ſituated in the Maſonnois, a little province of France, on the river Grône; and was founded by William duke of Berry and Aquitain; or, as others ſay, by the abbot Bernon, ſupported by that duke, in the year 910. This abbey was anciently ſo very ſpacious and magnificent, that in 1245, after the holding of the firſt council of Lyons, Pope Innocent IV. went to Cluny, accompanied with the two patriarchs of Antioch and Conſtantinople, 12 cardinals, 3 archbiſhops, 15 biſhops, and a greater number of abbots; who were all entertained, without one of the monks being put out of their place: though S. Louis, Q. Blanche his mother, the duke of Artois his brother, and his ſiſter; the emperor of Conſtantinople, the ſons of the kings of Arragon and Caſtile, the duke of Burgundy, 6 counts, and a great number of lords, with all their retinues, were there at the ſame time.

This order of monks was brought into England by William earl of Warren, ſon-in-law to William the Conqueror, who built a houſe for them at Lewes in Suſſex about the year 1077. There were 27 priories and cells of this order in England, which were governed by foreigners, afterwards made denizens.

CLUPEA, or HERRING, in ichthyology, a genus belonging to the order of abdominales. The upper jaw is furniſhed with a ſerrated myſtache; the branchioſtege membrane has eight rays; a ſcaly ſerrated line runs along the belly from the head to the tail; and the belly-fins have frequently nine rays. There are 11 ſpecies, *viz.*

1. The *harengus*, or common herring, has no ſpots, and the under jaw is longer than the upper one. A herring dies immediately after it is taken out of the water; whence the proverb, *As dead as a herring*. Herrings are found from the higheſt northern latitudes yet known, as low as the northern coaſts of France: and except one inſtance brought by Dod, of a few being taken in the bay of Tangier, none are ever found more ſoutherly. They are met with in vaſt ſhoals on the coaſt of America, as low as Carolina. In Cheſapeak-bay is an annual inundation of thoſe fiſh, which cover the ſhore in ſuch quantities as to become a nuiſance. The great winter rendezvous of the herring is within the arctic circle: there they continue for many months in order to recruit themſelves after the fatigue of ſpawning; the ſeas within that ſpace ſwarming with inſect food in a far greater degree than thoſe of our warmer latitudes. An immenſe number of them begin to appear off the Shetland iſles in April and May; but theſe are only the forerunners of the grand ſhoal which comes in June; and their appearance is marked by certain ſigns, by the numbers of birds which follow to prey on them; but when the main body approaches, its breadth and depth is ſuch as to alter the appearance of the very ocean. It is divided into diſtinct columns of five or ſix miles in length, and three or four in breadth, and they drive the water before them with a kind of rippling: ſometimes they ſink for the ſpace of ten or fifteen minutes, and then riſe again to the ſurface; and in fine weather reflect a variety of ſplendid colours.

The firſt check this army meets in its march ſouthward is from the Shetland iſles, which divide it into two parts; one wing takes to the eaſt, the other to the weſtern ſhores of Great Britain, and fill every bay and creek with their numbers; others paſs on towards Yarmouth, the great and ancient mart of herrings: they then paſs through the Britiſh Channel, and after that, in a manner diſappear. Thoſe which take towards the weſt, after offering themſelves to the Hebrides, where the great ſtationary fiſhery is, proceed to the north of Ireland, where they meet with a ſecond interruption, and are obliged to make a ſecond diviſion; the one takes to the weſtern ſide, and is ſcarce perceived, being ſoon loſt in the immenſity of the Atlantic; but the other, that paſſes into the Iriſh ſea, rejoices and feeds the inhabitants of moſt of the coaſts that border on it. Theſe brigades, as we may call them, which are thus ſeparated from the greater columns, are often capricious in their motions, and do not ſhow an invariable attachment to their haunts.

They are full of roe in the end of June, and continue in perfection till the beginning of winter, when they depoſit their ſpawn. The young herrings begin to approach the ſhores in July and Auguſt, and are then from half an inch to two inches long: thoſe in Yorkſhire are called *herring ſile*. Though we have no particular authority for it, yet as very few young herrings are found in our ſeas during winter, it ſeems moſt certain that they muſt return to their paternal haunts beneath the ice, to repair the vaſt deſtruction of their race during ſummer by men, fowl, and fiſh. Some of the old herrings continue on our coaſt the whole year: the Scarborough fiſhermen never put down their net but they catch a few: but the numbers that remain are not worth compariſon with thoſe that return. See

Herring-FISHERY. The Dutch are moſt extravagantly fond of this fiſh when pickled. A premium is given to the firſt buſs that arrives in Holland with a lading of this their ambroſia, and a vaſt price given for each keg. There is as much joy among the inhabitants on its arrival, as the Egyptians ſhow on the overflowing of the Nile. Flanders had the honour of inventing the art of pickling herrings.

2. The *ſprattus* has 13 rays in the back fin. It is a native of the European ſeas, and has a great reſemblance to the herring, only it is of a leſs ſize. They come into the river Thames below bridge in the beginning of November, and leave it in March; and are, during that ſeaſon, a great relief to the poor of the capital, who conſume prodigious quantities of them. At Graveſend and at Yarmouth they are cured like red herrings: they are ſometimes pickled, and are little inferior in flavour to the anchovy, but the bones will not diſſolve like thoſe of the latter.

3. The *aloſa*, or *ſhad*, has a forked ſnout, and black ſpots on the ſides. According to Belonius and Haſſelquiſt, this is a fiſh of paſſage in the Nile. In Britain the Severn affords this fiſh in higher perfection than any other river. It makes its firſt appearance there about May, continues about two months, and then is ſucceeded by a variety (having one or more round black ſpots on the ſides) named the *Twaite*, which is there in as great diſrepute as the Thames ſhad.

Whether the Severn ſhad ſpawn in this river and the Wye is not determined, for their fry has not yet been aſcertained. The old fiſh come from the ſea into the river in full roe. In the months of July and Auguſt, multitudes of bleak frequent the river near Glouceſter; ſome of them are as big as a ſmall herring, and theſe the fiſhermen erroneouſly ſuppoſe to be the fry of the ſhad. Numbers of theſe are taken near Glouceſter, in thoſe months only, but none of the emaciated ſhad are ever caught in their return. The *Thames* ſhad does not frequent the river till the latter end of May or beginning of June, and is eſteemed a very coarſe and inſipid ſort of fiſh.

4. The *encraſicolus*, or *anchovy*, has its upper jaw longer than the under one, and is about three inches long. They are taken in vaſt quantities in the Mediterranean, and are brought over here pickled. The great fiſhery is at Georgia, a ſmall iſland weſt of Leghorn. See *Anchovy*-FISHERY. There are ſeven other ſpecies of the herring beſides thoſe which have been deſcribed above.

CLUSIA, the BALSAM-TREE; a genus of the monogynia order, belonging to the polygamia claſs of plants; and in the natural method ranking under thoſe plants the order of which is doubtful. The calyx is tetraphyllous or hexaphyllous, with its leaflets oppoſite and imbricated; the corolla tetrapetalous or hexapetalous; the ſtamina numerous. The calyx and corolla of the female as in the male; the nectarium of antheræ or glandules coalited, including the germen. The capſule is quinquelocular, quinquevalved, and full of pulp. There are four ſpecies, all natives of America. The moſt remarkable is the *flava*. This is pretty common in the Britiſh American iſlands, where the trees grow to the height of 20 feet, and ſhoot out many branches on every ſide, furniſhed with thick, round, ſucculent leaves placed oppoſite. The flowers are produced at the ends of the branches, each having a thick ſucculent cover. After the flowers are paſt, they are ſucceeded by oval fruit. From every part of theſe trees there exudes a kind of turpentine, called in the Weſt Indies *hog-gum*. Theſe plants are very tender, and in this country muſt be kept conſtantly in a ſtove; and ſparingly watered, eſpecially in winter; for they naturally grow in thoſe parts of the iſlands where it ſeldom rains, and conſequently cannot bear much moiſture. They may be propagated from cuttings, which muſt be laid to dry for a fortnight or three weeks, that the wounded parts may be healed over; otherwiſe they will rot. The beſt time for planting theſe cuttings is in July, that they may be well rooted before the cold weather comes on in autumn.

CLUTIA, in botany; a genus of the gynandria order, belonging to the diœcia claſs of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The male calyx is pentaphyllous, the corolla pentapetalous: the calyx and corolla of the female as in the male; the ſtyles are three, and the capſule is trilocular with a ſingle ſeed. There are three ſpecies, all of them natives of warm climates. They are evergreen ſhrubby plants, riſing ſix or eight feet high, garniſhed with ſimple leaves, and greeniſh-white quinquepetalous flowers. They are propagated by cuttings in ſpring or ſummer, planting them in pots of light earth, plunged in a hot-bed. The plants muſt always be kept in a ſtove. Dr. Wright, in his account of the medicinal plants of Jamaica, ſays that the *clauſia elutheria* is the ſame as the caſcarilla and elutheria of the ſhops. Other medical writers have ſuppoſed them to be diſtinct barks, and they are ſold in the ſhops as different productions. Linnæus's croton caſcarilla, Dr. Wright obſerves, is the wild roſemary ſhrub of Jamaica, the bark of which has none of the ſenſible qualities of the caſcarilla.

CLUVIER (Philip), in Latin *Cluverius*, a celebrated geographer, born at Dantzic in 1580. He travelled into Poland, Germany, and the Netherlands, in order to ſtudy law; but, being at Leyden, Joſeph Scaliger perſuaded him to give way to his genius for geography. Cluvier followed his advice, and for this purpoſe viſited the greateſt part of the European ſtates. He was well verſed in many languages; and wherever he went, obtained illuſtrious friends and protectors. At his return to Leyden, he taught there with great applauſe; and died in 1623, aged 43. He wrote, 1. *De tribus Rheni alveis*. 2. *Germania antiqua*. 3. *Sicilia antiqua*. 4. *Italia antiqua*. 5. *Introductio in univerſam Geographiam*. All of them are juſtly eſteemed.

CLYDE, a river of Scotland, which riſes in Annandale, and running N. W. through Clydeſdale, paſſes by Lanerk, Hamilton, and Glaſgow, falling into the frith of Clyde, a few miles below Glaſgow. Near Lanerk, this river runs, for ſeveral miles, between high rocks covered with wood; and in its courſe exhibits many aſtoniſhing cataracts. At Stonebyres, it is confined within a very narrow bed, and makes one entire ſhoot, falling about 60 feet over a perpendicular rock; the water then pouring over another precipice, is daſhed into a deep chaſm beneath. "This great body of water," ſays a late traveller, "ruſhing with horrid fury, ſeems to threaten deſtruction to the ſolid rocks. The horrid and inceſſant din with which this is accompanied, unnerves and overcomes the heart. At the diſtance of about a mile from this place, you ſee a thick miſt, like ſmoke, aſcending to heaven, over the ſtately woods. As you advance, you hear a ſullen noiſe, which ſoon after almoſt ſtuns your ears. Doubling as you proceed toward a tuft of wood, you are ſtruck at once with the awful ſcene which ſuddenly burſts upon your aſtoniſhed ſight. Your organs of perception are hurried along, and partake of the turbulence of the roaring water. The powers of recollection remain ſuſpended by this ſudden ſhock; and it is not till after a conſiderable time, that you are enabled to contemplate the ſublime horrors of this majeſtic ſcene." The waterfall at Corehouſe, called Cora-lin, is no leſs remarkable. The water is here precipitated at leaſt 100 feet between two vaſt rugged precipices. On a pointed rock, overhanging this ſtupendous ſcene, ſtands a ſolitary tower. It was lately inhabited, but is now in ruins. In floods, the rock and tower have been obſerved to ſhake in ſuch a manner as to ſpill water in a glaſs ſtanding on a table in the caſtle. A path leads to the top of the fall, where, from a projecting rock, the ſpectator has a

tremendous view down the furious cataract, as it pours below the eye. The banks of this river are adorned on both fides with woods and orchards, and enriched with many elegant villas.

CLYPEOLA, TREACLE-MUSTARD; a genus of the filiculofa order, belonging to the tetradynamia clafs of plants; and in the natural method ranking under the 39th order, *Siliquofæ*. The filicula is emarginated, orbiculated, compreffed, plane, and deciduous. There are two fpecies, both natives of France, Italy, and the warm parts of Europe, but hardy enough to bear the winters in this country. One of them is an annual, and the other a perennial plant; both are low and herbaceous, bearing fpikes of white flowers. They are propagated by feeds, which fhould be fown in autumn where they are to remain.

CLYPEUS, in natural hiftory, a name given to the flat depreffed centroniæ, from their refembling a fhield. See CENTRONIA.

CLYSSUS, an extract prepared, not from one, but feveral bodies mixed together: and, among the moderns, the term is applied to feveral extracts prepared from the fame body, and then mixed together.

CLYSTER, is a liquid remedy, to be injected chiefly at the anus into the larger inteftines. It is ufually adminiftered by means of a bladder, perforated at each end, and having at one of the apertures an ivory pipe faftened with pack-thread. But it is common now to employ a kind of bag of elaftic gum, or elfe a pewter fyringe, fuch as is ufed among the French. For this purpofe liquids fhould neither be adminiftered too hot nor too cold, but moderately warm. Clyfters are fometimes ufed to nourifh and fupport a patient who can fwallow little or no aliment, becaufe of fome impediment in the organs of deglutition, in which cafe they may be made of broth, milk, ale, and decoctions of barley and oats with wine. A kind of clyfter of the fmoke of tobacco, has been ufed with confiderable effect when other clyfters proved ineffectual, in the iliac paffion, in the *hernia incarcerata*, and for the recovery of drowned perfons.

CLYTEMNESTRA, in fabulous hiftory, the daughter of Jupiter and Leda. She married Agamemnon; but while that prince was at the fiege of Troy, fhe had an amorous intrigue with Ægifthus, whom fhe engaged to murder Agamemnon at his return to his dominions. Her fon Oreftes, however, revenged the death of his father by killing Ægifthus, with his mother Clytemneftra; but was afterwards haunted by the Furies as long as he lived.

CLYTIA, or CLYTIE, daughter of Oceanus and Tethys, beloved by Apollo. She was deferted by her lover, who paid his addreffes to Leucothoe; and this fo irritated her, that fhe difcovered the whole intrigue to her rival's father. Apollo defpifed her the more for this; and fhe pined away, and was changed into a flower, commonly called a *fun-flower*, which ftill turns its head towards the fun in his courfe in token of her love.

CNEORUM, WIDOW-WAIL; a genus of the monogynia order, belonging to the triandria clafs of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The calyx is tridentated; there are three equal petals, and a tricoccous berry. There is but one fpecies, a little evergreen and very ornamental fhrub, adorned with fimple leaves, and tripetalous flowers of a pale yellow colour. It is propagated from feeds, and requires no other care than to be kept free from weeds.

CNICUS, BLESSED THISTLE; a genus of the polygamia æqualis order, belonging to the fyngenefia clafs of plants; and in the natural method ranking under the 49th order, *Compofitæ*. The calyx is ovate, imbricated with fpinous-branched fcales, and encircled with bracteæ. The florets are equal. There are feven fpecies, of which the only remarkable one is that formerly much ufed in medicine under the name of *carduus benedictus*. This is an annual plant cultivated in gardens: it flowers in June and July, and perfects its feeds in autumn.

COACH, a vehicle for commodious travelling fufpended on fprings, and moved on four wheels. In Britain, and throughout Europe, the coaches are drawn by horfes, except in Spain, where they ufe mules. In a part of the eaft, efpecially the dominions of the great Mogul, their coaches are drawn by oxen. In Denmark they fometimes yoke rein-deer in their coaches; though rather for curiofity than ufe. The coachman is ordinarily placed on a feat raifed before the body of the coach; but in Spain it is otherwife, the coachman being placed like our poftillion, on the firft horfe on the left.

The invention of coaches is owing to the French; yet are they not of any great antiquity, fcarce reaching beyond the reign of their Francis I. Coaches at firft were only ufed for the country: and authors obferve, as a thing very fingular, that there were at firft no more than two in Paris: the one belonging to the queen, and the other to Diana, natural daughter of Henry II. The firft courtier who had one was Jean de Laval de Bois Dauphin; whofe enormous bulk difabled him from travelling on horfeback. In Paris, prior to the revolution, the number of thefe vehicles is faid to have amounted to 15000; and many fuppofe that in London they have increafed in almoft the fame proportion. Coaches and other carriages for luxurious purpofes are fubject to a very heavy annual tax; as are alfo the makers of them, who are compelled to take out a licence.

Hackney-COACHES, thofe expofed to hire, in the ftreets of London, and fome other great cities, at rates fixed by authority. One thoufand hackney-coaches are allowed in London and Weftminfter; which are licenfed by commiffioners, and pay a duty to the crown. They are all numbered, having their numbers marked on tin plates fixed on the coach-doors. Their fares or rates are fettled by act of parliament.

Stage-COACHES, are thofe appointed for the conveyance of travellers from one city or town to another. The mafters of ftage-coaches are not liable to an action for things loft by their coachmen, who have money given them to carry the goods, unlefs where fuch mafter takes a price for the fame. Thefe alfo pay an annual duty to the revenue.

Mail-COACHES, are a fort of ftage-coaches calculated for expeditioufly carrying the mails, which are protected by a guard, and fubject to the regulations of the poft-office. They are exact as to their time of arrival and departure, are reftricted to four infide paffengers, and from experience have proved very beneficial to the commerce and correfpondence of this country.

COACH or COUCH, is alfo a fort of chamber or apartment in a large fhip of war near the ftern. The floor of it is formed by the aftmoft part of the quarter-deck, and the roof of it by the poop: it is generally the habitation of the captain.

COADUNATE, in botany, an order of plants in the *Fragmenta methodi naturalis* of Linnæus, in which he has thefe genera, viz. annona, liriodendrum, magnolia, uvaria, michelia, thea.

COAGULATION, in chemiftry, the act of rendering a fluid body in fome degree folid, by expofure to cold or by the addition of fome agent by which it is decompofed. Thus the white of eggs, the ferum of the blood, &c. are coagulated by the addition of alcohol; milk, by mixture with acids; the ferum of the blood by expofure to heat, &c. The fubftance thus produced is called the *coagulum*. Many writers have called cryftallization, congelation, &c. by the fame name.

COAKS. For the exciting of intenfe heats, as for the fmelting of iron ore, and for operations where the acid and oily particles would be detrimental, as the drying of malt, foffil-coals are previoufly charred, or reduced to *coaks*; that is, they

are made to undergo an operation fimilar to that by which charcoal is made. By this operation coals are deprived of their phlegm, their acid liquor, and part of their fluid oil. Coaks, therefore, confift of the two moft fixed conftituent parts, the heavy oil and the earth, together with the acid concrete falt, which, though volatile, is diffolved by the oil and the earth.

COAL, in mineralogy, a kind of folid inflammable fubftance, fuppofed to be of a bituminous nature, and commonly ufed for fuel. Of this fubftance there are various fpecies. 1. *Pit-coal (Lithanthrax)* is a black, folid, compact, brittle mafs, of moderate hardnefs, lamellated ftructure, more or lefs fhining, but feldom capable of a good polifh; and does not melt when heated. According to Kirwan, it confifts of petrol or afphaltum, intimately mixed with a fmall portion of earth chiefly argillaceous; feldom calcareous; and frequently mixed with pyrites. 2. *Culm coal*, called *kolmn* by the Swedes, has a greater portion of argillaceous earth and vitriolic acid, with a moderate proportion of petrol. It has the fame appearance with the foregoing, though its texture is more dull: it burns with a flame, without being confumed, but leaves behind it a flag of the fame bulk with the original volume of the coal. It is found in England and among fome aluminous ores in Sweden. 3. *Slate-coal* contains fuch a quantity of argillaceous earth, that it looks like common flate: however, it burns by itfelf with a flame. Such large quarries of it are found near Purbeck in Dorfetfhire, that the poor are thence fupplied with fuel. From the appearance of this flaty coal, Cronftedt has been induced to fuppofe that the earth of all kinds of coal is argillaceous, though it is not fo eafy to diftinguifh it after being burnt. The pit-coals, he fays, contain more or lefs of the vitriolic acid; for which reafon the fmoke arifing from them attacks filver in the fame manner as fulphur does, let the coals be ever fo free from marcafite, which, however, is often imbedded or mixed with them. 4. *Cannel coal (Ampelites)* is of a dull black colour; breaks eafy in all directions; and, if broken tranfverfely, prefents a fmooth conchoidal furface. It burns with a bright lively flame, but is very apt to fly in pieces in the fire: however, it is faid to be entirely deprived of this property by immerfion in water for fome hours previous to its being ufed. It contains a confiderable quantity of petrol in a lefs condenfed ftate than other coals. Its fpecific gravity is about 1.270. This kind of coal, being of an uniform hard texture, is eafily turned on a lathe, and takes a good polifh; hence it is ufed for making various toys, which appear like jet. 5. *Kilkenny coal* is the lighteft of any; its fpecific gravity being only about 1400. It contains the largeft quantity of afphaltum; burns with lefs fmoke and flame, and more intenfely, though more flowly, than the cannel-coal. The quantity of earth it contains does not exceed one twentieth part of its weight; but this kind of coal is frequently mixed with pyrites. It is found in the county of Kilkenny, in Ireland, and has the quality of burning without fmoke. 6. *Sulphureous coal* confifts of the former kinds mixed with a very confiderable portion of pyrites; whence it is apt to moulder and break when expofed to the air, after which water will act upon it. It contains yellow fpots that look like metal; burns with a fulphureous fmell, leaving behind it either flag or fulphureous afhes, or both. Its fpecific gravity is 1500 or more. 7. *Bovey coal (Xylanthrax)* is of a brown or brownifh black colour, and of a yellow laminar texture. Its laminæ are frequently flexible when firft dug, though they generally harden when expofed to the air. It confifts of wood penetrated with petrol or bitumen, and frequently contains pyrites, alum, &c. By diftillation it yields a fetid liquor mixed with a volatile alkali and oil; part of which is foluble in fpirit of wine, and part of a mineral nature, and infoluble. It is found in almoft all the countries of Europe.

Thefe are the moft confiderable of the varieties of coals commonly known; but we muft not imagine that each of them is to be met homogeneous in thofe places where they are found. On the contrary, the different qualities and proportions of their ingredients make a vaft number of other varieties, fit for different purpofes. Fourcroy remarks, that this foffil bitumen, when heated in contact with a body in combuftion, and having a free accefs of air, kindles the more flowly and with the greater difficulty in proportion as it is more weighty and compact. When once kindled, it emits a ftrong and durable heat, and burns for a long time before it is confumed. The matter that is burned, and produces the flame, appears very denfe, and feems united to fome other fubftance which retards its deftruction. On burning, it emits a particular ftrong fmell, which is not at all fulphureous when the coal contains no pyrites. When the combuftible, oily, and other volatile parts of the coal are diffipated, if the combuftion be then ftopped, the remainder is found to be reduced to a true charred ftate, and is called *coak*. This fubftance is capable of exciting the moft intenfe heat, for which purpofe it is ufed in metallurgic works all over Britain.

"It is well known (fays Magellan), that the Englifh method of burning pit-coal into *coak* has been a moft profitable and happy acquifition for the fmelting of ores, and for many other metallurgical and chemical proceffes in this ifland. But the ingenious and advantageous undertaking of lord Dundonald, by which he turns to a very confiderable profit the mines of coal in his and other eftates, by building ovens of a proper conftruction for burning pit-coal into coak, and at the fame time for collecting, in feparate receptacles, the volatile alkali, oil, tar, and pitch, which were generally loft by the ufual method, deferves to be noticed, as it affords a very remarkable inftance of the great loffes we fuffer for want of carefully attending to every refult from great proceffes of art when made on a large fcale. Thefe ovens are fo contrived, as to admit an under fupply of air; and the coals, after being kindled, decompofe themfelves by a flow but incomplete combuftion, which does not deftroy the ingredients. The refiduum left in the oven proves to be moft excellent cinders or coaks."

COAL-*Mine*. See COALERY.—Malicioufly fetting fire to coal-mines is felony, by ftat. 10 Geo. II. c. 32. § 6.

Small COAL, a fort of charcoal prepared from the fpray and brufhwood ftripped off from the branches of coppice wood, fometimes bound together, and fometimes charred without binding.

COALERY, COALIERY, or COLLIERY; a coal work, or place where coals are dug. It is generally agreed, that our *cannel* coal is the lapis ampelites of the Romans; though it feems to have been ufed by them only for toys, bracelets, &c. See AMPELITES. But of that common fuel which we denominate *coals*, the native Romans were entirely ignorant. It is certain that they are not, as fome have imagined, the lapis obfidianus of Pliny, about which there have been fuch difputes: nor the GAGATES, or JET, which others, again, have taken for the *lapis obfidianus*; though the lightnefs and texture fhow plainly that it is not either ftone or coal. In fact, there are no beds of it in the compafs of Italy. The great line of that fuel feems to fweep away round the globe, from north-eaft to fouthweft; not ranging at a diftance even from the fouth-eafterly parts of our ifland, as is generally imagined, but actually vifiting Brabant and France, and yet avoiding Italy.

The extenfive beds of coal, with which the kingdom is fo happily ftored, were firft noticed by the fkill, and firft opened by the labour, of the Britons; and for fome time before the arrival of the Romans among us. Yet, even for ages after this difcovery, wood continued to compofe the general firing of the nation. Coals were not brought into common ufe till the reign of Charles I.; and were then fold for about 17s. a chaldron.

The moft remarkable coalery, that we have ever had in this

ifland, was that wrought at Borrowftounnefs, under the fea. The veins of coal were found to continue under the bed of the fea in this place, and the colliers had the courage to work the vein near half way over; there being a mote half a mile from the fhore, where there was an entry that went down into the coal-pit, under the fea. This was made into a kind of round key or mote, as they call it, built fo as to keep out the fea, which flowed there twelve feet. Here the coals were laid, and a fhip, of that draught of water, could lay her fide to the mote, and take in the coal. This famous colliery belonged to the earl of Kincardine's family. The frefh water which fprung from the bottom and fides of the coal-pit, was always drawn out upon the fhore by an engine moved by water, that drew it forty fathom. This coal-pit continued to be wrought many years to the great profit of the owners, and the wonder of all that faw it; but, at laft an unexpected high tide drowned the whole at once; and the labourers had not time to efcape, but perifhed in it.

There are feveral other countries in Europe which poffefs confiderable coal-mines; as France, Liege, Germany, and Sweden. Alfo on the other fide of the Atlantic ocean, there has been coal difcovered, and wrought; in Newfoundland, Cape-Breton, Canada, and fome of the New-England provinces. But in all thefe countries, the coal is of a quality much inferior to the Britifh, and entirely unfit to be ufed in many manufactures; fo that they are obliged to import great quantities from Britain for the ufe of their manufactures of iron, &c. Our inland coal trade, that is, carrying coals from Newcaftle, Sunderland, Blith, and other adjacent places to London, and to the port-towns on the coaft, employs abundance of fhipping and feamen; in fo much that, in a time of urgent neceffity, the coalery navigation alone has been able to fupply a body of feamen for the navy of the country, fufficient to man a confiderable fleet at a very fhort warning, without difficulty, and when no other branch of trade could do the like. The Whitehaven coaleries alfo in Cumberland, belonging to lord Lonfdale, furnifh feveral counties in Ireland with coals, and conftantly employ upwards of 2000 feamen.

It might be expected, that a trade fo beneficial both to the nation and individuals, and which has been gradually increafing for feveral centuries paft, would have been advanced by this time to very great perfection, and reduced to a regular fyftem. But, in one very effential refpect, it is found to be quite otherwife. The art of *working coal-mines* in the moft profitable manner is indeed highly improved: but the fundamental principle of the art, that of fearching for and difcovering coal in any diftrict of the country where it has not yet been found, has never, that we know of, been treated in a fyftematic manner. This fubject we fhall confider a little.

The terreftrial matters which compofe the folid parts of the earth are difpofed in ftrata, beds, or layers, the under furface of one bearing againft or lying upon the upper furface of that below it, which laft bears or lies on the next below in the fame manner. Thefe ftrata confift of very different kinds of matter, fuch as free-ftone, lime-ftone, metal-ftone or whin-ftone, coal, &c. as will be particularly fpecified in the fequel. Some of thefe ftrata are of a confiderable thicknefs, being often found from 100 to 200 feet or upwards, nearly of the fame kind of matter from the fuperior to the inferior furface; and others are found of the leaft thicknefs imaginable, one inch or lefs. All thefe ftrata are divided or parted from each other laterally, either by their even, fmooth, polifhed furfaces, with very thin lamina of foft or dufty matter betwixt them, called *the parting*, which renders them eafy to feparate; or elfe only by the furfaces clofely conjoined to each other, without any vifible matter interpofed betwixt them; yet the different fubftance of each ftratum is not in the leaft intermixed, though fometimes they adhere fo ftrongly together, that it is very difficult to part or disjoin them: in this laft cafe they are faid to have *a bad parting*.

Befides this principal divifion or parting laterally, there are, in fome ftrata, fecondary divifions or partings alfo laterally, feparating or approaching towards a feparation, of the fame ftrata, into parts, of different thickneffes, nearly parallel to each other, in the fame manner as the principal partings divide the different ftrata from each other: but thefe fecondary ones are not fo ftrong or vifible, nor make fo effectual a parting, as the principal ones do; and are only met with in fuch ftrata as are not of an uniform hardnefs, texture, or colour, from the upper to the under furface. There are alfo other divifions or partings, called *backs*, in almoft every ftratum, which crofs the former lateral ones longitudinally, and cut the whole ftratum through its two furfaces into long rhomboidal figures. Thefe again are croffed by others called *cutters*, running either in an oblique or perpendicular direction to the laft mentioned backs, and alfo cut the ftratum through its two furfaces. Both thefe backs and cutters generally extend from the upper or fuperior ftratum down through feveral of the lower ones; fo that thefe backs and cutters, together with the lateral partings before mentioned, divide every ftratum into innumerable cubic, prifmatic, and rhomboidal figures, according to the thicknefs of the ftratum, and the pofition and number of the backs and cutters. They fometimes have a kind of thin partition of dufty or foft matter in them, and fometimes none, like the firft mentioned partings; but the fofter kind of ftrata generally have more backs and cutters than the harder kind, and they do not extend or penetrate through the others.

To explain this, let A, B, C, D, E, F, G, (2d pl. 83. fig. 1.) reprefent the principal partings before mentioned, or the upper and under furfaces of any ftratum; then *a, b, c, d, e, f*, will reprefent the fecondary lateral partings nearly parallel to the principal one: *g, h, i, k, l, m*, the longitudinal partings called *backs*; *n, o, p, q, r, s*, the crofs partings called *cutters*, croffing the laft-mentioned ones either obliquely or perpendicularly. In all places where the ftrata lie regular, they are divided and fubdivided in the manner above mentioned; and fometimes in this manner extend through a pretty large diftrict of country: though it is often otherwife; for the regularity is frequently interrupted, and the ftrata broken and difordered, by fundry chafms, breaches, or fiffures, which are differently denominated according to their various dimenfions, and the matters with which they are filled, viz. *Dikes*, *Hitches*, and *Troubles*, which fhall be explained in their order.

Dikes, are the largeft kind of fiffures; and feem to be nothing more than a crack or breach of the folid ftrata, occafioned by one part of them being broken away and fallen from the other. They generally run in a ftraight line for a confiderable length, and penetrate from the furface to the greateft depth ever yet tried, in a direction fometimes perpendicular to the horizon, and fometimes obliquely. The fame kind of ftrata are found lying upon each other in the fame order, but the whole of them greatly elevated or depreffed, on the one fide of the dike as on the other. The fiffures are fometimes two or three feet wide, and fometimes many fathoms. If the fiffure or dike be of any confiderable width, it is generally filled with heterogeneous matter, different from that of the folid ftrata on each fide of it. A *hitch* is only a dike or fiffure of a fmaller degree, by which the ftrata on one fide are not elevated or feparated from thofe on the other fide above one fathom. Thefe hitches are denominated in the fame manner as dikes, according to the number of feet they elevate or deprefs the ftrata. *Troubles* may be denominated dikes of the fmalleft degree; for they are not a real breach, but only an approach towards it which has not taken a full effect. The ftrata are generally altered by a trouble from their regular fite to a different pofition. When the regular courfe of

the ſtrata is nearly level, a trouble will cauſe a ſudden and conſiderable aſcent or deſcent. Where they have, in their regular ſituation, a certain degree of aſcent or deſcent, a trouble either increaſes it or alters it to a contrary poſition: and a trouble has theſe effects upon the ſtrata in common with dikes, that it greatly debaſes them from their original quality; the partings are ſeparated; the backs and cutters disjoined, and their regularity diſordered; the original cubic and priſmatic figures, of which the ſtrata were compoſed, are broken, and the diſlocation filled with heterogeneous matter; and the whole ſtrata are reduced to a ſofter and more friable ſtate.—The ſtrata are ſeldom or never found to lie in a true horizontal ſituation; but generally have an inclination or deſcent, called the *dip*, to ſome particular part of the horizon.

To illuſtrate what has been ſaid, ſee fig. 2. in the plate where *a*, *b*, *c*, *d*, &c. repreſents a courſe of ſtrata lying upon each other, having a certain inclination to the horizon. A B is a *downcaſt dike*, which depreſſes the ſtrata obliquely to *e*, *f*, *g*, *b*, &c. lying upon each other in the ſame order, but altered in their inclination to the horizon. C D repreſents a clay or free-ſtone *dike*, where the ſtrata are neither elevated nor depreſſed, but only broken off and removed to a certain diſtance. E F, repreſents a hitch, which breaks off and depreſſes the ſtrata only a little, but alters their inclination to the horizon. G H, repreſents a *trouble*, where the ſtrata on the one ſide are not entirely broken off from thoſe on the other, but only in a cruſhed and irregular ſituation. As ſome particular ſtrata are found at ſome times to increaſe, and at other times to diminiſh, in their thickneſſes, whilſt others remain the ſame, conſequently they cannot be all parallel; yet this increaſe and diminution in their thickneſſes come on very gradually.

The ſtrata are not found diſpoſed in the earth according to their ſpecific gravities: for we often find ſtrata of very denſe matter near the ſurface; and perhaps at 50 or even 100 fathoms beneath, we meet with ſtrata of not half the gravity of the firſt. A ſtratum of iron ore is very often found above one of coal, though the former has twice the gravity of the latter; and, in ſhort, there is ſuch an abſolute uncertainty in forming any judgment of the diſpoſition of the ſtrata from their ſpecific gravities, that it cannot in the leaſt be relied on.

It would be tedious and of little utility in this place, to give an account of the ſeveral ſtrata of coal, and of ſtone and other matters uſually connected with coal, and found to have a particular affinity with it: for which reaſon we ſhall do little more than enumerate them. Theſe ſubſtances are uſually arranged under ſix principal claſſes, and theſe include all the varieties of ſtrata that have been found to occur in all thoſe diſtricts of country both in England and Scotland where coal abounds. 1. The ſtrata of what is denominated *Whin ſtone* are the hardeſt of all others; the angular pieces of it will cut glaſs; it is of a very coarſe texture, and when broken acroſs the grain exhibits the appearance of large grains of ſand half vitrified. It can ſcarcely be wrought, or broken in pieces, by common tools, without the aſſiſtance of gun-powder: each ſtratum is commonly homogeneous in ſubſtance and colour, and cracked in the rock to a great depth. The moſt common colours of theſe ſtrata are black or dark blue, yet there are others of it aſh-coloured and light brown. 2. *Poſt-ſtone*, a free-ſtone of the hardeſt kind, and next to the lime-ſtone with reſpect to hardneſs and ſolidity. It is of a very fine texture; and when broken appears as if compoſed of the fineſt ſand. Of this kind of ſtone there are four varieties, diſtinguiſhed by their colour. 3. *Sand-ſtone*, a free ſtone of a coarſer texture than poſt, and not ſo hard. This is apparently of a coarſe ſandy ſubſtance, friable, and moulders to ſand when expoſed to the wind and rain; has frequently white ſhining ſpangles and ſmall ſtones incloſed in it. Of this, there are two kinds, grey and brown. 4. *Metal ſtone*, is a ſtratum in point of hardneſs next to ſand-ſtone: generally ſolid, compact, of conſiderable weight, and of an argillaceous ſubſtance, containing many nodules or balls of iron ore, and yellow or white pyrites; its partings, or the ſurfaces of its ſtrata, are hard, poliſhed, and ſmooth as glaſs. The moſt uſual colour of this ſtone is black; but there are ſeveral other lighter colours, down to a light brown or grey. It lies in ſtrata of various thickneſſes, though ſeldom ſo thick as the two laſt mentioned. 5. *Shiver*, is a ſtratum more frequently met with in coaleries than any other. There are many varieties of it, both in hardneſs and colour; but they all agree in one general characteriſtic. The black colour is moſt common; it is called by the miners *black ſhiver*, *black metal*, or *bleas*. It is ſofter than metal-ſtone, and in the mine is rather a tough than a hard ſubſtance, is not of a ſolid or compact matter, being eaſily ſeparable, by the multitude of its partings, &c. into very ſmall parts, and readily abſorbing water. The ſubſtance of this ſtratum is an indurated bole, commonly divided into thin lamina of unequal thickneſſes, which break into long ſmall pieces when ſtruck with force; and, on examination, they appear to be ſmall irregular rhomboides: each of theſe ſmall pieces has a poliſhed glaſſy ſurface; and, when broke acroſs the grain, appears of a dry, leafy, or laminated texture, like exceeding fine clay: it is very friable; feels to the touch like an unctuous ſubſtance; and diſſolves in air or water to a fine pinguid black clay. There are almoſt conſtantly found incloſed in its ſtrata lumps or nodules of iron ore; often real beds of the ſame. It lies in ſtrata ſometimes of conſiderable thickneſs, at other times not exceeding a few feet. 6. *Coal.* See the articles AMPELITES, LITHANTHRAX, &c. We ſhall here conſider coals as diſtinguiſhable into three kinds, according to their degrees of inflammability. The leaſt inflammable kinds are *Welſh coal*, *Kilkenny coal*, and *blind*, or *deaf coal*, which is found in many parts of Scotland and England. This coal takes a conſiderable degree of heat to kindle it, but when once thoroughly ignited will burn a long time; it remains in the fire in ſeparate pieces without ſticking together or caking; it produces neither flame nor ſmoke, and makes no cinder, but burns to a white ſtony flag. It makes a hot glowing fire like charcoal or cinders: but emits effluvia of a ſuffocating nature, which renders it fit only for burning amongſt maltſters, dyers, &c. *Open burning coal* ſoon kindles, making a hot pleaſant fire, but is ſoon conſumed. It produces both ſmoke and flame in abundance; but lies open in the fire, and does not cake together ſo as to form cinders, its cinders being burnt to aſhes before it is thoroughly calcined in the midſt; from this it has its name of *open burning*: it burns to white or brown aſhes very light. Of this kind is cannel coal, jett, parrot, ſplint, and moſt of the coals in Scotland. *Cloſe burning coal* kindles very quickly, makes a very hot fire, melts and runs together, the very ſmalleſt culm making the fineſt cinders. It makes a more durable fire than any other coal, and finally burns to heavy aſhes. Of this kind are the Newcaſtle and ſeveral other of the Engliſh coals, and the ſmithy coals of Scotland. The open burning and the cloſe burning coal mixed together, make a more profitable fire for domeſtic uſes than either of them ſeparate. In all thoſe diſtricts of country where coal is found, there are generally ſeveral ſtrata of it; perhaps all the different kinds above mentioned will be found in ſome, and only one of the kinds in others; yet this one kind may be divided into many different ſeams or ſtrata, by beds of ſhiver or other kinds of matter interpoſing, ſo as to give it the appearance of ſo many ſeparate ſtrata.

All theſe ſtrata with their ſeveral varieties, however, do not lie upon each other in the order in which they are deſcribed, nor in any certain or invariable order. Though there be found the ſame kinds of ſtrata in one coalery or diſtrict as in another,

yet they may be of very different thickneſſes. In ſome places there are moſt of the hard kinds, in others moſt of the ſofter; and in any one diſtrict it rarely happens that all the various kinds are found; for ſome kinds, perhaps, occur only once or twice, whilſt others occur 10 or 20 times before we reach the principal ſtratum of coal. In order to explain this, ſuppoſe the ſtrata in the pit at A fig. 3. lie in the order *a*, *b*, *c*, *d*, &c. they may be ſo much altered in their thickneſſes, by reaſon of ſome of them increaſing and others diminiſhing, at the diſtance of B, that they may be found there of very different thickneſſes: or if they are examined in a pit at D, by reaſon of its lower ſituation, and the ſtrata there not being a continuation of thoſe in the other places, they may be very different both in their order and thickneſſes, and yet of the ſame kinds.

To illuſtrate how the various ſtrata lie in ſome places, and how often the ſame ſtratum may occur betwixt the ſurface and the coal, we ſhall give the following example: The numbers in the left hand column refer to the claſſes of ſtrata before deſcribed, to which each belongs. The ſecond column contains the names of the ſtrata; and the four numeral columns to the right hand, expreſs the thickneſs of each ſtratum, in fathoms, yards, feet and inches.

N°	EXAMPLE.	Fas	Yd	Ft	Ins.
	Soil and gravel - - - - - - - -	0	1	1	0
	Clay mixed with looſe ſtones - - -	1	1	0	0
3	Coarſe brown ſandy-ſtone, with ſoft partings	3	0	2	6
2	White poſt, with ſhivery partings - -	1	1	0	5
5	Black ſhiver or bleas, with iron-ſtone balls	2	0	2	0
6	Coarſe ſplinty coal - - - - - - -	0	0	2	6
5	Soft grey ſhiver - - - - - - -	0	1	0	7
2	Brown and grey poſt, ſtreaked with black	1	0	2	0
5	Black ſhiver, with beds and balls of iron-ſtone - - - - - - - - - - -	0	1	2	6
4	Grey and black metal-ſtone - - -	0	1	1	9
2	White and brown poſt - - - - -	1	1	0	0
5	Black and grey ſhiver, ſtreaked with white	0	1	0	6
3	Soft grey ſandy ſtone, with ſhivery partings	0	1	1	0
2	Yellow and white poſt, with ſandy partings	1	0	2	0
5	Black and dun ſhivery, with iron ſtone balls	0	1	2	6
2	White poſt ſtreaked with black, and black partings - - - - - - - - -	1	0	0	6
5	Grey ſhiver, with iron-ſtone balls - -	0	1	0	9
4	Brown and black metal-ſtone - - -	1	1	2	6
5	Hard ſlaty black ſhiver - - - - -	1	1	0	0
6	Coal, hard, and fine ſplint - - - -	0	0	3	6
5	Soft black ſhiver - - - - - - -	0	0	0	3
6	Coal, fine and clear - - - - - -	0	0	3	3
5	Hard black ſhiver - - - - - - -	0	0	1	0
	Total Fathoms	25	0	0	0

In this inſtance the ſpecies of ſand-ſtone only occurs twice, and poſt five times, whilſt the ſhiver occurs no leſs than nine times.

To apply the foregoing obſervations to practice: Suppoſe it was required to examine whether there was coal in a piece of ground adjoining to, or in the neighbourhood of, other coaleries. In the firſt place, it is proper to be informed, at ſome of the adjacent coaleries, of the number and kinds of ſtrata; the order in which they lie upon each other; to what point of the horizon, and in what quantity, they dip; if any dikes, hitches, or troubles, and the courſe they ſtretch. Having learned theſe circumſtances, ſearch in the ground under examination where the ſtrata are expoſed to view, and compare theſe with the other. If they be of the ſame kinds, and nearly correſpond in order and thickneſs, and be lying in a regular manner, and agree by computation with the dip and riſe, it may ſafely be concluded the coal is there; and the depth of it may be judged from the depth of the coal in the other coalery, below any particular ſtratum which is viſible in this.

If the ſolid ſtrata are not expoſed to view, neither in the hills nor valleys of the ground under examination, then ſearch in the adjoining grounds; and if the ſame kind of ſtrata are found there as in the adjacent coalery, and there is reaſon, from the dip and other circumſtances, to believe that they ſtretch through the ground to be examined; it may then be concluded that the coal is there, as well as theſe other ſtrata.

Suppoſe a coalery is on the ſide of a hill, repreſented at A, fig. 3 in the plate, and you would ſearch for a coal at B, on the other ſide of the hill, but in a much lower ſituation; by obſerving the ſeveral ſtrata lying above the coal at A, and the point to which they dip, which is directly towards B (if clear of dikes), you may expect to find the ſame kind of ſtrata on the other ſide of the hill, but much lower down. Accordingly, if ſome of the ſtrata are viſible in the face of the precipice C, they may be compared with ſome of thoſe in the pit at A. Or, if they are not to be ſeen there, by ſearching in the oppoſite hill, they may perhaps be diſcovered at the place F; where, if they be found in the manner before mentioned, and there be reaſon to believe they extend regularly from the firſt place to this, it is more than probable the coal, as well as theſe ſtrata, will be found in the intermediate ground.

If the ground to be examined lie more to the riſe of the coal, as at E, which being ſuppoſed to be on a flat, perhaps the ſolid ſtrata there may be wholly covered by the gravel, clay, &c. of the outward ſurface lying upon them. In this caſe, by meaſuring the horizontal diſtance and the deſcent of ground from A to E, and computing the quantity of aſcent or riſe of the coal in that diſtance: by comparing thoſe together, it may be judged at what depth the coal will be found there, allowing that it lie irregular. Thus, ſuppoſe the coal at A 80 yards deep, the diſtance from A to E 500 yards, and that the coal riſes 1 yard in 10 yards of horizontal diſtance:

Then, from the depth of the pit	80
Deduct the deſcent of the ground from A to E, ſuppoſe - - - - -	24
This remainder would be the depth, if the coal was level - - - - -	56
But as the coal riſes 1 in 10 feet, then deduct what it riſes in 500 yards, which is	50
And the remainder is the depth of that coal at E - - - - - -	6 Yards.

Or ſuppoſe that the place at B is 500 yards the contrary way, or to the full dip of the coal at A; if a view of the ſolid ſtrata cannot be obtained, then by proceeding in the ſame manner as before, the depth of the coal at that place may be computed. Thus,

To the depth of the coal at the pit A	80
Add the deſcent or inclination of the coal in 500 yards, which, as before, is -	50
This ſum would be the depth, if the ground was level - - - - -	130
But as the ground deſcends towards B, deduct the quantity of that, which ſuppoſe - - - - - -	80
Remains the depth of the coal at B	50 Yards.

If the place to be examined be neither to the full dip nor full riſe, but in ſome proportions towards either, the ſame method may be purſued, computing how much the coal riſes or dips in a certain diſtance in that direction. If there is known to be a

dike in the workings of the pit at A, which elevates or depreſſes the ſtrata towards the place under examination, then the quantity of the elevation or depreſſion muſt be accordingly added to or deducted from the computed depth of the coal at that place. Suppoſe there is an upcaſt dike of 10 fathoms or 20 yards towards B, then deduct 20 from 50, the depth before computed, there will remain 30 yards or 15 fathoms for the depth of the coal at B. It often happens, however, that coal is to be ſearched for, in a part of the country, at ſuch a conſiderable diſtance from all other coaleries, that by reaſon of the intervention of hills, valleys, unknown dikes, &c. the connection or relation of the ſtrata with thoſe of any other coalery cannot be traced by any of theſe methods; in which caſe a more extenſive view muſt be taken of all the circumſtances before it will be poſſible to determine with any degree of probability, whether coal be in any particular diſtrict or not. But this inquiry would extend our remarks to too great a length.

In ſome ſituations, the coal will be diſcovered by one method alone; in others, by a compariſon of certain circumſtances attending each method; whilſt in ſome others, all the circumſtances that can be collected only lead to a certain degree of probability. In the laſt caſe, it will be more adviſable to proceed in the ſearch by *boring* a hole through the ſolid ſtrata, than by digging or ſinking a pit, it being both cheaper and more expeditious; and in every caſe, which does not amount to an abſolute certainty, this operation is neceſſary, to aſcertain the real exiſtence of the coal in that place.

We will ſuppoſe that the ground, A, B, C, D, fig. 4. has been examined, and from the appearance of the ſtrata where they are viſible (as at the precipice D, and ſeveral other places), they are found to be of thoſe kinds uſually connected with coal, and that the point to which they riſe is directly weſt towards A, but the ground being flat and covered to a conſiderable depth with earth, &c. the ſtrata cannot be viewed in the low grounds; therefore, in this and all ſimilar ſituations, the firſt hole that is bored for a trial for coal ſhould be on the weſt ſide of the ground, or to the full riſe of the ſtrata as at A, where, boring down through the ſtrata 1, 2, 3, ſuppoſe 10 fathoms, and not finding coal, it will be better to bore a new hole than to proceed to a great depth in that: therefore proceeding ſo far to the eaſtward as B, where the ſtratum 1, of the firſt hole, is computed to be 10 or 12 fathoms deep, a ſecond hole may be bored, where boring down through the ſtrata 4, 5, 6, 7, 8, the ſtratum 1 is met with, but no coal; it would be of no uſe to bore farther in this hole, as the ſame ſtrata would be found which were in the hole A: therefore, proceeding again ſo far to the eaſtward, as it may be computed the ſtratum 4 of the ſecond hole will be met with at the depth of 10 or 12 fathoms, a new hole may be bored at C; where, boring through the ſtrata 9, 10, 11, 12, the coal is met with at 13, before the hole proceed ſo deep as the ſtratum 4 of the former. It is evident, that by this method of procedure, neither the coal nor any other of the ſtrata can be paſſed over, as the laſt hole is always bored down to that ſtratum which was neareſt the ſurface in the former hole.

The purpoſes for which *boring* is uſed are numerous, and ſome of them of the utmoſt importance in coaleries. In coaleries of great extent, although the coal be known to extend through the whole grounds, yet accidental turns, and other alterations in the dip, to which the coal is liable, render the boring of three or more holes neceſſary, to determine exactly to what point of the horizon it dips or inclines, before any capital operation for the winning of it can be undertaken; becauſe a very ſmall error in this may occaſion the loſs of a great part of the coal, or at leaſt incur a double expence in recovering it.

Suppoſe A, B, C, D, fig. 5. to be part of the extenſive field of coal, intended to be won or laid dry by a fire engine; according to the courſe of the dip in adjoining coaleries, the point C is the place at which the engine ſhould be erected, becauſe the coal dips in direction to the line AC, conſequently the lever line would be in the direction CD; but this ought not to be truſted to. Admit two holes, 1, 2, be bored to the coal in the direction of the ſuppoſed dip, at 200 yards diſtance from each other, and a third hole 3 at 200 yards diſtance from each of them: ſuppoſe the coal is found, at the hole 1, to be 20 fathoms deep; at the hole 2, 10 fathoms deeper; but at the hole 3, only 8 fathoms deeper than at 1. Then to find the true level line and dip of the coal, ſay, As 10 fathoms the dip from 1 to 2, is to 200 yards the diſtance, ſo is 8 fathoms, the dip from 1 to 3, to 160 yards, the diſtance from one on the line 1, 2, to *a*, the point upon a level with the hole 3. Again ſay, As 8 fathoms, the dip from 1 to 3, is to 200 yards the diſtance; ſo is 10 fathoms, the dip from 1 to 2, to 250 yards, the diſtance from 1, in direction of the line 1, 3, to *b*, the point upon a level with the hole 2. Then let fall the perpendicular 1, *c*, which will be the true direction of the dip of the coal, inſtead of the ſuppoſed line AC; and by drawing ED, and DF, parallel to the other lines, the angle D, and no other place, is the deepeſt part of the coal, and the place where the engine ſhould be erected. If it had been erected at the angle C, the level line would have gone in the direction *c b*, by which means about one third part of the field of coal would have been below the level of the engine, and perhaps loſt, unleſs another engine was erected at D.

Boring not only ſhows the depth at which the coal lies, but its exact thickneſs; its hardneſs; its quality, and whether any foul mixture be in it or not; alſo the thickneſs, hardneſs, and other circumſtances of all the ſtrata bored through; and from the quantity of water met with in the boring, ſome judgment may be formed of the ſize of an engine capable of drawing it, where an engine is neceſſary. When holes are to be bored for theſe purpoſes, they may be fixed (as near as can be gueſſed) in ſuch a ſituation from each other, as to ſuit the places where pits are afterwards to be ſunk: by which means moſt of the expence may be ſaved, as theſe pits would otherwiſe require to be bored, when ſinking, to diſcharge their water into the mine below. There are many other uſes indeed to which boring is applied, and for that reaſon, boring is generally practiſed in England, by ſome one who makes it his profeſſion.

The boring rods are made of iron from 3 to 4 feet long, and about one inch and a half ſquare, with a ſcrew at each end, by which they are ſcrewed together, and other rods added as the hole increaſes in depth. The chiſſel is about 18 inches long, and two and a half broad at the end, which being ſcrewed on at the lower end of the rods, and a piece of timber put through an eye at the upper end, they are prepared for work. The operation is performed by lifting them up a little, and letting them fall again, at the ſame time turning them a little round; by a continuance of which motions, a round hole is made through the hardeſt ſtrata. When the chiſſel is blunt, it is taken out, and a ſcooped inſtrument, called a *wimble*, put on in its ſtead; by which the duſt or pulveriſed matter which was worn off the ſtratum in the laſt operation is brought up. By this ſubſtance, the borers know exactly the nature of the ſtratum they are boring in; and by any alteration in the working of the rods (which they are ſenſible of by handling them), they perceive the leaſt variation of the ſtrata. The principal part of the art depends upon keeping the hole clean, and obſerving every variation of the ſtrata with care and attention. The eſtabliſhed price of boring in England is 5s. per fathom for the firſt five fathoms, 10s. per fathom for the next five fathoms, and 15s. per fathom for the next five fathoms; and ſo continually increaſing 5s. per fathom at the end of every five fathoms; the borer finding all kinds of boring inſtruments, and taking his chance of the hardneſs of the ſtrata, except above one foot in

thicknefs of whin occur, when the former price ceafes, and he is paid per day.

It is exceedingly uncommon to meet with a ftratum of coal which is naturally dry, or whofe fubterraneau fprings or feeders of water are fo very fmall as to require no other means than the labour of men to draw off or conduct them away; for it moft commonly happens, that the ftratum of coal, and the other ftrata adjacent, abound fo much in feeders of water, that, before accefs can be had to the coal, fome other methods muft be purfued to drain or conduct away thefe feeders: therefore, after the deepeft part of the coal is difcovered, the next confideration is of the beft method of draining it, or, in the miner's language, *of winning the coal.* This fubject, however, we fhall not enter into farther than to obferve, that it is moft commonly done by a fteam-engine, or other machine funk into the earth.

After the *engine-pit,* as it is called, is got down to the coal, it is the moft general practice to excavate and take away a part only of the ftratum of coal in the firft working of the pit, leaving the other part as pillars for fupporting the roof; and after the coal is wrought in this manner to fuch a diftance from the pit as is intended, then thefe pillars, or fo many of them as can be got, are taken out by a fecond working, and the roof and other folid ftrata above permitted to fall down and fill up the excavation. The quantity of coal wrought away, and the fize of the pillars left in the firft working, are proportioned to the hardnefs and ftrength of the coal and other ftrata adjacent, compared with the incumbent weight of the fuperior ftrata.

If the roof and pavement are both ftrong, as well as the coal, and the pit about 30 fathoms deep, then two-thirds, or probably three-fourths, may be taken away at the firft working, and one-third or one-fourth left in pillars. If both roof and pavement be foft or tender, then a larger proportion muft be left in pillars, probably one third or near one-half; and in all cafes the hardnefs or ftrength of the coal muft be confidered. To form an idea of the proper dimenfions of the pillars to be left, and of the excavations from which the coal is to be taken away, we have given in the plate a plan of part of a pit's workings (fig. 6.), fuppofed to be at the depth of 30 fathoms, and the coal having a moderate rife. A reprefents the engine-pit; B, the coal-pit; A *a* B, the mine from the former to the latter; B C, the firft working or excavation made from the coal-pit, commonly called the *winning mine* or *winning headway,* nine feet wide; *b b b b,* &c. the workings called *rooms,* turned off at right angles from the others, of the width of 12 feet; *c c c c,* &c. the workings called *throughers* or *thirlings,* nine feet wide, wrought through at right angles from one room to another; *d d d,* &c. the pillars of coal left at the firft working for fupporting the roof, 18 feet long and 12 feet broad; D D, two large pillars of coal near the pit bottom, 15 or 20 yards long and 10 or 15 broad, to fupport the pit, and prevent its being damaged by the roof falling in; *e e,* the level mine wrought in the coal from the engine-pit bottom, four or five feet wide; *f f,* &c. large pillars of coal left next the level, to fecure it from any damage by the roof falling in; *g g,* a dike which depreffes the coal, one fathom; *h h,* &c. large pillars and barriers of coal left unwrought, adjoining to the dike where the roof is tender, to prevent its falling down. The coal taken out by the firft working in this pit is fuppofed to be one-third of the whole; and allowing the rooms 12 feet wide, and the thirlings 9 feet wide, then the pillars will require to be 12 feet wide and 18 feet long; for if one pillar be in a certain proportion to its adjoining room and thirling, the whole number of pillars will be in the fame proportion to the whole number of rooms and thirlings in the pit. Suppofe ABCD, (fig. 7.), to be a pillar of coal 18 feet long and 12 feet broad, its area will be 216 fquare feet; ACHE, the adjoining thirling, 12 feet by 9 feet, and its area 108 fquare feet; BAEFG, the adjoining room, 27 feet long and 12 feet broad, and its area 324 fquare feet; which added to 108 gives 432 fquare feet, or two-thirds wrought, and 216 fquare feet left, or one-third of the whole area FGHD.

It is proper to obferve, that in the profecution of the workings, the rooms to the right of the winning headway fhould be oppofite to the pillars on the left; and the firft, third, and fifth pillar, or the fecond, fourth, and fixth, adjoining to the faid headway, fhould be of fuch a length as to overlay the adjoining thirlings; as, in the plan, the pillar 2 overlays the thirlings 1 and 3; and the pillar 4, overlays the thirlings 3 and 5; this will effectually fupport the roof of the main road BC, and will bring the other pillars into their regular order, by which means each pillar will be oppofite to two thirlings. Alfo a larger proportion of coal than common fhould be left in all places which are intended to be kept open after the fecond working; fuch as the pit-bottoms, air-courfes, roads, and water courfes, or where the roof is tender; as it generally is near dikes, hitches, and troubles; and if the roof fhould continue tender for a confiderable fpace, it will perhaps be found proper to leave a few inches of coal adhering to the roof, which, together with a few props of timber fixed under it, may fupport it effectually for a long time. The level mine *e e,* and the winning headway BC, fhould be wrought forward a confiderable length before the other rooms, in order to be drove through any dikes that might interpofe; otherwife the progrefs of the workings might probably be ftopped a confiderable time, waiting until a courfe of new rooms were procured on the other fide of the dike. Suppofe the dike *g g,* fig. 6. to deprefs the coal fix feet, or one fathom, and that it rifes in the fame manner on the under fide of the dike as it does on the upper fide; in fuch a cafe, the only remedy would be to work or drive a level mine through the ftrata of ftone from the engine-level at *e,* over the dike, until it interfect the coal at *i*; and from thence to drive a new level mine in the coal at *i i,* and a new winning headway *i k.* In order to gain a new fet of rooms, and to fupply frefh air to this new operation, a fmall mine might be drove from the room *b,* and a hole funk down upon the level room *i i*; therefore, if the level mine *e e* was not drove fo far forward as to have all thefe operations completed before the rooms and other workings were intercepted by the dike, the working of the pit might ceafe until thefe new places were ready.

If there be two or three ftrata or feams of coal in the fame pit (as there often are) having only a ftratum of a few feet thick lying betwixt them, it is then material to obferve, that every pillar in the fecond feam be placed immediately below one in the firft, and every pillar in the third feam below one in the fecond; and in fuch a fituation the upper ftratum of coal ought to be firft wrought, or elfe all the three together: for it would be unfafe to work the lower one firft, left the roof fhould break, and damage thofe lying above.

It fometimes becomes neceffary to work the coal lying to the dip of the engine or the level; which coal is confequently drowned with water, and muft therefore be drained by fome means before it can be wrought. If the quantity of water proceeding from it be inconfiderable, it may then be drained by fmall pumps laid upon the pavement of the coal, and wrought by men or horfes, to raife the water up to the level of the engine-pit bottom: or if the feeders of water be more confiderable, and the fituation be fuitable, the working rod of thefe pumps might be connected with thofe in the engine-pit; by which means the water would be raifed up to the level: but if the quantity of water be very great; or if, from other circumftances, thefe methods may not be applicable; then the engine-pit may be be funk as deep below the coal as may be neceffary, and a level ftone mine drove from its bottom to the dip of the ftrata, until it interfect the ftratum of coal, from

Fig. 1.

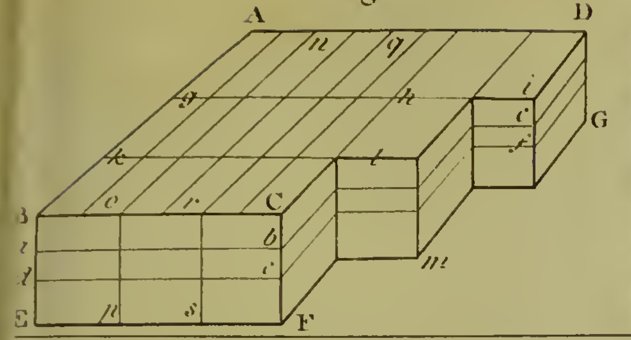


Fig. 2.

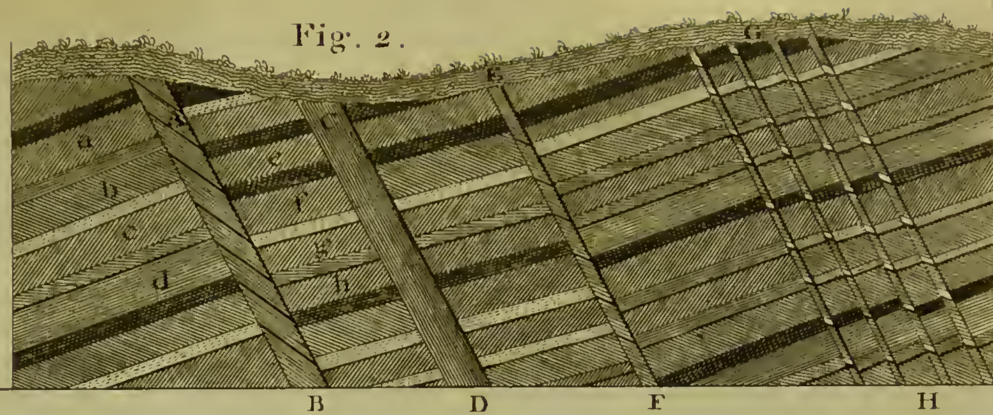


Fig. 3.

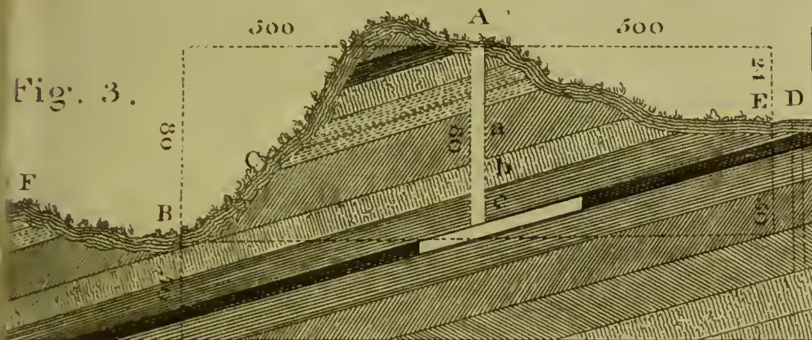


Fig. 4.

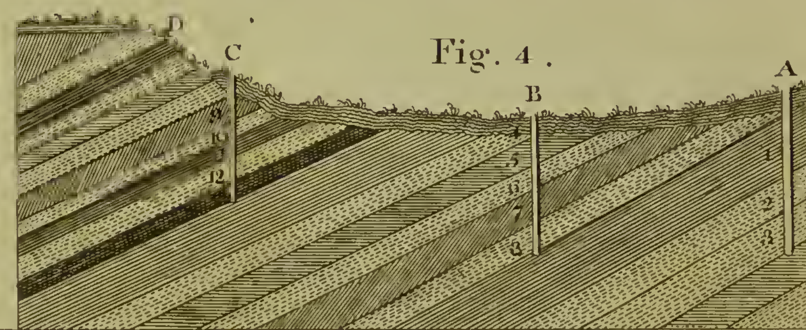


Fig. 5.

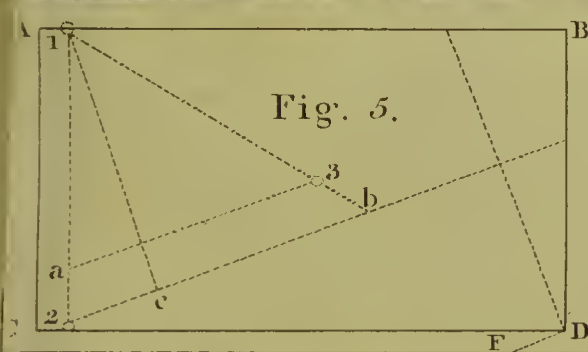


Fig. 7.

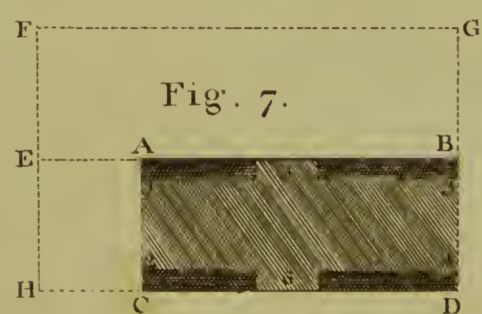


Fig. 8.

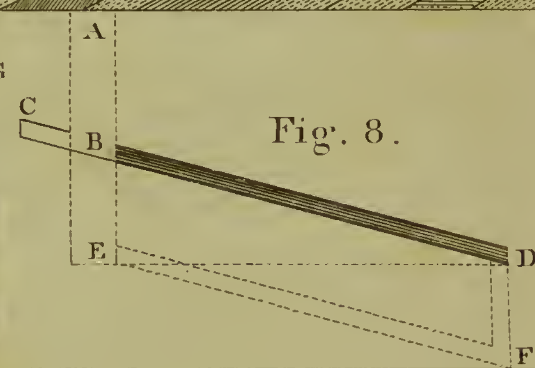
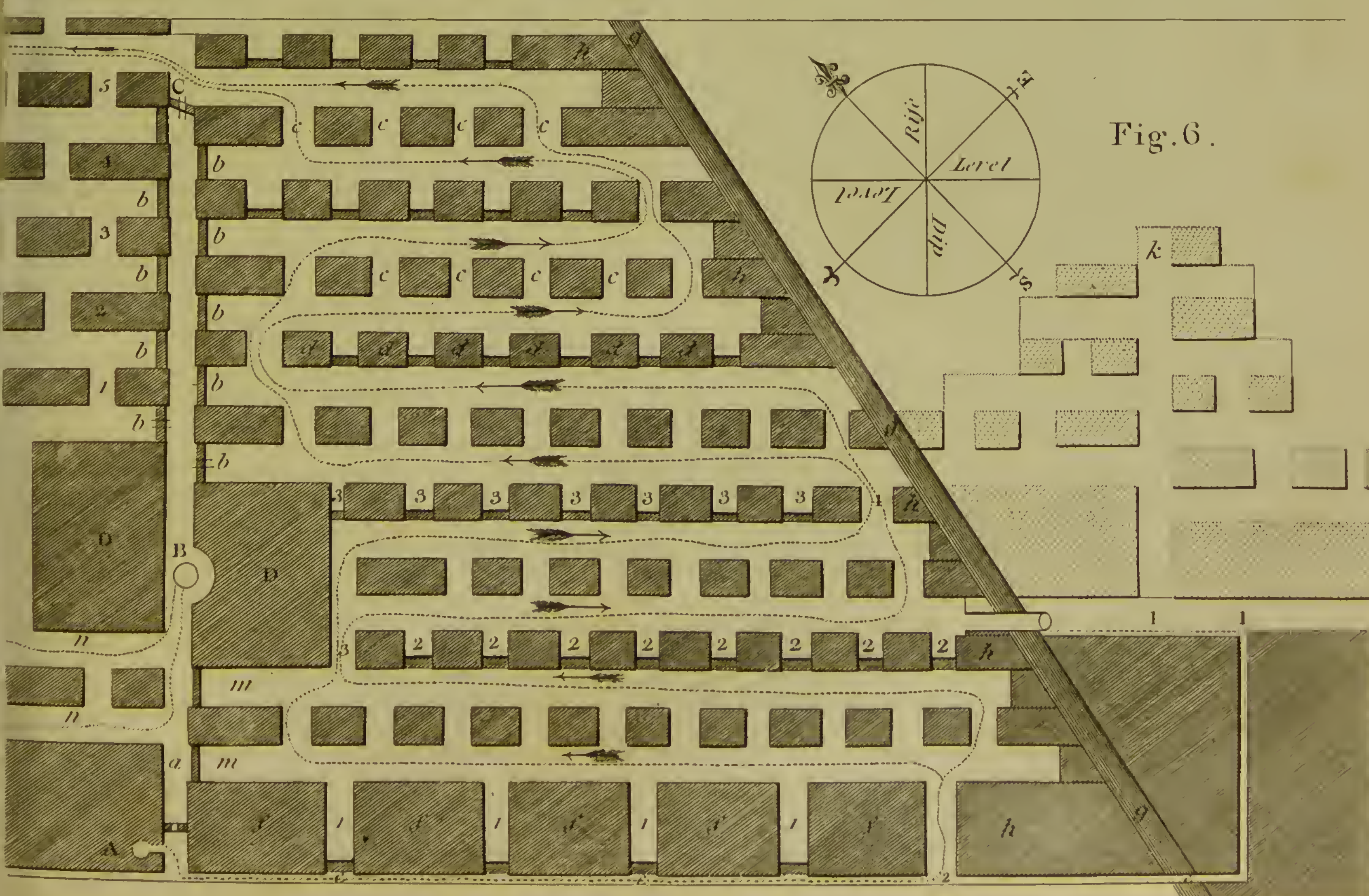


Fig. 6.



Barlow sculp.

whence a new level mine might be worked, which would effectually drain it. Suppofe AB, fig. 8. to be a fection of the engine-pit; BC, the coal drained by the engine; BD, the coal to the dip of the engine intended to be drained; then if the engine-pit be funk deeper to E, a ftone mine may be wrought in the direction ED, until it interfect the coal at D, by which the water will have a free paffage to the engine, and the coal will be drained. If there be another ftratum of coal lying at fuch a depth below the firft as the engine-pit is intended to be funk to, the upper feam may in fome fituations be conveniently drained, by driving a mine in the lower feam of the coal from E to F, and another in the upper one from B to D; and by boring a hole from D to F, the water will defcend to F, and filling the mine EF, rife up to the engine-pit bottom at E, which is upon a level with D. Whenever it is judged neceffary to work the pillars, regard muft be had to the nature of the roof. If the roof is tender, a narrow room may be wrought through the pillar from one end to the other, leaving only a fhell of coal on each fide for fupporting the roof at the time of working. Suppofe ABCD, fig. 7. to be a pillar of coal 18 feet long and 12 feet broad: if the roof is not ftrong, the room 1, 2, 3, 4, of eight feet wide, may be wrought up through that pillar, leaving a fhell of two feet thick on each fide; and if it can be fafely done, a part of thefe fhells may alfo be wrought away, by working two places through them as at 5 and 6. By this means very little of the coal will be loft.

Various methods are ufed for bringing the coals from the rooms and other workings to the pit bottom. Where the ftratum of coal is of a fufficient thicknefs, and has a moderate rife and dip, the coals are moft advantageoufly brought out by horfes, which convey them in a tub or bafket placed upon a fledge: a horfe by this means will bring out from four to eight hundred weight of coals at once, according to the quantity of the afcent or defcent. Sometimes they employ a fmall four-wheeled carriage; but there are fome fituations in which neither horfes nor men can be properly ufed; particularly where the coal has a great degree of defcent, or where many dikes occur. In that cafe the coals are brought out by women called *bearers*, who carry them in a kind of bafket upon their backs. At the pit bottom, the bafkets are hooked to a chain, and drawn up the pit by a rope to the furface, which is beft effected by a machine called a *gin*, wrought by horfes, or by fome other contrivance. After the coals are got to the furface, they are drawn a fmall diftance from the pit, and laid in feparate heaps: the largeft coals in one heap, the fmaller pieces called *chaws* in another, and the *culm* or *pan-coal* in a feparate place.

It may be readily imagined that the working of coaleries is fubject to various accidents; but there are none more dreadful in their confequences than the fudden efcape of *foul air*, by which the workmen are liable to inftant fuffocation. Of this there are two kinds: the *black damp* or *ftyth*, which is of a fuffocating nature; and the *inflammable* or combuftible damp. Without ftaying to inquire, in this place, into the origin and effects of thefe damps, it may be fufficient to obferve, that, in whatever part of any coalery a conftant fupply or a circulation of frefh air is wanting, there fome of thefe damps exift, accumulate in a body, and become noxious or fatal: and whenever there is a good circulation of frefh air, they cannot accumulate, being mixed with and carried away by the ftream of air as faft as they generate or exhale from the ftrata. Upon thefe principles are founded the feveral methods of ventilating a coalery. Suppofe the workings of the pits A and B fig. 6. to be obnoxious to the inflammable damps; if the communication was open betwixt the two pits, the air which went down the pit A would proceed immediately along the mine *a*, and afcend out of the pit B; for it naturally takes the neareft direction: fo that the air in all the workings would be ftagnant; and they would be utterly inacceffible from the accumulation of the combuftible damp. In order to expel this, the air muft be made to circulate through all the different rooms by means of collateral air-courfes made in this manner: The paffage or mine *a* muft be clofed up or ftopped by a partition of deals, or by a wall built with bricks or ftones, to prevent the air paffing that way. This building is called a *ftopping*. There muft alfo be ftoppings made in the thirlings 1,1,1, &c. betwixt the pillars *f f*, &c. which will direct the air up the mine *e e*, until it arrive at the innermoft thirling 2, which is to be left open for its paffage. There muft alfo be ftoppings made at the fide of the mine *a* at *mm*, and on both fides of the main head-way BC at *bb*, &c. then returning to the innermoft thirling 2, proceed to the third row of pillars, and build up the thirlings 2 2, &c. leaving open the thirling 3 for a paffage for the air; and proceeding on to the fifth row of pillars, build up in the fame manner the ftoppings 3 3, &c. leaving open 4 for an air courfe; and by proceeding in this manner to ftop up the thirlings or paffages in every other row of pillars, the current of frefh air will circulate through and ventilate the whole workings, in the direction pointed to by the fmall arrows in the plan, cleaning away all the damps and noxious vapours that may generate. When it is arrived at C, it is conducted acrofs the main head-way, and carried through the other part of the pit's workings in the fame manner, until it return through *n n* to the pit B, where it afcends; and as the rooms advance farther, other ftoppings are regularly made. In fome of thofe ftoppings, on the fide of the main headway, there muft be doors to admit a paffage for the bringing out of the coals from the rooms to the pit; however, thefe doors muft be conftantly fhut, except at the time of paffing through them.

Moft of the larger coaleries fend their coals to the fhips for the coafting trade or exportation; and, as the quantity is generally very large, it would take a greater number of carts than could conveniently be obtained at all times to carry them; befides the confiderable expence of that manner of carriage: they therefore generally ufe waggons, for carrying them along *waggon-ways*, laid with timber; by which means one horfe will draw from two to three tons at a time, when in a cart not above half a ton could be drawn. The waggons have four wheels, either made of folid wood or of caft iron. The body of the carriage is longer and wider at the top than at the bottom; and ufually has a kind of trap-door at the bottom, which, being loofed, permits the coals to run out without any trouble. The waggon-way fhould be made into the ftore-houfe, at fuch a height from the ground, as to permit the coals to run from the waggons down a fpout into the veffels; or elfe to fall down into the ftore-houfe, as occafion may require.

COAMINGS, in fhip-building, are thofe planks, or that frame, forming a border round the hatches, which raife them up higher than the reft of the deck. Loop-holes, for mufkets to fhoot out at, are often made in the coamings, in order to clear the deck of the enemy when the fhip is boarded.

COANE, among the Greeks, a name given to a peculiar fpecies of *tutia* or *tutty*, which was always found in a tubular form. It had its name from κωνη, a word ufed to exprefs a fort of cylindric tube, into which the melted brafs was received from the furnace, and in which it was fuffered to cool. In cooling, it always depofited a fort of recrement on the fides of the veffel or tube, and this was the tutty called *coane*.

COAST, a fea-fhore, or the country adjoining to the edge of the fea. The fea-coaft of Britain, from the figure, in fome meafure, of the ifland, but chiefly from the inlets of the fea, and the very irregular indented line which forms its fhore, comprehends, allowing for thofe finuofities, at leaft 800 marine leagues. In this refpect, therefore, it is fuperior to France, though that

be a much larger country; and equal alfo to Spain and Portugal in this circumftance, though Britain is not half the fize of that noble peninfula.

COAST-Cape, the name of the chief Britifh fettlement on the coaft of Guinea in Africa. The name is thought to be a corruption of *Cabo Corfo*, the ancient Portuguefe appellation. It lies under the meridian of London, in 50 N. lat.

COASTING, in navigation, the act of making a progrefs along the fea-coaft of any country. The principal articles relating to this part of navigation are, the obferving the time and direction of the tides; knowledge of the reigning winds; of the roads and havens; of the different depths of the water, and qualities of the ground.

Coasting-*Pilot*, a pilot who by long experience has become fufficiently acquainted with the nature of any particular coaft, and of the requifites mentioned in the preceding article, to conduct a fhip or fleet from one part of it to another.

COAT, or coat of Arms, in heraldry, a habit worn by the ancient knights over their arms both in war and tournaments, and ftill borne by heralds at arms. It was a kind of fur-coat, reaching as low as the navel, open at the fides, with fhort fleeves, fometimes furred with ermine and hair, upon which were applied the armories of the knights embroidered in gold and filver, and enamelled with beaten tin coloured black, green, red, and blue; whence the rule never to apply colour on colour, nor metal on metal. The coats of arms were frequently open, and diverfified with bands and fillets of feveral colours, alternately placed, as we ftill fee clothes fcarleted, watered, &c. Hence they were called devifes, as being divided and compofed of feveral pieces fewed together: whence the words *falfe, pale, chevron, bend, crofs faltier, lozenge*, &c. which have fince become honourable pieces, or ordinaries of the fhield. See Cross, Bend, Chevron, &c. Coats of arms and banners were never allowed to be worn by any but knights and ancient nobles.

Coat, in anatomy. See Tunic.

Coat *of Mail*, a kind of armour made in form of a fhirt; confifting of iron rings wove together netwife. See Mail.

COATI, in zoology, a fynonime of a fpecies of Viverra and Ursus.

COATIMUNDI, a variety of the above.

COATING, among chemifts, the application of clay or any other fubftance on the out or infide of any glafs veffel, to preferve it from breaking, by the violence of the fire to which it is afterwards expofed. See Chemistry.

Coating *of Phials, Panes of Glafs*, &c. among electricians, is ufually performed by covering the outfide and infide alfo of a phial with tinfoil, brafs or gold-leaf, &c. by which means it becomes capable of being *charged*. See Electricity.

COATZONTECOXOCHITL, or *Flower with the viper's head*, in botany, a Mexican flower of incomparable beauty. It is compofed of five petals or leaves, purple in the innermoft part, white in the middle, the reft red but elegantly ftained with yellow and white fpots. The plant which bears it has leaves refembling thofe of the iris, but longer and larger; its trunk is fmall and flim: this flower was one of the moft efteemed amongft the Mexicans. The Lincean academicians of Rome, who commented on and publifhed the Hiftory of Hernandez in 1651, and faw the paintings of this flower, with its colours, executed in Mexico, conceived fuch an idea of its beauty, that they adopted it as the emblem of their very learned academy, denominating it *Fior di Lince*. See plate 78.

COBALT, one of the femi-metals. See Chemistry, p. 432. The moft common ore of cobalt is that called the *black* or *vitreous ore*, and *Kobalt Mulm* or *Schlaken Kobalt* by the Germans. It is found in a loofe powdery form, fometimes refembling lamp-black, fometimes of a grey colour, in which ftate it is called *cobalt ochre*; but when in fcoriform half-vitrified maffes, it obtains the name of *vitreous* or *glaffy ore*. When this kind of ore contains any fulphur or arfenic, they are only mechanically mixed with it. A fmall portion of copper, however, is fometimes found in it. It is frequently embodied in ftones or fands of a black colour; fometimes it is contained in argillaceous earths of a blue or green colour. Talc, chalk, and gypfum, impregnated with it, are called by the fame name; and by fome *fpiegel cobalt*. Cobalt, mineralifed by the *arfenical acid*, is found either loofe and pure, or mixed with chalk or gypfum, or indurated and cryftallized in tetrahedral cryftals. It is alfo found in a ftalactitical form. It frequently invefts other cobaltic ores; and is found fometimes in ftone and fand. Cobalt, mineralifed by *fulphurated iron*, is of a colour nearly refembling tin or filver. It is fometimes found in large maffes, fometimes in grains cryftallized of a dull white colour, and frequently has the appearance of *mifpickle*. A coarfe grained kind of this ore, found in Sweden, becomes flimy in the fire, and fticks to the iron rods employed in ftirring it while calcining. The flaggy kind contains a large quantity of iron. Cobalt, mineralifed by *fulphur, arfenic*, and *iron*, has a great refemblance to the harder kinds of grey cobalt ore; but it is never hard enough to ftrike fire with fteel, and fometimes may even be fcraped with a knife. The moft fhining kinds of this and the former fpecies are called *kobalt glantz*.

The great confumption of cobalt is for the permanent blue colour which it communicates to glaffes and enamels, either upon metals, porcelains, or earthen wares of any kind. It is the fame blue prepared in a very cheap way by the Dutch, chiefly from the coarfe glafs or blue glafs of cobalt, and called *azur de Hollande* by the French, which is employed by laundreffes. But although cobalt is applied to few or no other purpofes, the quantities confumed in this way afford fufficient profit to thofe who have cobalt mines in their poffeffion. Ores of cobalt are met with in various parts of Europe; but the greateft quantities are found near Schnuberg in the diftrict of Mifnia in Saxony; alfo at St. Andreafberg in the Upper Hartz.

When cobalt is united to bifmuth, by means of nickel, the compound is called *fpeifs*. This name is alfo given to a mixture of cobalt, nickel, bifmuth, fulphur, and arfenic. In Germany and Saxony, the word *cobalt* is applied to the damps, arfenical vapours, and their effects on the miners; which has induced the vulgar to apply it to an evil fpirit whom they fuppofed to dwell in the mines.

Regulus of Cobalt, a kind of femi-metal prepared from cobalt. See Chemistry, p. 432.

COBBING, a punifhment fometimes inflicted at fea. It is performed by ftriking the offender a certain number of times on the breech with a flat piece of wood called the *cobbing-board*. It is chiefly ufed as a punifhment to thofe who quit their ftation during the period of the night-watch.

COBITIS, the loache, in ichthyology, a genus of fifhes belonging to the order of abdominales. The eyes are in the upper part of the head; the branchioftege membrane has from four to five rays; and the body is nearly of an equal thicknefs throughout. The fpecies are five; three of which are natives of Europe. The loache is found in feveral of our fmall rivers, keeping at the bottom on the gravel; and is on that account, in fome places, called the *groundling*. It is frequent in the ftream near Amefbury in Wiltfhire, where the fportfmen, through frolic, fwallow it down alive in a glafs of white-wine.

COBLE, a boat ufed in the turbot fifhery, twenty feet fix inches long, and five feet broad. It is about one ton burden, rowed with three pair of oars, and admirably conftructed for encountering a mountainous fea.

COBLENTZ, an ancient and handfome town of Germany, in the electorate of Treves, at the confluence of the Rhine and

Mofelle. It is the ufual refidence of the elector of Treves, and is 50 miles N. E. of Treves. Lon. 7. 32. E. Lat. 50. 24. N.

COBOB, the name of a difh among the Moors. It is made of feveral pieces of mutton wrapt up in the cawl, and afterwards roafted in it; the poorer people, inftead of the meat, ufe the heart, liver, and other parts of the entrails, and make a good difh, though not equal to the former.

COBOOSE, in fea-language, is derived from the Dutch *kambuis*, and denotes a fort of box, refembling a fentry-box, ufed to cover the chimneys of fome merchant fhips. It generally ftands againft the barricade, on the fore-part of the quarter deck. It is called in the Weft Indies *cobre vega*.

COBURG, a town of Germany, in the circle of Franconia, capital of a principality of the fame name, with a college, a fort, and a caftle. This town, with its principality, belongs to the houfe of Saxony. It is feated on the Itch, 20 miles N. of Bamberg. Lon. 11. 18. E. Lat. 50. 22. N.

COBWEB, in phyfiology, the fine net-work which fpiders fpin out of their own bowels, in order to catch their prey. See Aranea.

COCCEIUS (John), profeffor of theology at Bremen, was founder of a fect called *Cocceians:* they held, among other fingular opinions, that of a vifible reign of Chrift in this world, after a general converfion of the Jews and all other people to the true Chriftian faith, as laid down in the voluminous works of Cocceius. He died in 1699, aged 66.

COCCINELLA, in zoology, a genus of infects of the order of coleoptera; the characters of which are thefe: The antennæ are fubclavated: the palpi are longer than the antennæ, the laft articulation heart-fhaped; the body is hemifpheric; the thorax and elytra are margined; the abdomen is flat. See plate 78. This genus is divided into fections, from the colour of the elytra, and of the fpots with which they are adorned. The females, impregnated by the males, depofit their eggs, which turn to fmall larvæ, flow in their progrefs, and enemies to the plant-loufe. Thofe larvæ are frequently found upon leaves of trees covered with plant-lice. On the point of being metamorphofed, they fettle on a leaf by the hinder part of their body, then bend and fwell themfelves, forming a kind of hook. The fkin extends, grows hard; and in a fortnight's time the chryfalis opens along the back. The infect in its perfect ftate receives the impreffions of the air, that gives its elytra a greater degree of confiftence. It feldom flies, and cannot keep long on the wing. Of all the different larvæ of the coccinella, the moft curious is the white hedgehog, a name given it by M. de Reaumur on account of the fingularity of its figure, and the tufts of hair which render it remarkable. It feeks its food on the leaves of trees. After a fortnight, it fettles on one fpot, and, without parting with its fur, turns to a chryfalis; three weeks after which, it becomes a coccinella. The flough appears noways impaired by its transformation. M. de Reaumur has obferved it on a plum-tree. It is likewife found upon the rofe-tree. When the coccinella firft arrive at the ftate of perfection, the colours of their elytra are very pale, nearly bordering upon white or cream colour; and the elytra are very foft and tender, but foon grow hard, and change to very lively brilliant colours. Their eggs are of an oblong form, and of the colour of amber.

COCCOLOBO, in botany; a genus of the trigynia order; belonging to the octandria clafs of plants; and in the natural method ranking under the 12th order, *Holoraceæ*. The calyx is quinquepartite and coloured; there is no corolla; the berry is formed of the calyx, and is monofpermous. The fpecies called *uvifera*, or *fea-fide grape*, grows upon the fandy fhores of moft of the Weft India iflands, where it fends up many woody ftems, eight or ten feet high, covered with brown fmooth bark, and furnifhed with thick, veined, fhining, orbicular leaves five or fix inches diameter, ftanding upon fhort foot-ftalks.

COCCOTHRAUSTES, in ornithology, the trivial name of a fpecies of Loxia.

COCCULUS Indicus, the name of a poifonous berry, too frequently mixed with malt liquors in order to make them intoxicating; but this practice is exprefsly forbidden by act of parliament. It is the fruit of the Menispermum *Cocculus*. Fifhermen have a way of mixing it with pafte: this the fifh fwallow greedily, and are thereby rendered lifelefs for a time and float on the water. The old women ufe it with ftavefacre, for deftroying lice in children's heads.

COCCUS, in zoology, a genus of infects belonging to the order of hemiptera. The roftrum proceeds from the breaft; the belly is briftly behind; the wings of the male are erect; and the female has no wings. See plate 78. The fpecies are 22, denominated principally from the plants they frequent. The moft remarkable fpecies are:

1. The coccus hefperidum, or green-houfe bug, which is oval, oblong, of a brown colour, covered with a kind of varnifh: it has fix legs; with a notch and four briftles at the tail. It infefts orange-trees and other fimilar plants in green-houfes. When young, it runs upon the trees; but afterwards fixes on fome leaf, where it hatches an infinity of eggs, and dies. The male is a very fmall fly.

2. The coccus phalarides. The male of this fpecies is fmall. Its antennæ are long for its fize. The feet and body are of a reddifh colour, nearly pink, and fprinkled with a little white powder. Its two wings, and the four threads of its tail, are fnow-white, and of thofe threads two are longer than the reft. It is to be found upon the fpecies of gramen which Linnæus calls *phalaris*. The female contrives, along the ftalks of that dog-grafs, little nefts, of a white cottony fubftance, in which fhe depofits her eggs. The fmall threads of her tail are fcarcely perceptible.

3. The coccus cacti, a native of the warmer parts of America, is the famous cochineal animal, fo highly valued in every part of the world for the incomparable beauty of its red colour, which it readily communicates to wool and filk, but with much more difficulty to linen and cotton. This infect, like all others, is of two fexes, but exceedingly diffimilar in their appearance. The female, which alone is valuable for its colour, is ill-fhaped, tardy, and ftupid: its eyes, mouth, and antennæ, are fixed fo deep, and are fo concealed in the folds of the fkin, that it is impoffible to diftinguifh them without a microfcope. The male is very fcarce, and is fufficient for 300 females or more; it is active, fmall, and flender, in comparifon with the female; its neck is narrower than the head, and ftill narrower than the reft of the body. Its thorax is of an elliptic form, a little longer than the neck and head put together, and flattened below; its antennæ are jointed, and out of each joint iffue long flender hairs that are difpofed in pairs on each fide. It has fix feet, each formed of diftinct parts. From the pofterior extremity of its body two large hairs or briftles are extended, which are four or five times the length of the infect. It bears two wings that are fixed to the upper part of the thorax, which fall like the wings of common flies when it walks or refts. Thefe wings, which are of an oblong form, are fuddenly diminifhed in breadth where they are connected to the body. The male is of a bright red; the female of a deeper colour. They are bred on a plant, known in Oaxaca in New Spain, and all thofe parts where it abounds, by the name of *nopal*, or *nopalleca*, the *Indian fig-tree*. See Cactus.

The cochineal-infect may, in fome circumftances, be compared to the filk-worm, particularly in the manner of depofiting its eggs. The infects deftined for this purpofe are taken at a proper time of their growth, and put into a box well clofed,

and lined with a coarfe cloth left any of them be loft: and in this confinement they lay their eggs and die. The box is kept clofe fhut till the time of placing the eggs on the nopal, when, if any motion is perceived, it is a fufficient indication that the animalcule has life, though the egg is fo minute as hardly to be perceived: and this is the feed placed on the foliage of the nopal, the quantity contained in the fhell of a hen's egg being fufficient for covering a whole plant. The principal countries where the cochineal infects are bred, are Oaxaca, Tlafcala, Chulula, Nueva Gallicia, and Chiapa, in the kingdom of New Spain; and Hambato, Loja, and Tucuman in Peru: but it is only in Oaxaca that they are gathered in large quantities, and form a branch of commerce; the cultivation of thefe little creatures being there the chief employment of the Indians. In trade, four forts of Cochineal are diftinguifhed, *Maftique*, *Campefchane*, *Tetrafchale*, and *Sylvefter*; of which the firft is accounted the beft, and the laft the worft. Its principal confumption is among the dyers. See the Treatife on Dyeing, p. 129.

4. The coccus ilicis, or that forming the kermes grains, inhabits the quercus coccifera of the fouthern parts of Europe. M. Hellot fays it is found in the woods of Vauvert, Vandeman, and Narbonne; but more abundantly in Spain, towards Alicant and Valencia. Both ancients and moderns feem to have had very confufed notions concerning the origin and nature of the kermes; fome confidering it as a fruit, without a juft knowledge of the tree which produced it; others taking it for an excrefcence formed by the puncture of a particular fly, the fame as the common gall obferved upon oaks: but it was finally difcovered that the kermes is in reality nothing elfe but the body of an infect transformed into a grain, berry, or hufk, according to the courfe of nature. The progrefs of this transformation muft be confidered at three different feafons. In the firft ftage, at the beginning of March, an animalcule, no larger than a grain of millet, fcarce able to crawl, is perceived fticking to the branches of the tree, where it fixes itfelf, and foon becomes immoveable; at this period it grows the moft, appears to fwell and thrive with the fuftenance it draws in by degrees. At the fecond ftage, in April, its growth is completed; its fhape is then round, and about the fize of a pea: it has then acquired more ftrength, and the down which covered it is changed into duft, and feems to be nothing but a hufk or a capfule, full of a reddifh juice not unlike difcoloured blood. Its third ftate is towards the end of May, when the hufk appears replete with fmall eggs, lefs than the feed of a poppy. Thefe are properly ranged under the belly of the infect, progreffively placed in the neft of down that covers its body, which it withdraws in proportion to the number of eggs. After this work is performed, it foon dies, though it ftill adheres to its pofition, rendering a further fervice to its progeny, and fhielding them from the inclemency of the weather, or the hoftile attacks of an enemy. In a good feafon they multiply exceedingly, having from 1800 to 2000 eggs, which produce the fame number of animalcules. In France, poor people gather the kermes, letting their nails grow in order to pick them off with greater facility.

5. The coccus lacca, or gum-lac animal, is a native of the Eaft Indies. The head and trunk form one uniform, oval, compreffed, red body, of the fhape and magnitude of a very fmall loufe, confifting of twelve tranfverfe rings. The back is carinate; the belly flat; the antennæ half the length of the body, filiform, truncated, and diverging, fending off two, often three, delicate, diverging hairs, longer than the antennæ: the mouth and eyes could not be feen with the naked eye. The tail is a little white point, fending off two horizontal hairs as long as the body. It has three pair of limbs, half the length of the infect. This is its defcription in that ftate in which it fallies forth from the womb of the parent in the months of November and December. They traverfe the branches of the trees upon which they were produced, for fome time, and then fix themfelves upon the fucculent extremities of the young branches. By the middle of January they are all fixed in their proper fituations; and appear as plump as before, but fhow no other marks of life. The limbs, antennæ, and fetæ of the tail are no longer to be feen. Around their edges they are environed with a fpiffid fubpellucid liquid, which feems to glue them to the branch: it is the gradual accumulation of this liquid which forms a complete cell for each infect, and is what is called *gum-lacca*. About the middle of March the cells are completely formed, and the infect is in appearance an oval, fmooth, red bag, without life, about the fize of a fmall cochanical infect, emarginated at the obtufe end, full of a beautiful red liquid. In October and November we find about 20 or 30 oval eggs, or rather young grubs, within the red fluid of the mother. When this fluid is all expended, the young infects pierce a hole through the back of their mother, and walk off one by one, leaving their exuviæ behind, which is that white membranous fubftance found in the empty cells of the ftick lac.

The infects are the inhabitants of four trees: 1. Ficus religiofa, *Linnæi*; 2. Ficus indica, *Linnæi*; 3. Plafo, *Hortus Malabaricus*; and 4. Rhamnus jujuba, *Linnæi*. The infects generally fix themfelves fo clofe together, and in fuch numbers, that fcarcely one in fix can have room to complete her cell: the others die, and are eaten up by various infects. The extreme branches appear as if they were covered with a red duft, and their fap is fo much exhaufted, that they wither and produce no fruit; the leaves drop off, or turn to a dirty black colour. A red medicinal gum is produced by incifion from the plafo tree, fo fimilar to the gum-lacca, that it may readily be taken for the fame fubftance. Hence it is probable, that thofe infects have little trouble in animalizing the fap of thefe trees in the formation of their cells. The gum-lacca of this country is principally found upon the uncultivated mountains on both fides the Ganges, where the only trouble in procuring it is in breaking down the branches, and carrying them to market. The beft lack is of a deep red colour.

This infect and its cell has gone under the various names of *gum lacca*, *lack*, *loc-tree*; in Bengal, *la*: and by the Englifh it is diftinguifhed into four kinds, differently denominated. For thefe, and their feveral ufes, fee the article Lacca.

In the figure is reprefented the infect at its birth; big with young; the embryo before birth inclofed in its membrane; the coccus, with two hairs from each antennæ; and the fame with three hairs from each antennæ; the three latter figures are magnified.

6. Coccus Polonicus, an infect which may properly enough be called the *cochineal* of the northern part of the world. As the cochineal loves only the hot climates, this creature affects only the cold ones. Though collected for the ufe of the dyers, it is greatly inferior to the true cochineal. It is commonly known by the name of *coccus Polonicus*, or the *fcarlet grain of Poland*. It is to be met with not only in Poland, but in many of the northern countries. It is found affixed to the root of a plant, and ufually to plants of that fpecies from thence called *polygonum cocciferum*. Towards the end of June the coccus is in a fit ftate to be gathered. Every one of thefe creatures is then nearly of a fpherical form, and of a fine violet colour. Some of them, however, are not larger than poppy feeds, but others are the fize of a pepper corn; and each of them is lodged, either in part or entirely, in a fort of cup like that of an acorn. On fome plants are found only one or two of thefe, and on others more than forty; and they are fometimes placed near the origin of the ftalks of the plants.

COCCYGÆUS musculus. See Anatomy, *Table of the Mufcles*.

COCCYX, or Os Coccygis. See Anatomy, p. 165.

COCHIN, a sea-port of Travancore, in the peninsula of Hindostan. It belongs to the Dutch, and is 120 miles S. by E. of Calicut. Lon. 75. 30. E. Lat. 10. 0. N.

COCHIN CHINA, a kingdom of Asia, bounded on the E. by the Eastern Ocean, on the N. by Tonquin, on the W. by Cambodia, and on the S. by Ciampa. It is larger and richer than Cambodia; but the inhabitants are not so civil to strangers. It abounds in gold, raw silk, and drugs. Their religion is much the same as that of China, and their cities and towns have gates at the end of each street, which are shut every night. If any fire break out in a ward, all the inhabitants are destroyed, except the women and children. The inhabitants are of a light brown complexion, well-shaped, with long hair and thin beards.

COCHLEA, the shell-snail, in zoology. See HELIX.

COCHLEA, in Anatomy. See ANATOMY, p. 212.

COCHLEARIA, SCURVY-GRASS; a genus of the siliculosa order, belonging to the tetradynamia class of plants; and in the natural method ranking under the 39th order, *Siliquosæ*. The silicula is emarginated, turgid, and scabrous; with the valves gibbous and obtuse. There are six species; the most remarkable of which are, 1. The *angelica*, or garden scurvy-grass, grows naturally on the sea-shore, in the north of England and in Holland; and is cultivated for use in the gardens near London. It hath a fibrous root, from which arise many round succulent leaves, which are hollowed like a spoon; the stalks rise from six inches to a foot high: these are brittle, and garnished with leaves which are oblong and sinuated. The flowers are produced in clusters at the end of the branches, consisting of four small white petals, which are placed in the form of a cross; and are succeeded by short, roundish, swelling, seed-vessels, having two cells divided by a thin partition. In each of these are lodged four or five roundish seeds. 2. The *armoracia*, or horse-radish, is so well known as to need no description. The first is propagated by seeds, which are to be sown in July, in a moist spot of ground: and when the plants are come up, they should be thinned so as to be left at about six inches each way. The horse-radish is propagated by cuttings or buds from the sides of the old roots. Scurvy-grass is pungent and stimulating, and had its name from the properties attributed to it in the cure of the scurvy, which, however, are unfounded. Horse-radish root has a quick pungent smell, and a penetrating acrid taste, which it communicates on distillation with water, and in this way it has been employed by some to alleviate fits of the stone, and other complaints of the urinary passages.

COCHLITES, in natural history, an appellation given to the petrified shells of the cochleæ or snails.

COCK, in zoology, the English name of the males of gallinaceous birds, but more especially used for the common dunghill cock. See PHASIANUS.

Black COCK. } See TETRAO.
COCK *of the Wood.* }

COCK-*Chaffer*. See SCARABÆUS.

COCK-*Paddle, Lump-fish*, or *Sea-owl*. See CYCLOPTERUS.

COCK-*Pit*, a sort of theatre upon which game cocks fight. See *Cock*-FIGHT.

COCK-PIT, of a ship of war, the apartment of the surgeon and his mates; being the place where the wounded men are dressed in time of battle, or otherwise. It is situated under the lower deck.

COCKBURNE (Mrs. Catharine), a most accomplished lady and celebrated dramatic writer, was the daughter of Capt. David Trotter, a native of Scotland, and a sea-commander in the reign of King Charles II. She was born in London, August 16, 1679, and died on the 11th of May, 1749, in her 71st year. Her works are collected into two large volumes 8vo, by Dr. Birch; who has prefixed to them an account of her Life and Writings.

COCKERMOUTH, a populous borough of Cumberland, with a market on Monday. It lies between the rivers Derwent and Cocker, over which are two stone bridges. It is between two hills, on one of which stands a handsome church; on the other a stately castle. It has a thriving manufactory of shalloons, worsted stockings, and hats. The market is the best for corn in the county, except that of Penrith. It is 44 miles N. W. by N. of Kendal, and 290 N. N. W. of London. Lon. 3. 25. W. Lat. 54. 42. N.

COCKET, is a seal belonging to the king's custom-house, or rather a scroll of parchment sealed and delivered by the officers of the customs to merchants, as a warrant that their merchandises are customed. It is also used for the *office* where goods exported are first entered, pay their customs, and have a cocket or certificate of discharge.

COCKLE, in ichthyology. See CARDIUM.

COCKLE, or SHIRLE, in mineralogy, a species of stones of the garnet kind, belonging to the siliceous class. It is called *Schoerlus* by Bergman, *Lapis corneus chrystallizatus* by Wallerius, and *Stannum chrystallis columnaribus* by Linnæus. It is hard and heavy, shooting into crystals of a prismatic figure, principally of a black or green colour. The name *cockle* for these kinds of stones is an old Cornish word; but is sometimes also applied to very different substances. The term *shirl* is adopted from the Germans. The English mineral name of *call* has also been used by some authors as synonymous with *cockle*, and these are even confounded together at the mines; but the *call*, definitively speaking, is the same with the substance called *wolfram* by the Germans.

The specific gravity of these stones is between 3000 and 3400, though always in proportion to their different solidities. They crack in the fire, and are very difficult to be fused; resisting both microcosmic salt and mineral alkali. They cannot totally be dissolved in nitrous acid; but the dissolved part is precipitated in a gelatinous form on the addition of an alkali. On a chemical analysis they are found to contain siliceous earth, argil, calcareous earth, and iron; which last is found in a much greater quantity when they are opaque than when transparent. According to Bergman, some contain 55 parts of siliceous earth, 39 of argillaceous, and six of pure calcareous earth; but some contain ten or twelve of magnesia. In Britain they are chiefly found in Cornwall, about the tin mines, and some fine crystallized kinds have been brought from Scotland. There are four varieties, 1. The *schoerlus martialis*, or cockle mixed with iron. 2. The *spatosus*, or sparry cockle, which is found in some places of a deep green colour; whence authors have called it the mother of emeralds. 3. The *fibrous* cockle, resembling threads of glass; which are either parallel, or like rays from a centre, in which last case it is called *starred cockle*; and, 4. *Crystallized* cockle, which is found of a black, deep-green, light-green, and reddish-brown in Sweden, and some other European countries. Near Basil in Switzerland is also found, though very rarely, a stone called *tauffstein*, belonging to this variety. It is of a reddish brown colour, and consists of two hexagonal crystals of cockle grown together in the form of a cross. See MINERALOGY.

COCKNEY, a very ancient nickname for a citizen of London. Ray says, an interpretation of it is, A young person coaxed or cocquered, made a wanton, or nestle-cock, delicately bred and brought up, so as when arrived at man's estate to be unable to bear the least hardship. Another, A person ignorant of the terms of the country œconomy, such as a young citizen, who having been ridiculed for calling the neighing of a horse laughing, and told that it was called neighing, next morning,

on hearing the cock crow, to ſhow that inſtruction was not thrown away upon him, exclaimed to his former inſtructor, "*How that cock neighs!*" whence the citizens of London have ever ſince been called *cock-neighs*, or cockneys. Whatever may be the origin of this term, we at leaſt learn from the following verſes, attributed to Hugh Bagot earl of Norfolk, that it was in uſe in the time of king Henry II.

> Was I in my caſtle at Bungay,
> Faſt by the river Waveney,
> I would not care for the king of cockney.
> (*i. e.* the king of London).

The king of the cockney occurs among the regulations for the ſports and ſhows formerly held in the Middle Temple, on Childermas day, where he had his officers, a marſhal, conſtable, butler, &c.—See Dugdale's *Origines Juridiciales*, p. 247.

COCKROACH. See the article Blatta.

COCKSWAIN, or Cockson, an officer on board a man of war, who hath the care of the boat, or ſloop, and all things belonging to it. He is to be always ready with his boat's gang or crew, and to man the boat, on all occaſions. He ſits in the ſtern of the boat, and ſteers; and hath a whiſtle to call and encourage his men.

COCOA, in botany. See Cocos.

COCONATO, a town in Piedmont in Italy, famous for being the birth-place of Columbus, who firſt diſcovered America. E. long. 8. 0. N. lat. 44. 50.

COCOS, in botany; a genus belonging to the natural order of *Palmæ*. See plate 78. The calyx of the male is tripartite; the corolla tripetalous, with ſix ſtamina. The calyx of the female quinquepartite; the corolla tripetalous; the ſtigmata three, and the plum coriaceous. There is only one ſpecies known, which is cultivated in both the Indies, and is of the greateſt uſe to the inhabitants. It is ſuppoſed to be a native of the Maldive and ſome deſert iſlands in the Eaſt Indies; and from thence to have been tranſported to all the warm parts of America: for it is not found in any of the inland parts, nor any where far diſtant from the ſettlements. The tree frequently riſes 60 feet high. The body of the trunk, which generally leans to one ſide, occaſioned, as is ſuppoſed, by the great weight of nuts it ſuſtains when young, is the exact ſhape of an apothecary's large iron peſtle, being of an equal thickneſs at top and at bottom, but ſomewhat ſmaller in the middle; its colour is of a pale brown throughout, and the bark ſmooth. The leaves or branches are often 14 or 15 feet long, about 28 in number, winged, of a yellow colour, ſtraight and tapering. The pinnæ or partial leaves are green, often three feet long next the trunk, but diminiſhing in length toward the extremity of the branches. The branches are faſtened at top by brown ſtringy threads that grow out of them, of the ſize of ordinary pack-thread, and are interwoven like a web. The nuts hang at the top of the trunk, in cluſters of a dozen in each. Each nut, next the ſtem, has three holes cloſely ſtopped; one of them being wider, and more eaſily penetrated than the reſt. When the kernel begins to grow, it incruſts the inſide of the nut in a blueiſh jelly-like ſubſtance; as this grows harder, the incloſed liquid, diſtilled into the nut from the roots, becomes ſomewhat acid; and the kernel, as the nut ripens, becomes ſtill more ſolid; and at length lines the whole inſide of the nut for above a quarter of an inch thick, being as white as ſnow, and of the flavour of an almond. The quantity of liquor in a full grown nut is frequently a pint and upwards. The huſky tegument of the nut conſiſts of ſtrong, tough, ſtringy filaments, which, when removed from the fruit, reſemble coarſe oakum. The ſhells of theſe nuts, being tipped with ſilver, are frequently uſed for drinking cups, and the nut itſelf is ſweetiſh and of a very agreeable flavour.

COCTION, a general term for all alterations made in bodies by the application of heat.

COCYTUS, one of the rivers of hell, according to the theology of the poets. It was a branch of the river Styx; and flowed, according to Horace, with a dull and languid ſtream.

COD, in ichthyology. See Gadus and Fishery.

Cod is alſo a term uſed, in ſome parts of the kingdom, for a pod. See Pod.

Cod-*Cape*, a promontory on the coaſt of New England, near the entrance of Boſton harbour. W. long. 69. 50. N. lat. 42. 0.

CODDY-moddy, the Engliſh name of a ſpecies of Larus.

CODE, a collection of the laws and conſtitutions of the Roman emperors, made by order of Juſtinian. The word comes from the Latin *codex*, "a paper book;" ſo called *à codicibus* or *caudicibus arborum*, "the trunks of the trees;" the bark whereof being ſtripped off, ſerved the ancients to write their books on. The code is accounted the ſecond volume of the civil law, and contains twelve books; the matter of which is nearly the ſame with that of the digeſts, eſpecially the firſt eight books: but the ſtyle is neither ſo pure, nor the method ſo accurate, as that of the digeſts; and it determines matters of daily uſe, whereas the digeſts diſcuſs the more abſtruſe and ſubtle queſtions of the law, giving the various opinions of the ancient lawyers. Although Juſtinian's code is diſtinguiſhed by the appellation of *code*, by way of eminence, yet there were codes before his time; ſuch were, 1. The Gregorian code, and Hermogenean code; collections of the Roman laws, made by two famous lawyers, Gregorius and Hermogenes, which included the conſtitutions of the emperors from Adrian to Diocleſian and Maximinus. 2. The Theodoſian code, compriſed in 16 books, formed out of the conſtitutions of the emperors from Conſtantine the Great to Theodoſius the Younger: this was obſerved almoſt over all the weſt, till it was abrogated by the Juſtinian code. There are alſo ſeveral later codes, particularly the ancient Gothic, and thoſe of the French kings; as the code of Euridic, code-Lewis, code-Henry, code-Marchande, code des Eaux, &c.; and the late king of Pruſſia likewiſe publiſhed a code, which compriſes the laws of his kingdom in a very ſmall volume.

CODEX, in antiquity, denotes a book or tablet on which the ancients wrote. See Code. It alſo denoted a kind of puniſhment by means of a clog or block of wood, to which ſlaves who had offended were tied faſt, and obliged to drag it along with them; and ſometimes they ſat on it cloſely bound.

CODIA, among botaniſts, ſignifies the head of any plant, but more particularly a poppy head; whence its ſyrup is called *diacodium*.

Codia, in botany; a genus of the digynia order, belonging to the octandria claſs of plants. The calyx is tetraphyllous, with ſmall oblong horizontal leaves; the corolla conſiſts of four very ſmall linear petals; the ſtamina are eight filaments twice as long as the calyx; the antheræ are roundiſh.

CODICIL, is a writing, added by way of ſupplement to a will, when any thing has been omitted that the teſtator would have added, or wants to be explained, altered, or recalled. It only requires to be ſigned by witneſſes in the ſame way as the body of the will itſelf.

CODLIN, an apple uſeful in the kitchen, being the moſt proper ſort for baking.

CODLING, an appellation given to the cod-fiſh when young. See Gadus.

CODON (κωδων), in antiquity, a cymbal, or rather little braſs bell, reſembling the head of a poppy. They were faſtened to the trappings and bridles of horſes.

Codon, in botany; a genus of the monogynia order, belonging to the decandria claſs of plants. The calyx is decem-

partite, with the ſegments alternately long and ſhort; the corolla campanulated, with the limb decempartite and equal; the nectarium decemlocular, of ten ſcales inſerted into the heels of the ſtamina; the ſeed-caſe bilocular; the ſeeds hairy, roundiſh, in a dry coloured pulp.

CODRINGTON (Chriſtopher), a brave Engliſh officer, and not leſs diſtinguiſhed for his learning and benevolence; was born at Barbadoes in the year 1668, and educated at Oxford; after which he betook himſelf to the army; and, by his merit and courage, ſoon recommending himſelf to the favour of King William, was made a captain in the firſt regiment of foot-guards. He was at the ſiege of Namur in 1695; and, upon the concluſion of the peace of Ryſwick, was made captain-general and governor in chief of the Leeward and Caribbee iſlands. However, in 1701, ſeveral articles were exhibited againſt him to the houſe of commons in England; to which he publiſhed a diſtinct and particular anſwer, and was honourably acquitted of all imputations. In 1703 he ſhowed great bravery at the attack of Guadaloupe: but at laſt he reſigned his government, and lived a ſtudious retired life. For a few years before his death, he chiefly applied himſelf to church-hiſtory and metaphyſics. He died at Barbadoes on the 7th of April 1710, and was buried there the day following; but his body was afterwards brought over to England, and interred, on the 19th of June 1716, in the chapel of All-Souls College, Oxford. By his laſt will, he bequeathed his plantations in Barbaboes, and part of the iſland of Barbuda, to the ſociety for propagating the goſpel in foreign parts; and left a noble legacy to All-Souls College, of which he had been a fellow. This legacy conſiſted of his library, which was valued at 6000l.; and 10,000l. to be laid out, 6000 in building a library, and 4000 in furniſhing it with books. He wrote ſome of the poems in the *Muſæ Anglicanæ*, printed at London in 1741.

CŒCUM, or BLIND-GUT. See ANATOMY, page 189.

COEFFICIENTS, in algebra, are ſuch numbers or known quantities as are put before letters or quantities, whether known or unknown, and into which they are ſuppoſed to be multiplied. Thus, in $3x$, ax, or bx; 3, a and b, are the coefficients of x: and in $6a$, $9b$; 6, and 9, are the coefficients of a and b. See ALGEBRA.

CŒLESTIAL, or CELESTIAL, in general, denotes any thing belonging to the heavens: thus we ſay, *cœleſtial obſervations, the cœleſtial globe*, &c.

CŒLIAC ARTERY, in anatomy, that artery which iſſues from the aorta, juſt below the diaphragm. See ANATOMY, page 195.

CŒLIAC *Vein*, in anatomy, that vein running through the inteſtinum rectum, along with the cœliac artery.

CŒLOMA, among the old ſurgeons, a hollow ulcer, ſeated in the tranſparent cornea of the eye.

CŒLUS, Heaven, in Pagan mythology, the ſon of Æther and Dies, or Air and Day.

CŒMETERY. See CEMETERY.

CŒMPTIONALES, among the Romans, an appellation given to old ſlaves, which were ſold in a lot with others, becauſe they could not be ſold alone.

CŒNOBITE, a religious who lives in a convent, or in community, under a certain rule; in oppoſition to an achoret, or hermit, who lives in ſolitude. The word comes from the Greek κοινος, *communis*; and βιος, *vita*, "life." Caſſian makes this difference between a *convent* and a *monaſtery*, that the latter may be applied to the reſidence of a ſingle religious or recluſe; whereas the *convent* implies *cœnobites*, or numbers of religious living in common. Fleury ſpeaks of three kinds of monks in Egypt; *anachorets*, who live in ſolitude; *cœnobites*, who continue to live in community; and *ſarabaites*, who are a kind of monks-errant, that ſtroll from place to place. He refers the inſtitutions of cœnobites to the times of the apoſtles, and makes it a kind of imitation of the ordinary lives of the faithful at Jeruſalem; though St. Pachomius is uſually ſuppoſed the inſtitutor of the cœnobite life; as being the firſt who gave a rule to any community.

CŒNOBIUM, κοινοβιον, the ſtate of living in a ſociety, or community, where all things are common. Pythagoras is thought to be the author or firſt inſtitutor of this kind of life; his diſciples, though ſome hundreds in number, being obliged to give up all their private eſtates, in order to be annexed to the joint ſtock of the whole. The Eſſenians among the Jews and Platoniſts are ſaid to have lived in the ſame manner. Many of the Chriſtians alſo have thought this the moſt perfect kind of ſociety, as being that in which Chriſt and his apoſtles choſe to live.

CŒSFELDT, a town in Germany, in Weſtphalia, and in the territories of the biſhop of Munſter. It is near the river Burkel. E. long. 8. 2. N. lat. 51. 58.

CŒVORDEN, one of the ſtrongeſt towns in the United Provinces, in Overyſſel, fortified by the famous Cohorn. E. long. 6. 41. N. lat. 52. 40.

COFFEA, the COFFEE-TREE; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 47th order, *Stellatæ*. The corolla is funnel-ſhaped; the ſtamina above the tube; the berry inferior, diſpermous; the ſeeds arillated, or having a proper exterior covering dropping off of its own accord. There is but one ſpecies, ſuppoſed to be a native of Arabia Felix. It ſeldom riſes more than 16 or 18 feet in height; the main ſtem grows upright, and is covered with a light brown bark; the branches are produced horizontally and oppoſite, croſſing each other at every joint; ſo that every ſide of the tree is fully garniſhed with them, and they form a ſort of pyramid. The leaves alſo ſtand oppoſite; and when fully grown are about four or five inches long, and two broad in the middle, decreaſing toward each end; the borders are waved, and the ſurface is of a lucid green. The flowers are produced in cluſters at the root of the leaves, ſitting cloſe to the branches; they are tubulous, and ſpread open at the top, where they are divided into five parts; they are of a pure white, and have a grateful odour, but are of ſhort duration. The fruit, which is the only uſeful part, reſembles a cherry. It grows in cluſters, and is ranged along the branches under the axillæ of the leaves, of the ſame green as the laurel, but ſomething longer. When it comes to be of a deep red, it is gathered for the mill, in order to be manufactured into thoſe *coffee-beans* now ſo generally known.

The coffee-tree is cultivated in Arabia, Perſia, the Eaſt Indies, the Iſle of Bourbon, and ſeveral parts of America. It is alſo raiſed in botanic gardens in ſeveral parts of Europe. It delights particularly in hills and mountains, where its root is almoſt always dry, and its head frequently watered with gentle ſhowers. It prefers a weſtern aſpect, and ploughed ground without any appearance of graſs. The plants ſhould be placed at eight feet diſtance from each other, and in holes twelve or fifteen inches deep. If left to themſelves, they would riſe to the height of 16 or 18 feet; but they are generally ſtinted to five, for the convenience of gathering their fruit with the greater eaſe. Thus dwarfed, they extend their branches ſo, that they cover the whole ſpot round about them. They begin to yield fruit the third year, but are not in full bearing till the fifth. With the ſame infirmities that moſt other trees are ſubject to, theſe are likewiſe in danger of being deſtroyed by a worm or by the ſcorching rays of the ſun. The hills where the coffee-trees are found have generally a gravelly or chalk bottom. In the laſt, it languiſhes for ſome time and then dies: in the former its roots, which ſeldom fail of ſtriking between ſtones, obtain nouriſhment, and keep the tree alive and fruitful for 30 years. This is nearly the period for plants of the coffee-

tree. The proprietor, at the end of that time, not only finds himſelf without trees, but has his land ſo reduced, that it is not fit for any kind of culture; and unleſs he is ſo ſituated that he can take up a ſpot of virgin land, to make himſelf amends for that which is totally exhauſted by the coffee-trees, his loſs is irreparable.

The coffee-tree is ſometimes cultivated in European gardens; but it requires a ſtove. It makes a fine appearance at all ſeaſons of the year, but eſpecially when in flower, and when the berries are red, which is generally in the winter, ſo that they continue a long time in that ſtate. It is propagated from the berries; but they muſt be planted immediately when gathered from the tree, for they loſe their vegetative quality in a very ſhort time. The freſh berries may be planted in ſmall pots, and plunged into a hot-bed of tanners bark. If the bed be of a proper temperature, the young plants will appear in a month or five weeks; and in ſix more will be ready for tranſplanting into different pots. During ſummer, they muſt be frequently watered; but not too plentifully. The moſt proper ſoil for them is that of a kitchen garden, which is naturally looſe, and not ſubject to bind, eſpecially if it has conſtantly been well wrought and dunged.

COFFEE alſo denotes a kind of drink, prepared from thoſe berries; very familiar in Europe for theſe 100 years, and among the Turks 170. Its original however is not well known. The preparation of coffee conſiſts in roaſting, or giving it a juſt degree of torrefaction on an earthen or metalline plate, till it acquire a browniſh hue equally deep on all ſides. It is then ground in a mill, as much as ſerves the preſent occaſion, and infuſed in a way with which every one is familiar, in a proper quantity of boiling water. Very different accounts have been given of the medicinal qualities of this berry. To determine its real effects on the human body, Dr. Percival has made ſeveral experiments, the reſult of which he gives in his Eſſays, vol. ii. p. 127.

"The medicinal qualities of coffee (ſays he) ſeem to be derived from the grateful ſenſation which it produces in the ſtomach, and from the ſedative powers it exerts on the *vis vitæ*. Hence it aſſiſts digeſtion, and relieves the head-ach; and is taken in large quantities, with peculiar propriety, by the Turks and Arabians; becauſe it counteracts the narcotic effects of opium, to the uſe of which thoſe nations are much addicted.

"In delicate habits, it often occaſions watchfulneſs, tremors, and many of thoſe complaints which are denominated nervous. It has been even ſuſpected of producing palſies; and, from my own obſervation, I ſhould apprehend not entirely without foundation. Slare affirms, that he became paralytic by the too liberal uſe of coffee, and that his diſorder was removed by abſtinence from that liquor."

Sir John Pringle has obſerved, "it is the beſt abater of the paroxyſms of the periodic aſthma that I have ſeen. The coffee ought to be of the beſt Mocco, newly burnt, and made very ſtrong immediately after grinding it. I have commonly ordered an ounce for one diſh; which is to be repeated freſh after the interval of a quarter or half an hour; and which I direct to be taken without milk or ſugar. This medicine in general is mentioned by Muſgrave, in his treatiſe *De arthritide anomala*." He farther adds, that he has frequently directed coffee in the aſthma with great ſucceſs.

COFFER, in architecture, a ſquare depreſſure or ſinking in each interval between the modillions of the Corinthian cornice; ordinarily filled up with a roſe; ſometimes with a pomegranate, or other enrichment.

COFFER, in fortification, denotes a hollow lodgement, athwart a dry moat, from 6 to 7 feet deep, and from 16 to 18 broad; the upper part made of pieces of timber raiſed two feet above the level of the moat; which little elevation has hurdles laden with earth for its covering, and ſerves as a parapet with embraſures: the coffer is nearly the ſame with the caponiere, excepting that this laſt is ſometimes made beyond the counterſcarp on the glacis; and the coffer always in the moat taking up its whole breadth, which the caponiere does not. It differs from the traverſe and gallery, in that theſe latter are made by the beſiegers, and the coffer by the beſieged. The beſieged generally make uſe of coffers to repulſe the beſiegers when they endeavour to paſs the ditch. To ſave themſelves from the fire of theſe coffers, the beſiegers throw up the earth on that ſide towards the coffer.

COFFERER *of the King's* HOUSEHOLD, a principal officer in the court, next under the comptroller. He was likewiſe a white-ſtaff officer, and always a member of the privy council. He had a ſpecial charge and overſight of the other officers of the houſehold. He paid the wages of the king's ſervants below ſtairs, and for proviſions, as directed by the board of green-cloth. This office is now ſuppreſſed, and the buſineſs of it is tranſacted by the lord ſteward, and paymaſter of the houſehold. He had 100l. a-year ſalary, and 400l. a-year for board.

COFFIN, the cheſt in which a dead body is uſually put for interment. The ſepulchral honours paid to departed friends in ancient times are extremely curious. Their being *put into a coffin* was with them conſidered as a mark of the higheſt diſtinction; though with us the pooreſt people have their coffins. At this day, in the eaſt, they are not at all made uſe of; and Turks and Chriſtians, as Thevenot aſſures us, agree in this. The ancient Jews ſeem to have buried their dead in the ſame manner: neither was the body of Chriſt, it ſhould ſeem, put into a coffin; nor that of Eliſha, (2 Kings xiii. 21.) whoſe bones were *touched* by the corpſe that was let down *a little after* into his ſepulchre. However, that coffins were anciently made uſe of in Egypt, all agree; ſince antique *coffins of ſtone* and *ſycamore wood* are ſtill to be ſeen in that country; not to mention thoſe ſaid to be made of a kind of paſteboard, formed by folding or glueing cloth together a great many times, curiouſly plaſtered, and then painted with hieroglyphics. Its being an ancient Egyptian cuſtom, and not practiſed in the neighbouring countries, was, doubtleſs, the cauſe that the ſacred hiſtorian expreſsly obſerves of Joſeph, that he was not only embalmed, but put into a coffin too; both being cuſtoms that were peculiar to the Egyptians.

Maillet apprehends (Let. vii. p. 281.) that all were not incloſed in coffins who were laid in the Egyptian repoſitories of the dead; but that it was an honour appropriated to perſons of figure.

COGGLE, or COG, a ſmall fiſhing-boat upon the coaſts of Yorkſhire: and cogs (cogones) are a kind of little ſhips or veſſels uſed in the rivers Ouſe and Humber; (Stat. 23. H. VIII. c. 18.) *Præparatis cogonibus, galleis, & aliis navibus, &c.* (Mat. Paris. ann. 1066.) And hence the cogmen, boatmen, and ſeamen, who after ſhipwreck or loſſes by ſea travelled and wandered about to defraud the people by begging and ſtealing, until they were reſtrained by proper laws.

COGITATION, a term uſed by ſome for the act of thinking.

COGNAC, a town in France, in the department of Charente and late province of Angoumois, with a caſtle, where Francis I. was born. It is ſeated on the Charente, and is remarkable for excellent brandy. It is 17 miles W. of Angouleſme. Lon. 0. 10. W. Lat. 45. 44. N.

COGNATION, in the civil law, a term for that line of conſanguinity which is between males and females, both deſcended from the ſame father; as agnation is for the line of parentage between males only deſcended from the ſame ſtock.

COGNI, an ancient and ſtrong town of Caramania in Turkey in Aſia, and the reſidence of a beglerbeg. It is ſeated in a pleaſant

country, abounding in corn, fruits, pulfe and cattle. Here are fheep whofe tails weigh 30 pounds. E. long. 32. 56. N. lat. 37. 56.

COGNIZANCE, or CONNUSANCE, in law, has many fignifications. Sometimes it is an acknowledgement of a fine, or confeffion of fomething done; fometimes the hearing of a matter judicially, as to take cognizance of a caufe; and fometimes a particular jurifdiction, as cognizance of pleas is an authority to call a caufe or plea out of another court, which no perfon can do but the king, except he can fhow a charter for it. This cognizance is a privilege granted to a city or town to hold plea of all contracts, &c. within the liberty; and if any one is impleaded for fuch matters in the courts at Weftminfter, the mayor, &c. of fuch franchife may demand cognizance of the plea, and that it may be determined before them.

COGNIZANCE is alfo ufed for a badge on a waterman's or ferving-man's fleeve, which is commonly the giver's creft, whereby he is denoted to belong to this or that nobleman or gentleman.

COGS. See COGGLE.

COHABITATION, denotes the ftate of a man and a woman who live together without being legally married. By the common law of Scotland, cohabitation for a year and a day, or a complete twelvemonth, is deemed matrimony.

CO-HEIR, one who fucceeds to a fhare of an inheritance, to be divided among feveral.

COHESION, one of the four fpecies of attraction, denoting that force by which the parts of bodies adhere or ftick together. See EXPERIMENTAL PHILOSOPHY.

COHOBATION, in chemiftry, an operation by which the fame liquor is frequently diftilled from the fame body, either with an intention to diffolve this body, or to produce fome change upon it. This is one of thofe operations which the antient chemifts practifed with great patience and zeal, and which are now neglected. To make this operation eafier, and to prevent the trouble of frequently changing the veffels, a particular kind of alembic, called a *pelican*, was invented. This veffel was made in the form of a cucurbit with an alembic-head, but had two fpouts communicating with the body. As the vapour rofe up into the head, it was gradually condenfed, and ran down the fpouts into the body of the pelican, from whence it was again diftilled; and fo on. This veffel is reprefented in plate 89.

COHORN (N.) the greateft engineer Holland has produced. Among his other works, which are efteemed mafter-pieces of fkill, he fortified Bergen-op-zoom; which, to the furprife of all Europe, was taken by the French in 1747. He wrote a treatife on fortification; and died in 1704.

COHORT, in Roman antiquity, the name of part of the Roman legion, compofing about 600 men. There were ten cohorts in a legion, the firft of which exceeded all the reft both in dignity and number of men. When the army was ranged in order of battle, the firft cohort took up the right of the firft line; the reft followed in their natural order: fo that the third was in the centre of the firft line of the legion, and the fifth on the left; the fecond between the firft and third; and the fourth between the third and fifth: the five remaining cohorts formed a fecond line in their natural order.

COIF, the badge of a fergeant at law, who is called fergeant of the coif, from the lawn coif they wear under their caps, when they are created fergeants. The chief ufe of the coif was to cover the clerical tonfure. See TONSURE.

COILING, on fhipboard, implies a fort of ferpentine winding of a cable or other rope, that it may occupy a fmall fpace in the fhip. Each of the windings of this fort is called a *fake*; and one range of the fakes upon the fame line is called a *tier*. There are generally from five to feven fakes in a tier; and three or four tiers in the whole length of a cable. This, however, depends on the extent of the fakes. The fmaller ropes employed about the fails are coiled upon cleats, at fea, to prevent their being entangled amongft one another in traverfing, contracting, or extending the fails.

COILON, in the ancient Grecian theatres, the fame with the cavea of the Romans.

COIMBRA, a handfome, large, and celebrated town of Portugal, capital of the province of Beira, with a bifhop's fee, and a famous univerfity. The cathedral and the fountains are very magnificent. It is feated in a very pleafant country abounding in vine-yards, olive-trees, and fruits. It ftands on a mountain, by the fide of the river Mondego. W. long. 8. 57. N. lat. 40. 10.

COIN, a piece of metal converted into money by the impreffing of certain marks or figures thereon. See MONEY.

COIN, in architecture, a kind of dye cut diagonalwife, after the manner of a flight of a ftair-cafe, ferving at bottom to fupport columns in a level, and at top to correct the inclination of an entablature fupporting a vault.

COIN is alfo ufed for a folid angle compofed of two furfaces inclined towards each other, whether that angle be exterior, as the coin of a wall, a tree, &c. or interior, as the coin of a chamber or chimney. See QUOIN.

COINAGE, or COINING, the art of making money, as performed either by hammer or mill. Formerly the fabric of coins was different from what it is at prefent; but this art has been improved and rendered very expeditious, by feveral ingenious machines, and by a wife application of the fureft phyfical experiments to the methods of fining, dyeing, and ftamping the different metals. The three fineft inftruments the mint-men ufe, are the laminating engine; the machine for making the impreffions on the edges of coins; and the mill. After they have taken the laminæ, or plates of metal, out of the mould into which they are caft, they do not beat them on the anvil, as was formerly done, but make them pafs and repafs between the feveral rollers of the laminating engine, which being gradually brought clofer and clofer to each other, at laft give the lamina its uniform and exact thicknefs. Inftead of dividing the lamina into fmall fquares, they at once cut clean out of it as many planchets as it can contain, by means of a fharp fteel trepan, of a roundifh figure, hollow within, and of a proportionable diameter, to fhape and cut off the piece at one and the fame time. After thefe planchets have been prepared and weighed with ftandard pieces, filed or fcraped to get off the fuperfluous part of the metal, and then boiled and made clean, they arrive at laft at the machine (fig. 1. plate 79.) which marks them upon the edge; and finally, the mill (fig. 2.), which, fqueezing each of them fingly between two dyes, brought near each other with one blow, forces the two furfaces or fields of the piece to fill exactly all the vacancies of the two engraved figures.

The principal pieces of the machine (fig. 1.) to ftamp coins on the edge, are two fteel laminæ, about a line thick. One half of the legend, or of the ring, is engraved on the thicknefs of one of the laminæ, and the other half on the thicknefs of the other; and thefe two laminæ are ftraight, although the planchet marked with them be circular. When they ftamp a planchet, they firft put it between the laminæ in fuch a manner, as that thefe being each of them laid flat upon a copper-plate, which is faftened upon a very thick wooden table, and the planchet being likewife laid flat upon the fame plate, the edge of the planchet may touch the two laminæ on each fide, and in their thick part. One of thefe laminæ is immoveable, and faftened with feveral fcrews; the other flides by means of a dented wheel, which takes into the teeth that are on the furface of the lamina. This fliding lamina makes the planchet turn in fuch a manner, that it,

remains ſtamped on the edge, when it has made one turn. Only crown and half crown pieces are thick enough to bear the impreſſion of letters on their edges.

The coining engine or mill (fig. 2.), is ſo handy that a ſingle man may ſtamp twenty thouſand planchets in one day. Gold, ſilver, and copper planchets, are all of them coined with a mill, to which the coining ſquares (fig. 3.), commonly called *dyes*, are faſtened; that of the face under, in a ſquare box garniſhed with male and female ſcrews, to fix and keep it ſteady; and the other above, in a little box garniſhed with ſimilar ſcrews, to faſten the coining ſquare. The planchet is laid flat on the ſquare of the effigy, which is dormant; and they immediately pull the bar of the mill by its cords, which cauſes the ſcrew ſet within it to turn. This enters into the female ſcrew, which is in the body of the mill, and turns with ſo much ſtrength, that by puſhing the upper ſquare upon that of the effigy, the planchet, violently preſſed between both ſquares, receives the impreſſion of both at one pull, and in the twinkling of an eye. The planchet thus ſtamped and coined, goes through a final examination of the mint wardens, from whoſe hands it goes into circulation.

In the Coining of *Medals*, the proceſs is the ſame, in effect, with that of money; the principal difference conſiſting in this, that money having but a ſmall relievo receives its impreſſion at a ſingle ſtroke of the engine; whereas for medals, the height of their relievo makes it neceſſary that the ſtroke be repeated ſeveral times: to this end the piece is taken out from between the dyes, heated, and returned again; which proceſs, in medallions and large medals, is repeated fifteen or twenty times before the full impreſſion be given: care muſt be taken, every time the planchet is removed, to take off the ſuperfluous metal, ſtretched beyond the circumference, with a file. Medallions, and medals of a high relievo, are uſually firſt caſt in ſand, by reaſon of the difficulty of ſtamping them in the preſs, where they are put only to perfect them; becauſe the ſand does not leave them ſmooth, clear, and accurate enough.

Britiſh Coinage. It was only in the reign of William III. that the hammer-money ceaſed to be current in England, where till then it was ſtruck in that manner, as in other nations. Before the hammer-ſpecie was called in, the Engliſh money was in a wretched condition, having been filed and clipped by natives as well as foreigners, inſomuch that it was ſcarce left of half its value. The Britiſh coinage is now wholly performed in the Tower of London, where there is a corporation for it, under the title of the *Mint*. Formerly there were here, as there are ſtill in other countries, the rights of ſeinorage and braſſage: but ſince the eighteenth year of king Charles II. there is nothing taken either for the king or for the expences of coining; ſo that weight is returned for weight, to any perſon who carries his gold and ſilver to the Tower. The ſpecie confined in Great Britain is eſteemed contraband, and not to be exported: but all foreign ſpecie may be ſent out of the realm, as well as gold and ſilver in bars, ingots, duſt, &c.

Barbary Coinage, particularly that of Fez and Tunis, is under no proper regulations, as every goldſmith, Jew, or even private perſon, undertakes it at pleaſure; which practice renders their money exceedingly bad, and their commerce very unſafe.

Muſcovite Coinage. In Muſcovy there is no other coin ſtruck but ſilver, and that only in the cities of Moſcow, Novogrod, Twere, and Pleſkow, to which may be added Peterſburgh. The coinage of each of theſe cities is let out to farm, and makes part of the royal revenue.

Perſian Coinage. All the money made in Perſia is ſtruck with a hammer, as is that of the reſt of Aſia; and the ſame may be underſtood of America, and the coaſts of Africa, and even Muſcovy: the king's duty, in Perſia, is ſeven and a half *per cent.* for all the monies coined, which are lately reduced to ſilver and copper, there being no gold coin there except a kind of medals, at the acceſſion of a new ſophi.

Spaniſh Coinage is eſteemed one of the leaſt perfect in Europe. It is ſettled at Seville and Segovia, the only cities where gold and ſilver are ſtruck.

COIRE, or, as the Germans call it, Chur, a large and handſome town of Switzerland, and capital of the country of the Griſons, with a biſhop's ſee, whoſe prelate has the right of coining money. It is divided into two parts; the leaſt of which is of the Roman Catholic religion, and the greateſt of the Proteſtant. It is governed by its own laws, and ſeated in a plain, abounding in vineyards and game, on the river Pleſſure, half a mile from the Rhine. E. long. 9. 27. N. lat. 46. 50.

COITION, the intercourſe between male and female in the act of generation. It is obſerved that frogs are 40 days in the act of coition. Bartholine, and others relate, that butterflies make 130 vibrations of the wings in one act of coition.

COIX, Job's-tears; a genus of the triandria order, belonging to the monœcia claſs of plants; and in the natural method ranking under the 4th order, *Gramina*. The male flowers grow in ſpikes remote from one another; the calyx is a biflorous, beardleſs glume. The calyx of the female is a biflorous glume; the corolla a beardleſs glume; the ſtyle bipartite; the ſeed covered with the calyx oſſified. Of this there is but one ſpecies, a native of the Archipelago iſlands, and frequently cultivated in Spain and Portugal, and alſo in the Weſt Indies. It is an annual plant, riſing from a fibrous root, with two or three jointed ſtalks, to the height of two feet, with ſingle, long, narrow leaves at each joint, reſembling thoſe of the reed; at the baſe of the leaves come out the ſpikes of flowers ſtanding on ſhort footſtalks; the ſeeds greatly reſemble thoſe of gromwell; whence the plant has by ſome writers been called *lithoſpermum*. This plant may be propagated in this country by ſeeds brought from Portugal, and ſown on a hot-bed; after which the young plants are to be removed into a warm border, and planted at the diſtance of two feet at leaſt from each other. They will require no other care than to be kept free from weeds.

COKE, or Cooke (Sir Edward), lord chief juſtice of the king's bench in the reign of James I. was deſcended from an ancient family in Norfolk, and born at Milcham in 1549. When he was a ſtudent in the Inner Temple, the firſt occaſion of his diſtinguiſhing himſelf was the ſtating the caſe of a cook belonging to the Temple ſo exactly, that all the houſe, who were puzzled with it, admired him and his pleading, and the whole bench took notice of him. After his marriage with a lady of great fortune, preferments flowed in upon him. The cities of Norwich and Coventry choſe him for their recorder; the county of Norfolk, for one of their knights in parliament; and the houſe of commons, for their ſpeaker, in the 35th year of the reign of queen Elizabeth. The queen appointed him ſolicitor-general in the year 1592, and attorney-general the next year. In 1603 he was knighted by king James I. and in November the ſame year, upon the trial of Sir Walter Raleigh, &c. at Wincheſter, he treated that gentleman with a ſcurrility of language hardly to be paralleled. June 27, he was appointed lord chief juſtice of the common pleas; and in 1613, lord chief juſtice of the king's bench, and ſworn one of the privy council. In 1615 he was very vigorous in the diſcovery and proſecution of the perſons employed in poiſoning Sir Thomas Overbury in the Tower in 1612. His conteſt not long after with the lord chancellor Egerton, with ſome other caſes, haſtened the ruin of his intereſt at court; ſo that he was ſequeſtered from the council table and the office of lord chief juſtice. In 1621 he vigorouſly maintained, in the houſe of commons, that no procla-

mation is of any force againſt the parliament. The ſame year, being looked upon as one of the greateſt incendiaries in the houſe of commons, he was removed from the council of ſtate with diſgrace; the king ſaying, that "he was the fitteſt inſtrument for a tyrant that ever was in England:" he was alſo committed to the Tower, and his papers were ſeized. Upon the calling of a new parliament in 1625, the court-party, to prevent his being elected a member, got him appointed ſheriff of Buckinghamſhire. To avoid the office, if poſſible, he drew up exceptions againſt the oath of a ſheriff, but was obliged to undertake the office. In 1628 he ſpoke vigorouſly upon grievances; and made a ſpeech in which he affirmed, that "the Duke of Buckingham was the cauſe of all our miſeries." While he lay upon his death-bed, his papers and laſt will were ſeized by an order of council. He died in 1634, having publiſhed many works: the moſt remarkable are his Inſtitutes of the laws of England; the firſt part of which is only a tranſlation and comment of Sir Thomas Littleton, one of the chief juſtices of the common pleas in the reign of Edward IV.

COKENHAUSEN, a ſtrong town of Livonia in Sweden, on the river Divina. E. long. 24. 26. N. lat. 56. 40.

COL, a name given by ſome to one of the weſtern iſlands of Scotland; it abounds in corn, paſture, ſalmon, eels, and cod. W. long. 7. 35. N. lat. 57.

COLARBASIANS, or Colorbasians, a ſect of Chriſtians in the ſecond century; ſo called from their leader Colarbaſus, a diſciple of Valentinus; who, with Marcus, another diſciple of the ſame maſter, maintained the whole plenitude and perfection of truth and religion to be contained in the Greek alphabet: and that it was upon this account that Jeſus Chriſt was called the *alpha* and *omega*. This ſect was a branch of the Valentinians. See alſo Marcosians.

COLBERG, a ſtrong, handſome ſea-port town of Germany, in Pomerania, belonging to the king of Pruſſia. It is remarkable for its ſalt-works; and is ſeated at the mouth of the river Perſant, on the Baltic ſea, 60 miles north-eaſt of Stetin, and 30 north-eaſt of Camin. E. long. 15. 57. N. lat. 54. 18.

COLBERT (John Baptiſt), marquis of Segnelai, one of the greateſt ſtateſmen that France ever had, was born at Paris in 1619; and deſcended from a family that lived at Rheims in Champagne, no way conſiderable for its ſplendour or antiquity. This great miniſter died of the ſtone, September 6th, 1683, in his 65th year; leaving behind him ſix ſons and three daughters. He was of a middle ſtature, rather lean than fat. His mien was low and dejected, his air gloomy, and his aſpect ſtern. Upon the whole, he was a wiſe, active, generous-ſpirited miniſter; ever attentive to the intereſts of his maſter, the happineſs of the people, the progreſs of arts and manufactures, and in ſhort to every thing that could advance the credit and intereſt of his country. He was a pattern for all miniſters of ſtate; and every nation may wiſh themſelves bleſſed with a Colbert.

COLCHESTER, a large borough of Eſſex, with a market on Wedneſday and Saturday. It is a place of great antiquity, ſeated on a fine eminence on the Coln, which is navigable within a mile of the town, at a place called the Hythe, which may be termed the Wapping of Colcheſter, and in which the cuſtom-houſe is ſituated. The town was ſurrounded by a wall, which had ſix gates and three poſterns; but theſe are now demoliſhed. It had 16 pariſh-churches (in and out of the walls), but now only 12 are uſed: theſe are not large, and moſt of them were damaged in 1648, when the town ſurrendered to the army of the parliament, after a memorable ſiege, in which they had ſuffered all the extremities of famine. There is a large manufactory of bays; and the town is famous for oyſters and eringo-roots. It is a corporation, governed by a mayor, aldermen, recorder, &c. To the eaſt are the ruins of an old caſtle, in which is one of the town priſons. It is 22 miles E. N. E. of Chelmsford, and 51 E. N. E. of London. E. long. 1. 0. N. lat. 51. 55.

COLCHI (Arrian, Ptolemy), a town of the Hither India; thought to be *Cochin*, on the coaſt of Malabar; now a factory and ſtrong fort of the Dutch. E. long. 75. 0. N. lat. 10. 0.

COLCHICUM, meadow-saffron; a genus of the trigynia order, belonging to the hexandria claſs of plants; and in the natural method ranking under the ninth order, *Spathaceæ*. The corolla is ſexpartite, with its tube radicated, or having its root in the ground; there are three capſules, connected and inflated. There are three ſpecies, all of them bulbous-rooted, low, perennials, poſſeſſing the ſingular property of their leaves appearing at one time, and their flowers at another; the former riſing long and narrow from the root in the ſpring, and decaying in June; the flowers, which are monopetalous, long, tubular, erect, and ſix-parted, riſe naked from the root in autumn, not more than four or five inches high. Their colours afford a beautiful variety; being purple, variegated purple, white, red, roſe-coloured, yellow, &c. with ſingle and double flowers. They are all hardy plants, inſomuch that they will flower though the roots happen to lie out of the ground. Of the root of this plant two drachms killed a large dog in 13 hours, operating violently by ſtool, vomit, and urine; yet an infuſion of the root in vinegar, formed into a ſyrup, it is ſaid, proves a ſafe and powerful pectoral and diuretic, of ſervice in dropſies, &c. The virtues of colchicum, in fact, ſeem much to reſemble thoſe of ſquills. The hermodactyl of the ſhops is ſaid to be the root of the variegatum, a ſpecies of this genus.

COLCHIS, a country of Aſia, at the ſouth of Aſiatic Sarmatia, eaſt of the Euxine Sea, north of Armenia, and weſt of Iberia. It is famous for the expedition of the Argonauts, and as the birth-place of Medea. It was fruitful in poiſonous herbs, and produced excellent flax. The inhabitants were originally Egyptians, who ſettled there when Seſoſtris king of Egypt extended his conqueſts in the north.

COLCOTHAR, the ſubſtance remaining after the diſtillation or calcination of vitriolated iron by a violent fire. See Chemistry, page 439, &c.

COLD. See Freezing.

Cold, in medicine. See Medicine.

Cold, in farriery. See Farriery.

COLDENIA, in botany; a genus of the tetragynia order, belonging to the tetrandria claſs of plants; and in the natural method ranked among thoſe the order of which is doubtful. The calyx is tetraphyllous; the corolla funnel-ſhaped; the ſtyles four; the ſeeds two and bilocular. There is but one ſpecies, a native of India. It is an annual plant, whoſe branches trail on the ground, extending about ſix inches from the root. They are adorned with ſmall blue flowers growing in cluſters, which come out from the wings of the leaves. They are propagated by ſeeds ſown on a hot-bed; when the plants come up, they may be removed each into a ſeparate pot, and plunged into a hot-bed of tanner's bark, where they are to remain conſtantly.

COLDINGUEN, a town of Denmark, in North Jutland, and dioceſe of Ripen. E. long. 9. 25. N. lat. 55. 35.

COLD-finch, a ſpecies of Motacilla.

COLD-SHIRE iron, that which is brittle when cold.

COLE (William), the moſt famous botaniſt of his time, was born at Adderbury in Oxfordſhire, about the year 1626, and ſtudied at Merton college in Oxford. He at length removed to Putney, near London; and publiſhed "The Art of Simpling; and Adam in Eden, or Nature's Paradiſe." Upon the reſtoration of king Charles II. he was made ſecretary to Dr. Duppa, biſhop of Wincheſter; but died two years after, aged 37.

COLE-FISH, a ſpecies of GADUS.

COLE-*Seed*, the ſeed of the *napus ſativa*, or long-rooted, narrow-leaved rapa, called in Engliſh *navew*, and reckoned by Linnæus among the braſſicas, or cabbage kind. See BRASSICA. This plant is cultivated to great advantage in many parts of England, on account of the rape oil expreſſed from its ſeeds. The practice of ſowing it was firſt introduced by thoſe Germans and Dutchmen who drained the fens of Lincolnſhire; and hence a falſe notion hath prevailed, that it will thrive only in a marſhy ſoil. The produce of cole-ſeed is generally from five to eight quarters on an acre; and it is commonly ſold at 20s. per quarter.

COLEOPTERA, or BEETLE, the name of Linnæus's firſt order of inſects. See ZOOLOGY.

COLEWORT. See BRASSICA.

COLERAIN, a large borough of Ireland, in the county of Londonderry, on the river Bann, 25 miles N. E. of Londonderry. W. long. 6. 39. N. lat. 55. 16.

COLIBERTS, *Coliberti*, in law, were tenants in ſoccage, and particularly ſuch villeins as were manumitted or made freemen. But they had not an abſolute freedom; for though they were better than ſervants, yet they had ſuperior lords to whom they paid certain duties, and in that reſpect might be called ſervants, though they were of middle condition between freemen and ſervants.

COLIC, a ſevere pain in the bowels, ſo called becauſe the colon was formerly ſuppoſed to be the part affected. See MEDICINE.

COLIC, in farriery. See FARRIERY.

COLIMA, a ſea-port town of Mexico in North America, and capital of a fertile valley of the ſame name. It is ſeated at the mouth of a river in W. long. 109. 6. N. lat. 18. 30.

COLIOURE, a ſmall ſea-port of France, in the department of the Eaſtern Pyrenees and late province of Rouſſillon, at the foot of the Pyrenees, 10 miles S. E. of Perpignan. E. long. 3. 8. N. lat. 42. 34.

COLIR, an officer in China, who may properly be called an inſpector, having an eye over what paſſes in every court or tribunal of the empire. In order to render him impartial, he is kept independent, by having his poſt for life. The power of the colirs is ſuch, that they make even the princes of the blood tremble.

COLISEUM, or COLISÆUM, in the antient architecture, an oval amphitheatre, built at Rome by Veſpaſian, in the place where ſtood the baſon of Nero's gilded houſe. The word is formed from *coloſæum*, on account of the coloſſus of Nero that ſtood near it; or, according to Nardini, from the Italian *coliſeo*. In this were placed ſtatues, repreſenting all the provinces of the empire: in the middle whereof ſtood that of Rome, holding a golden apple in her hand. The ſame name *coliſeum*, is alſo given to another amphitheatre of the emperor Severus. In theſe *coliſea* were repreſented games, and combats of men and wild beaſts: but there are now little remaining of either of them, time and war having reduced them to ruins.

COLITES, in natural hiſtory, a name given by ſome writers to a kind of pebble, found in the ſhape of the human penis and teſtes, and that either ſeparately or both together.

COLLAERT (Adrian), an eminent engraver who flouriſhed about 1550, was born at Antwerp. After having learned in his own country the firſt principles of engraving, he went to Italy, where he reſided ſome time to perfect himſelf in drawing. He worked entirely with the graver, in a firm neat ſtyle, but rather ſtiff and dry. The vaſt number of plates executed by his hand ſufficiently evince the facility with which he engraved; and though exceedingly neat, yet they are ſeldom highly finiſhed.

COLLAERT (Hans or John), ſon to the foregoing, was alſo an excellent artiſt. He drew and engraved exactly in the ſtyle of his father; and was in every reſpect equal to him in merit. He muſt have been very old when he died; for his prints are dated from 1555 to 1622. He aſſiſted his father in all his great works, and engraved beſides a prodigious number of plates of various ſubjects. One of his beſt prints is *Moſes ſtriking the rock*, a large print, lengthwiſe, from Lambert Lombard. A great number of ſmall figures are introduced into this print; and they are admirably well executed: the heads are fine, and the drawing very correct.

COLLAR, in Roman antiquity, a ſort of chain put generally round the necks of ſlaves that had run away, after they were taken, with an inſcription round it, intimating their being deſerters, and requiring their being reſtored to their proper owners, &c.

COLLAR, in a more modern ſenſe, an ornament conſiſting of a chain of gold, enamelled, frequently ſet with ciphers or other devices, with the badge of the order hanging at the bottom, worn by the knights of different military orders over their ſhoulders, on the mantle, and its figure drawn round their armories. Thus, the collar of the order of the garter conſiſts of S.S. with roſes enamelled red, within a garter enamelled blue, and the George at the bottom.

Knights of the COLLAR, a military order in the republic of Venice, called alſo the order of St. Mark, or the medal. It is the doge and the ſenate that confer this order; the knights bear no particular habit, only the collar, which the doge puts around their necks, with a medal, whereon is repreſented the winged lion of the republic.

COLLAR *of a Draught-horſe*, a part of harneſs, made of leather and canvas, and ſtuffed with ſtraw or wool, to be put about the horſe's neck.

COLLARAGE, a tax or fine laid on the collars of draught-horſes, employed in removing pipes of wine.

COLLATERAL, in genealogy, thoſe relations which proceed from the ſame ſtock, but not in the ſame line of aſcendents or deſcendents, but being, as it were, aſide of each other. Thus uncles, aunts, nephews, nieces, and couſins, are collaterals, or in the ſame collateral line: thoſe in a higher degree, and near the common root, repreſent a kind of paternity with regard to thoſe more remote. See CONSANGUINITY.

COLLATERAL *Succeſſion*. When a deceaſed perſon, for want of heirs deſcended of himſelf, is ſucceeded in his eſtate by a brother or ſiſter, or their deſcendants, the eſtate is ſaid to have gone to *collateral heirs*.

COLLATINA PORTA, a gate of Rome, at the Collis Hortulorum, afterwards called *Pinciana*, from the Pincii, a noble family. Its name *Collatina*, is from *Collatia*, to the right of which was the Via Collatina, which led to that town.

COLLINA, a gate of Rome at the Collis Quirinalis, not far from the temple of Venus Erycina (Ovid); called alſo *Salaria*, becauſe the Sabines carried their ſalt through it (Tacitus). Now *Salara*.

COLLATION, in the canon law, the giving or beſtowing of a benefice on a clergyman by a biſhop, who has it in his own gift or patronage. It differs from inſtitution in this, that inſtitution is performed by the biſhop, upon the preſentation of another, and collation is his own act of preſentation: and it differeth from a common preſentation, as it is the giving of the church to the perſon, and preſentation is the giving or offering of the perſon to the church. But collation ſupplies the place of preſentation and inſtitution; and amounts to the ſame as inſtitution where the biſhop is both patron and ordinary. Anciently the right of preſentation to all churches was in the biſhop; and now if the patron neglects to preſent to a church, then this right returns to the biſhop by collation: if the biſhop neglects to collate within ſix months after the elapſe

of the patron, then the archbifhop hath a right to do it; and if the archbifhop neglects, then it devolves to the king; the one as fuperior, to fupply the defects of bifhops, the other as fupreme, to fupply all defects of governments.

Collation, in common law, the comparifon or prefentation of a copy to its original, to fee whether or not it be conformable; or the report or act of the officer who made the comparifon. A collateral act is equivalent to its original, provided all the parties concerned were prefent at the collation.

Collation is alfo ufed among the Romanifts for the meal or repaft made on a faft-day, in lieu of a fupper. Only fruits are allowed in a collation. F. Lobineau obferves, that anciently there was not allowed even bread in the collations in Lent, nor any thing befide a few comfits and dried herbs and fruits; which cuftom, he adds, obtained till the year 1513. Cardinal Humbert obferves further, that in the middle of the 11th century there were no collations at all allowed in the Latin church in the time of Lent; and that the cuftom of collations was borrowed from the Greeks, who themfelves did not take it up till about the 11th century.

Collation is alfo popularly ufed for a repaft between meals, particularly between dinner and fupper. The word collation, in this fenfe, Du Cange derives from *collocutio*, "conference:" and maintains, that originally collation was only a conference, or converfation on fubjects of piety, held on faft-days in monafteries; but that, by degrees, the cuftom was introduced of bringing in a few refrefhments; and that by the exceffes to which thofe fober repafts were at length carried, the name of the abufe was retained, but that of the thing was loft.

Collation *of Seals*, denotes one feal fet on the fame label, on the reverfe of another.

COLLEAGUE, a partner or affociate in the fame office or magiftrature. See Adjunct.

COLLECT, collection, a voluntary gathering of money, for fome pious or charitable purpofe. Some fay, the name *collect*, or *collection*, was ufed, by reafon thofe gatherings were anciently made on the days of *collects*, and in *collects*, i. e. in affemblies of Chriftians; but, more probably, *quia colligebatur pecunia*.

Collect is fometimes alfo ufed for a tax, or impofition, raifed by a prince for any pious defign. Thus, hiftories fay, that in 1166 the king of England, coming into Normandy, appointed a collect for the relief of the holy land, at the defire and after the example of the king of France. See Croisade.

Collect, in the liturgy of the church of England, and the mafs of the Romanifts, denotes a prayer accommodated to any particular day, occafion, or the like. See Liturgy, and Mass. In the general, all the prayers in each office are called *collects*: either becaufe the prieft fpeaks in the name of the whole affembly, whofe fentiments and defires he fums up by the word *oremus*, "let us pray," as is obferved by pope Innocent III. or becaufe thofe prayers are offered when the people are affembled together.

COLLECTIVE, among grammarians, a term applied to a noun expreffing a multitude, though itfelf be only fingular; as an army, company, troop, &c. called *collective nouns*.

COLLECTOR, in general, denotes a perfon who gets or brings together things formerly difperfed and feparated. Hence, a Collector, in matters of civil polity, is a perfon appointed by the commiffioners of any duty, the inhabitants of a parifh, &c. to raife or gather any kind of tax. The fame term, among botanifts, denotes one who collects as many plants as he can, without ftudying botany in a fcientific manner.

COLLEGATORY, in the civil law, a perfon who has a legacy left him in common with one or more other perfons.

COLLEGE, an affemblage of feveral bodies or focieties, or of feveral perfons into one fociety. College, among the Romans, ferved indifferently for thofe employed in the offices of religion, of government, the liberal and even mechanical arts and trades; fo that, with them, the word fignified what we call a corporation or company.

In the Roman empire, there were not only the *college of augurs*, and the *college of capitolini*, i. e. of thofe who had the fuperintendance of the capitoline games; but alfo colleges of artificers, *collegia artificum*; colleges of carpenters, *fabricorum*, or *fabrorum tignariorum*; of potters, *figulorum*; of founders, *ærariorum*; the college of lockfmiths, *fabrorum ferrariorum*; of engineers of the army, *tignariorum*; of butchers, *laniorum*; of dendrophori, *dendrophororum*; of centonaries, *centonariorum*; of makers of military cafques, *fagariorum*; of tent-makers, *tabernaculariorum*; of bakers, *piftorum*; of muficians, *tibicinum*; &c. Plutarch obferves, that it was Numa who firft divided the people into colleges; which he did to the end that each confulting the interefts of their college, whereby they were divided from the citizens of the other colleges, they might not enter into any general confpiracy againft the public repofe. Each of thefe colleges had diftinct meeting-places or halls; and likewife, in imitation of the ftate, a treafury and common cheft, a regifter, and one to reprefent them upon public occafions, and acts of government. Thefe colleges had the privilege of manumitting flaves, of being legates, and making by-laws for their own body, provided they did not clafh with thofe of the government.

College is alfo ufed for an inftitution among the moderns, founded on the model of the ancient colleges. Such are the three colleges of the empire, viz. the College *of Electors, or their Deputies*, affembled in the diet of Ratifbon. College *of Princes*; the body of princes, or their deputies, at the diet of Ratifbon. College *of Cities*, is, in like manner, the body of deputies which the imperial cities fend to the diet. College *of Cardinals*, or the *Sacred* College; a body compofed of the three orders of cardinals. See Cardinals.

College is alfo ufed for a public place endowed with certain revenues, where the feveral parts of learning are taught. An affemblage of feveral of thefe colleges conftitute an univerfity. The erection of colleges is part of the royal prerogative, and not to be done without the king's licence. The eftablifhment of colleges or univerfities is a remarkable period in literary hiftory. The fchools in cathedrals and monafteries confined themfelves chiefly to the teaching of grammar. There were only one or two mafters employed in that office. But, in colleges, profeffors are appointed to teach all the different parts of fcience. The firft obfcure mention of academical degrees in the univerfity of Paris (from which the other univerfities in Europe have borrowed moft of their cuftoms and inftitutions), occurs in the year 1215.

College *of Civilians*, commonly called *Doctors Commons*; a college founded by Dr. Harvey, dean of the arches, for the profeffors of the civil law refiding in London: where ufually, likewife, refides the judge of the arches court of Canterbury, judge of the admiralty, of the prerogative court, &c. with other civilians; who all live, as to diet and lodging, in a collegiate manner, commoning together; whence the appellation of *Doctors Commons*. Their houfe being confumed in the great fire, they all refided at Exeter-houfe in the Strand till 1672; when their former houfe was rebuilt, at their own expence, in a very fplendid manner. To this college belong 34 proctors, who make themfelves parties for their clients, manage their caufes, &c.

College *of Phyficians*, a corporation of phyficians in London, who, by feveral charters and acts of parliament of Henry VIII. and his fucceffors, have certain privileges, whereby no man, though a graduate in phyfic of any univerfity, may,

without licence under the faid college-feal, practife phyfic in or within feven miles of London; with power to adminifter oaths, fine and imprifon offenders in that and feveral other particulars; to fearch the apothecaries fhops, &c. in and about London, to fee if their drugs, &c. be wholefome, and their compofitions according to the form prefcribed by the faid college in their difpenfatory. By their charter they are alfo freed from all troublefome offices, as to ferve on juries, be conftable, keep watch, provide arms, &c.

The fociety had anciently a college in Knight-rider-ftreet, the gift of Dr. Linacre, phyfician to king Henry VIII. Since that time they have had a houfe built them by the famous Dr. Harvey in 1652, at the end of Amen-corner, which he endowed with his whole inheritance in his life-time: but this being burnt in the great fire in 1666, a new one was erected, at the expence of the fellows, in Warwick-lane, with a noble library, given partly by the marquis of Dorchefter, and partly by Sir Theodore Mayerne.

Of this college there are at prefent a prefident, four cenfors, eight electors, a regifter, and a treafurer, chofen annually in October; the cenfors have, by charter, power to furvey, govern, and arreft all phyficians, or others practifing phyfic, in or within feven miles of London; and to fine, amerce, and imprifon them, at difcretion. The number of fellows was anciently thirty, till king Charles II. increafed their number to forty: and king James II. giving them a new charter, allowed the number of fellows to be enlarged fo as not to exceed fourfcore; referving to himfelf and fucceffors the power of placing and difplacing any of them for the future.

Edinburgh College *of Phyficians* was erected on the 29th November 1681. The defign of this inftitution was, to prevent the abufes daily committed by foreign and illiterate impoftors, quacks, &c. For this reafon, his majefty, at the time above mentioned, granted letters patent to erect into a body corporate and politic, certain phyficians in Edinburgh and their fucceffors, by the title of "the Prefident and Royal College of Phyficians at Edinburgh," with power to choofe annually a council of feven, one whereof to be prefident; thefe are to elect a treafurer, clerk, and other officers; to have a common feal; to fue and to be fued; to make laws for promoting the art of phyfic, and regulating the practice thereof, within the city of Edinburgh, town of Leith, and diftricts of the Canongate, Weft-port, Pleafance, and Potter-row; through all which the jurifdiction of the college extends.

Edinburgh College *of Surgeons*. This is but a very late inftitution, by which the furgeons of Edinburgh are incorporated into a *Royal College*, and authorized to carry into execution a fcheme for making provifion for their widows and children, &c. They have alfo the privilege of examining and licenfing, if found qualified, all practitioners in furgery within certain bounds.

College *of Juftice*, the fupreme civil court of Scotland; otherwife called *Court of Seffion*, or *of Council and Seffion*.

Sion College, or the college of the London clergy; which has been a religious houfe time out of mind, fometimes under the denomination of a priory, fometimes under that of a fpital or hofpital. At its diffolution under 31ft Henry VIII. it was called *Elfyn's Spital*, from the name of its founder, a mercer, in 1329. At prefent it is a compofition of both, viz. a college for the clergy of London, who were incorporated in 1630, in purfuance of the will of Dr. White, under the name of the *Prefident and Fellows of Sion College*; and an hofpital for ten poor men and as many women. The officers of the corporation are the prefident, two deans, and four affiftants; who are annually chofen from among the rectors and vicars of London; and are fubject to the vifitation of the bifhop. They have a good library, built and ftocked by Mr. Simpfon, and furnifhed by feveral other benefactors, chiefly for the clergy of the city, without excluding other ftudents on certain terms; and a hall, with chambers for ftudents, generally occupied by the minifters of the neighbouring parifhes.

Grefham College or College *of Philofophy*; a college founded by Sir Thomas Grefham, and endowed with the revenue of the Royal Exchange: one moiety of this endowment the founder bequeathed to the mayor and aldermen of London and their fucceffors, in truft, that they fhould find four able perfons to read, within the college, divinity, geometry, aftronomy, and mufic. Thefe are chofen by a committee of the common council, confifting of the lord mayor and three aldermen and eight commoners, and allowed each, befides lodging, 50l. *per annum*. The other moiety he left to the company of mercers, to find three more able perfons, chofen by a committee of that company, confifting of the mafter and three wardens, during their office, and eight of the court of affiftants, to read law, phyfic, and rhetoric, on the fame terms; with this limitation, that the feveral lecturers fhould read in term-time, every day in the week except Sundays; in the morning in Latin, in the afternoon the fame in Englifh: but that in mufic to be read only in Englifh. By 8th George III. cap. 32. the building appropriated to this college was taken down, and the excife office erected in its room. Each of the profeffors is allowed 50l. *per annum*, in lieu of the apartments, &c. relinquifhed by them in the college, and is permitted to marry, notwithftanding the reftriction of Sir Thomas Grefham's will. The lectures are now read in a room over the Royal Exchange; and the city and mercers company are required to provide a proper place for that purpofe. In this college the Royal Society formerly met.

College *de Propaganda Fide*, was founded at Rome in 1622 by Gregory XV. and enriched with ample revenues. It confifts of thirteen cardinals, two priefts, and a fecretary; and was defigned for the propagation and maintenance of the Romifh religion in all parts of the world. The funds of this college have been very confiderably augmented by Urban VIII. and many private donations. Miffionaries are fupplied by this inftitution, together with a variety of books fuited to their feveral appointments. Another college of the fame denomination was eftablifhed by Urban VIII. in 1627, in confequence of the liberality of John Baptift Viles, a Spanifh nobleman. This is fet apart for the inftruction of thofe who are defigned for foreign miffions. It was at firft committed to the care of three canons of the patriarchal churches; but ever fince the year 1641 it is under the fame government with the former inftitution.

College *of Heralds*, commonly called the *Heralds Office*; a corporation founded by a charter of king Richard III. who granted them feveral privileges, as to be free from fubfidies, tolls, offices, &c. They had a fecond charter from king Henry VI.; and a houfe built near Doctors Commons, by the earl of Derby, in the reign of king Henry VII. was given them by the duke of Norfolk, in the reign of queen Mary, which houfe was rebuilt. This college is fubordinate to the earl-marfhal of England. They are affiftants to him in his court of chivalry, ufually held in the common-hall of the college. See Herald.

College *of Heralds in Scotland*, confifts of Lyon king at arms, fix heralds, and fix purfuivants, and a number of meffengers. See Lyon.

COLLEGIANS, Collegiani, Collegiants, a religious fect formed among the Arminians and Anabaptifts in Holland, about the beginning of the feventeenth century; fo called becaufe of their colleges, or meetings, twice every week; where every one, females excepted, has the fame liberty of expounding the fcripture, praying, &c. They are faid to be all either Arians or Socinians: they never communicate in the college, but meet twice a-year from all parts of Holland at Rhinfbergh

(whence they are alfo called *Rhinfberghers*), a village two miles from Leyden, where they communicate together; admitting every one that prefents himfelf, profeffing his faith in the divinity of the holy fcriptures, and refolution to live fuitably to their precepts and doctrines, without regard to his fect or opinion. They have no particular minifters, but each officiates as he is difpofed. They never baptize without dipping.

COLLEGIATE, or COLLEGIAL, churches, are thofe which have no bifhop's fee, yet have the ancient retinue of the bifhop, the *canons and prebends*. Such are Weftminfter, Rippon, Windfor, &c. governed by deans and chapters. Of the collegiate churches there are two kinds; fome of royal, and others of ecclefiaftical foundation; each of them, in matters of divine fervice, regulated in the fame manner as the cathedrals. There are even fome collegiate churches that have the epifcopal rights. Some of thefe churches were anciently abbeys, which in time were fecularized. The church of St. Peter's, Weftminfter, was anciently a cathedral; but the revenues of the monaftery being by act of parliament 1 Elizabeth vefted in the dean and chapter, it commenced a collegiate church. In feveral caufes the ftyling it *cathedral*, inftead of *collegiate, church* of Weftminfter has occafioned error in the pleadings.

COLLET, among jewellers, denotes the horizontal face or plane at the bottom of a brilliant. See BRILLIANT.

COLLET, in glafs-making, is that part of a glafs veffel which fticks to the iron inftrument wherewith the metal was taken out of the melting-pot; thefe are afterwards ufed for making green glafs.

COLLETICS, in pharmacy, denote much the fame with AGGLUTINANTS or VULNERARIES.

COLLIER, or COALLIER. See COALLIER.

COLLIERY, COALERY, or COALLIERY. See COALERY.

COLLINS (William), an admirable poet, was born at Chichefter, about the year 1724. He received his claffical education at Winchefter; after which he ftudied at New College in Oxford, was admitted a commoner of King's College in the fame univerfity, and was at length elected a demy of Magdalene college. While at Oxford, he applied himfelf to the ftudy of poetry, and publifhed his Oriental Eclogues; after which he came to London. He was naturally poffeffed of an ear for all the varieties of harmony and modulation; his heart was fufceptible of the fineft feelings of tendernefs and humanity, and was particularly carried away by that high enthufiafm which gives to imagination its ftrongeft colouring; and he was at once capable of foothing the ear with the melody of his numbers, of influencing the paffions by the force of the pathos, and of gratifying the fancy by the luxury of defcription. With thefe powers he attempted lyric poetry; and, in 1746, publifhed his Odes, defcriptive and allegorical: but the fale of this work being not at all anfwerable to its merit, he burnt the remaining copies in indignation. Being a man of a liberal fpirit and a fmall fortune, his pecuniary refources were unhappily foon exhaufted; and his life became a miferable example of neceffity, indolence and diffipation. He projected books which he was well able to execute; and became in idea an hiftorian, a critic, and a dramatic poet; but wanted the means and encouragement to carry thefe ideas into execution. Day fucceeded day, for the fupport of which he had made no provifion; and he was obliged to fubfift, either by the repeated contributions of a friend, or the generofity of a cafual acquaintance. His fpirits became oppreffed, and he funk into a fullen defpondence. While in this gloomy ftate of mind, his uncle, colonel Martin, died, and left him a confiderable fortune. But this came too late for enjoyment; he had been fo long haraffed by anxiety and diftrefs, that he fell into a nervous diforder, which at length reduced the fineft underftanding to the moft deplorable childifhnefs. In the firft ftages of this diforder, he endeavoured to relieve himfelf by travelling, and paffed into France; but the growing malady obliged him to return; and having continued, with fhort intervals, in this pitiable ftate till the year 1756, he died in the arms of his fifter. The ingenious Mr. Langhorne has publifhed his poetical works, with memoirs of the author, in one volume duodecimo.

COLLINSON (Peter), an eminent naturalift and antiquarian, defcended of an ancient family, was born on the paternal eftate called *Hugal-Hall*, or *Height of Hugal*, near Windermere lake in the parifh of Stavely, about ten miles from Kendal in Weftmoreland. Whilft a youth he difcovered his attachment to natural hiftory. He began early to make a collection of dried fpecimens of plants, and had accefs to the beft gardens at that time in the neighbourhood of London. He became early acquainted with the moft eminent naturalifts of his time; the Doctors Derham, Woodward, Dale, Lloyd, and Sloane, were amongft his friends. Among the great variety of articles which form that fuperb collection, now (by the wife difpofition of Sir Hans and the munificence of parliament) the Britifh Mufeum, fmall was the number of thofe with whofe hiftory Mr. Collinfon was not well acquainted; he being one of thofe few who vifited Sir Hans at all times familiarly. He was the firft who introduced the great variety of feeds and fhrubs which are now the principal ornaments of every garden. The great Linnæus, during his refidence in England, contracted an intimate friendfhip with Mr. Collinfon, which was reciprocally increafed by a multitude of good offices, and continued to the laft. Befides his attachment to natural hiftory, he was very converfant in the antiquities of our own country, having been elected a member of the Society of Antiquaries April 7, 1737: and he fupplied them with many curious articles, refpecting both our own and other countries. He died in 1768, leaving behind him many materials for the improvement of natural hiftory.

COLLINSONIA, in botany; a genus of the monogynia order belonging to the decandria clafs of plants; and in the natural method ranking under the 40th order, *Perfonatæ*. The corolla is unequal, with its under-lip multifid, and the fegments capillary. There is only one fpecies, a native of North America, but poffeffed of no remarkable properties.

COLLIQUAMENTUM, in natural hiftory, an extremely tranfparent fluid in an egg, obfervable after two or three days incubation, containing the firft rudiments of the chick. It is concluded in one of its own proper membranes; diftinct from the albumen. Harvey calls it the *oculus*.

COLLIQUATION, in chemiftry, is applied to animal, vegetable, and mineral fubftances, tending towards fufion. See FUSION.

COLLIQUATION, in phyfic, a term applied to the blood, when it lofes its firmnefs of texture; and to the folid parts, when they wafte away, by means of the animal fluids being exhaufted through the feveral glands, and particularly thofe of the fkin, which occafions fluxes of many kinds, but moftly profufe and clammy fweats.

COLLIQUATIVE FEVER, in phyfic, a fever attended with a diarrhœa, or with profufe fweats.

COLLISION, the ftriking of one hard body againft another; or the friction or percuffion of bodies moving violently in different directions, and dafhing againft each other.

COLLUM, the fame with NECK.

COLLUSION, in law, a fecret underftanding between two parties, who plead or proceed fraudulently againft each, to the prejudice of a third perfon.

COLLUTHIANS, a religious fect, who rofe about the beginning of the fourth century, on occafion of the indulgence fhown to Arius by Alexander patriarch of Alexandria. Several people being fcandalized at fo much condefcenfion, and,

among the reſt, Colluthus, a prieſt of the ſame city, he hence took a pretence for holding ſeparate aſſemblies, and by degrees proceeded to the ordination of prieſts, as if he had been a biſhop; pretending a neceſſity for this authority, in order to oppoſe Arius. To his ſchiſm he added hereſy; teaching, that God did not create the wicked; that he was not author of the evils that befal men, &c. He was condemned by a council held at Alexandria by Oſius, in the year 330.

COLLYBUS, Κόλλυβος, in antiquity, the ſame with what is now called *the rate of exchange*.

COLLYRÆ, or Collyrides, in antiquity, a certain ornament of hair, worn by the women on their necks. It was made in the form of the ſmall roundiſh cakes called κολλυραι, *collyræ*.

COLLYRIDIANS, in church hiſtory, a ſect, towards the cloſe of the 4th century, denominated from a little cake, called by the Greeks κολλυριδια, *collyridia*, which they offered to the Virgin Mary. This ſect, it ſeems, conſiſted chiefly of Arabian women, who, out of an extravagance of devotion to the Virgin, met on a certain day in the year to celebrate a ſolemn feaſt, and to render divine honours to Mary as to a goddeſs; eating the cake which they offered in her name. St. Epiphanius, who relates the hiſtory of this ſuperſtitious ceremony, ridicules it. They ſprung up in oppoſition to the Antidico-Marianites.

COLLYRIUM, in pharmacy, a topical remedy for an inflammation or other complaint of the eyes. It is uſually cooling and ſedative.

COLMAR, a large and handſome town of France, capital of the department of Upper Rhine and late province of Upper Alſace. It was formerly an imperial town, and has been recently erected into a biſhopric. It is ſeated near the river Ill, 35 miles S. W. of Straſburg. E. lon. 7. 27. N. lat. 48. 5.

COLMARS, a town of France, in the department of the Lower Alps and late province of Provence, 20 miles E. of Digne. E. lon. 6. 35. N. lat. 44. 7.

COLMOGOROD, a town of the empire of Ruſſia, with an archbiſhop's ſee, ſeated in an iſland formed by the river Divina, in E. long. 40. 30. N. lat. 36. 32.

COLNBROOK, a town of Bucks, with a market on Wedneſday. It is ſeated on the river Coln, and is 17 miles W. from London. W. lon. 0. 25. N. lat. 51. 29.

COLNE, a town of Lancaſhire, with a market on Wedneſday. It is ſeated on a hill, 36 miles S. E. of Lancaſter, and 214 N. N. W. of London. W. lon. 2. 5. N. lat. 53. 50.

COLOCHINA, an ancient town of the Morea in Turkey in Europe. E. long. 23. 2. N. lat. 36. 32.

COLOCYNTHIS, in botany, a ſpecies of Cucumis.

COLOCZA, a town of Hungary, ſeated on the Danube, and capital of the county of Bath, with an archbiſhop's ſee. It was taken by the Turks in 1686, but afterwards retaken by the Imperialiſts. E. long. 19. 42. N. lat. 46. 33.

COLOGNA, a town of Italy in Padua, and in the territory of Venice. E. long. 11. 43. N. lat. 45. 39.

COLOGNE (the archbiſhopric or dioceſe of), an ancient, large, and handſome city of Germany, with an archbiſhop's ſee, and a univerſity. It has 37 monaſteries, and 365 churches and chapels. It is fortified in the ancient manner, with ſtrong walls, flanked with 83 large towers, and ſurrounded by three ditches. It is a free imperial city; and though the elector has a palace here, he has not the liberty of ſtaying in it for many days together, nor is he admitted to come at all with a numerous attendance. It is ſeated on the W. bank of the Rhine. The inhabitants are generally Roman Catholics; but there are ſome Proteſtants, who are obliged to perform divine ſervice at Milheim, three miles from the city. They pretend to ſhow, among a vaſt number of other relics, the bodies of the three Magi, called the Three Kings; and every ſeven years there is a proceſſion of Hungarians, who come to return them thanks for procuring rain in a dry ſeaſon. It is 17 miles E. of Juliers. E. lon. 7. 10. N. lat. 50. 55.

Cologne, electorate of, one of the moſt fertile and conſiderable countries of Germany, bounded on the N. by the duchy of Cleves and by Guelderland, on the E. by the duchy of Berg, on the S. by the archbiſhopric of Treves, and on the W. by the duchy of Juliers. The elector is arch-chancellor of the empire for Italy, and has a right to conſecrate the emperor for Italy, with that of Mentz. The revenues are computed to amount to 130,000l a year.

Cologne-*Earth*, a kind of a very light baſtard ochre, of a deep brown colour.

COLOMBO, a handſome, pleaſant, and ſtrong town of Aſia, ſeated on the eaſtern ſide of the iſland of Ceylon in the Eaſt Indies. It was built by the Portugueſe in 1638; and in 1658 they were driven from it by the natives, aſſiſted by the Dutch, who kept poſſeſſion of it till lately, when they were diſpoſſeſſed by the Britiſh. It is about three quarters of a mile long, and as much in breadth. The natives live in the old town, without the walls of the new: the ſtreets of this laſt are wide and ſpacious; and the buildings are in the modern taſte, particularly the governor's houſe, which is a handſome ſtructure. E. long. 80. 25. N. lat. 7. 0.

COLOMEY, or Colomia, a town of Poland in Red Ruſſia, ſeated on the river Pruth, in E. long. 25. 9. N. lat. 48. 45.

COLOMNA (Fabio), a very learned botaniſt, born at Naples about the year 1567. He became ſkilled in the languages, in muſic, deſigning, painting, and the mathematics; and died about the middle of the 17th century. He wrote, 1. "Φυτοβασανος, ſeu Plantarum aliquot (ac piſcium) hiſtoria. 2. Minus cognitarum rariorumque ſtirpium εκφρασις; itemque de aquatilibus, aliiſque nonnullis animalibus, libellus;" and other works.

COLON, in anatomy, the firſt and moſt conſiderable of the large inteſtines. See Anatomy, page 189.

COLON, in grammar, a point or character formed thus [:], ſerving to mark a pauſe, and to divide the members of a period. See Pointing; ſee alſo Period, Comma, and Semicolon. Grammarians generally aſſign the uſe of a colon to be, to mark the middle of a period; or to conclude a ſenſe leſs perfect than the dot or period:—but a ſenſe leſs perfect than the period, is an expreſſion extremely vague and indeterminate. See Period. Others ſay, a colon is to be uſed when the ſenſe is perfect, but the ſentence not concluded; but neither is this over clear and expreſs. A late author, in an ingenious diſcourſe, *De ratione interpungendi*, marks the office of the colon, and wherein it differs from the ſemicolon, &c. more preciſely. A colon, on his principles, ſerves to diſtinguiſh thoſe conjunct members of a ſentence, which are capable of being divided into other members; whereof one, at leaſt, is conjunct. Thus, in the ſentence, *As we cannot diſcern the ſhadow moving along the dial-plate, ſo the advances we make in knowledge are only perceived by the diſtance gone over*; the two members being both ſimple, are only ſeparated by a comma. In this, *As we perceive the ſhadow to have moved, but did not perceive it moving; ſo our advances in underſtanding, in that they conſiſt of ſuch minute ſteps, are only perceivable by the diſtance*: the ſentence being divided into two equal parts, and thoſe conjunct ones, ſince they include others; we ſeparate the former by a ſemicolon, and the latter by commas. But in this, *As we perceive the ſhadow to have moved along the dial, but did not perceive it moving; and it appears the graſs has grown, though nobody ever ſaw it grow: ſo the advances we make in knowledge, as they conſiſt of ſuch minute ſteps, are only perceivable by the diſtance*—the advancement in knowledge is compared to

the motion of a ſhadow, and the growth of graſs; which compariſon divides the ſentence into two principal parts: but ſince what is ſaid of the movement of the ſhadow, and likewiſe of the growth of graſs, contains two ſimple members, they are to be ſeparated by a ſemicolon; conſequently a higher pointing is required to ſeparate them from the other part of the ſentence, which they are oppoſed to: and this is a colon. See PUNCTUATION.

COLONEL, in military matters, the commander in chief of a regiment, whether horſe, foot, or dragoons. Skinner derives the word from colony; being of opinion, the chiefs of colonies, called *coloniales*, might give the name to chiefs of forces. In the French and Spaniſh armies, colonel is confined to the infantry and dragoons: the commanding officer of a regiment of horſe they uſually call *meſtre de camp*. Formerly inſtead of colonel, the French uſed the word *coronel*; and this old ſpelling comes nearer to our common way of pronouncing the word *colonel*. A colonel may put an officer of his regiment in arreſt, but muſt acquaint the general with it. He is not allowed a guard, only a ſentry from the quarter-guard.

COLONEL-*Lieutenant*, he who commands a regiment of guards, whereof the king, prince, or other perſon of the firſt eminence, is colonel. Theſe colonel-lieutenants have always a colonel's commiſſion, and are uſually general officers.

Lieutenant-COLONEL, the ſecond officer in a regiment, who is at the head of the captains, and commands in the abſence of the colonel.

COLONNA, a town of Italy, in the campagna of Rome, 18 miles eaſtward of that city. E. long. 13. 15. N. lat. 42. 0.

COLONNADE, in architecture, a periſtyle of a circular figure; or a ſeries of columns diſpoſed in a circle, and inſulated within ſide. A *Polyſtyle* COLONNADE, is that whoſe number of columns is too great to be taken in by the eye at a ſingle view. Such is the colonnade of the palace of St. Peter's at Rome, conſiſting of 284 columns of the Doric order, each above four feet and an half diameter, all in Tiburtine marble.

COLONSAY, one of the Hebrides or Weſtern Iſlands of Scotland. It comprehends that of Oronſay, from which it is only ſeparated in time of flood.

COLONUS, an huſbandman, or villager, who was bound to pay yearly a certain tribute, or at certain times of the year to plough ſome part of the lord's land; and from hence comes the word *clown*, who is called by the Dutch *boor*.

COLONY, a company of people tranſplanted into a remote province in order to cultivate and inhabit it. We may diſtinguiſh three kinds of colonies. 1. Thoſe ſerving to eaſe the inhabitants of a country, where the people are become too numerous. 2. Thoſe eſtabliſhed by victorious princes in the middle of vanquiſhed nations, to keep them in awe and obedience. 3. *Colonies of commerce*; which may be ſo called, becauſe, in effect, it is trade that is the ſole occaſion and object of their being eſtabliſhed.

It was by means of the firſt kind of colonies that, ſome ages after the deluge, the eaſt firſt, and ſucceſſively all the other parts of the earth, became inhabited; and without mentioning any thing of the Phœnician and Grecian colonies, ſo famous in ancient hiſtory, it is notorious that is was for the eſtabliſhment of ſuch colonies, that, during the declenſion of the empire, thoſe torrents of barbarous nations, iſſuing, for the generality, out of the north, over-run the Gauls, Italy, and the other ſouthern parts of Europe; and, after ſeveral bloody battles, divided it with the ancient inhabitants.

The ſecond deſcription of colonies, the Romans uſed more than any other people; and with a view to ſecure the conqueſts they had made from the weſt to the eaſt. Every one knows how many cities in Gaul, Germany, Spain, and even England, value themſelves on their having been of the number of Roman colonies. There were two kinds of colonies among the Romans: thoſe ſent by the ſenate; and the military ones, conſiſting of old ſoldiers, broken and diſabled with the fatigues of war, who were thus provided with lands as the reward of their ſervices. The colonies ſent by the ſenate were either Roman or Latin, *i. e.* compoſed either of Roman citizens or Latins. M. Vaillant has filled a volume in folio with medals ſtruck by the ſeveral colonies, in honour of the emperors who founded them. The ordinary ſymbol they engraved on their medals was either an eagle; as when the veteran legions were diſtributed in the colonies: or a labourer, holding a plough drawn by a pair of oxen; as when the colony conſiſted of ordinary inhabitants. On all the medals are ſeen the names of the decemviri, who held the ſame rank and had the ſame authority there as the conſuls had at Rome.

Laſtly, the colonies of commerce, are thoſe eſtabliſhed by the Britiſh, French, Spaniards, Portugueſe, and other nations within theſe two laſt centuries, and which they continue ſtill to eſtabliſh, in ſeveral parts of Aſia, Africa, America, and the Iſlands in the South Seas; either to keep up a regular commerce with the natives, or to cultivate the ground, by planting ſugar-canes, indigo, tobacco, and other commodities. "Plantations, ſays Blackſtone, or colonies in diſtant countries, are either ſuch where the lands are claimed by right of occupancy only, by finding them deſert and uncultivated, and peopling them from the mother-country; or where, when already cultivated, they have either been gained by conqueſt, or ceded to us by treaties. And both the rights are founded upon the law of nature, or at leaſt on that of nations. But there is a difference between theſe two ſpecies of colonies with reſpect to the laws by which they are bound. For it hath been held, that if an uninhabited country be diſcovered and planted by Engliſh ſubjects, all the Engliſh laws then in being, which are the birthright of every ſubject, are immediately there in force. But this muſt be underſtood with many and very great reſtrictions. Such coloniſts carry with them only ſo much of the Engliſh law as is applicable to their own ſituation, and the condition of an infant colony; ſuch, for inſtance, as the general rules of inheritance, and of protection from perſonal injuries. The artificial refinements and diſtinctions incident to the property of a great and commercial people, the laws of policy and revenue (ſuch eſpecially as are enforced by penalties), the mode of maintenance for the eſtabliſhed clergy, the juriſdiction of ſpiritual courts, and a multitude of other proviſions, are neither neceſſary nor convenient for them, and therefore are not in force. What ſhall be admitted and what rejected, at what times, and under what reſtrictions, muſt, in caſes of diſpute, be decided in the firſt inſtance by their own provincial judicature, ſubject to the reviſion and controul of the king in council; the whole of their conſtitution being alſo liable to be new-modelled and reformed by the general ſuperintending power of the legiſlature in the mother-country. But in conquered or ceded countries, that have already laws of their own, the king may indeed alter and change thoſe laws; but, till he does actually change them, the ancient laws of the country remain, unleſs ſuch as are againſt the law of God, as in an infidel country."

COLOPHONY, in pharmacy, the ſame with black reſin. It receives its name of *colophonia*, from Colophon, a city of Ionia; becauſe the beſt was formerly brought from thence. Two ſorts are mentioned in ancient writings; the one dry, the other in a liquid form. The latter ſeems to have been liquid pitch, which is the crude reſin of the pine brought from Colophon; the other was called *reſina fricta*, and conſiſted only of the former deprived of its humid parts.

COLOQUINTIDA, in botany. See CUCUMIS.

COLORATURA, in muſic, denotes all manner of varia-

tions, trillos, diminutions, &c. serving to make a song agreeable.

COLORNO, a town of Italy, in the Parmazan, near the river Po, eight miles from Parma. The duke of Parma has a pleasure-house here, one of the most delightful seats in all Italy, and the gardens are very fine. E. long. 9. 15. N. lat. 44. 54.

COLOSSUS, a statue of enormous or gigantic size. The most eminent of this kind was the Colossus of Rhodes; a statue of Apollo, so high, that ships passed with full sails betwixt its legs. It was the workmanship of Chares, a disciple of Lysippus; who spent 12 years in making it: it was at length overthrown by an earthquake, after having stood 1360 years. Its height was six score and six feet: there were few people could fathom its thumb, &c. When the Saracens became possessed of the island, the statue was found prostrate on the ground: they sold it to a Jew, who loaded 900 camels with the brass. The basis that supported it was a triangular figure; its extremities were sustained with 60 pillars of marble. There was a winding-stair-case to go up to the top of it; from whence one might discover Syria, and the ships that went into Egypt, in a great looking-glass, that was hung about the neck of the statue. Among the antiquities of Rome, there are seven famous Colossuses: two of Jupiter, as many of Apollo, one of Nero, one of Domitian, and one of the Sun.

COLOSTRUM, the first milk of any animal after bringing forth young, called *beestings*. It is remarkable that this milk is generally cathartic, and purges the meconium; thus serving both as an aliment and medicine. An emulsion prepared with turpentine dissolved with the yolk of an egg, is sometimes called by this name.

COLOSWAR, a large and celebrated town of Transylvania, where the senates have their meetings. It is seated on the river Samos, in E. long. 22. 45. N. lat. 46. 53.

COLOUR, in physics, a property inherent in light, by which, according to the various sizes of its parts, or from some other cause, it excites different vibrations in the optic nerve; which propagated to the sensorium, affect the mind with different sensations. See CHROMATICS and OPTICS.

COLOUR, in painting, is applied both to the drugs, and to the tints produced by those drugs variously mixed and applied. The principal colours used by painters are red and white lead; yellow and red ochres; several kinds of earth, umbre, orpiment, lamp-black, burnt ivory, black lead, vermillion, gamboge, lacca, blue and green ashes, verdigris, bistre, bice, smalt, carmine, ultramarine: each of which, with their uses, &c. are to be found under their proper articles. Of these colours some are ground with gum-water, some used with oil, and others only in fresco.

Painters reduce all the colours they use under these two classes, of *dark* and *light* colours. Black, and all that are obscure and earthy, as umbre, bistre, &c. are of the first description. Under light colours are comprehended white, and all that approach nearest to it. Painters also distinguish colours into *simple* and *mineral*. Under simple colours they rank all those which are extracted from vegetables, and which will not bear the fire; as the yellow made of saffron, French berries, lacca, and other tinctures extracted from flowers, &c. The mineral colours are those which being drawn from metals, &c. are able to bear the fire, and therefore are used by enamellers. *Changeable* and *permanent* is another division, which, by some, is made of colours. Changeable colours are such as depend on the situation of the objects with respect to the eye, as that of a pigeon's neck, taffeties, &c. The first, however, being attentively viewed with a microscope, each fibre of the feathers appears composed of several little squares, alternately red and green, so that they are fixed colours.

Water COLOURS, are such as are used in painting with gum-water, size, or any other substance that is solubie in water.

Incapacity of distinguishing COLOURS. Of this extraordinary defect in vision, we have some curious instances in the Philosophical Transactions for 1777. The account was communicated by Mr. Huddart to Dr. Priestley.

COLOUR, in dyeing. See DYEING.

COLOUR of *Plants*, is an attribute found to be very variable. Different colours are observed, not only in different individuals of the same species, but likewise in different parts of the same individual. Thus, marvel of Peru, and sweet-William, have frequently petals of different colours on the same plant. Three or four different colours are frequently found upon the same leaf or flower; as on the leaves of the amaranthus, tricolor, and the flowers of the tulip, auricula, three-coloured violet, and others. To produce the most beautiful and striking variety of colours in such flowers, is the principal delight and business of the florist.

Particular colours seem to be appropriated to particular parts of the plant. Thus, *white* is most common in roots, sweet berries, and the petals of spring flowers. *Water colour*, in the filaments and styles. *Black*, in the roots and seeds; rarely in the seed vessel, and scarce ever to be found in the petals. *Yellow* is frequently in the antheræ or tops of the stamina; as likewise in the petals of autumnal flowers, and the compound legulated flowers of Linnæus. *Red* is common in the petals of summer flowers, and in the acid fruits. *Blue* and *violet*-colour, in the petals. *Green*, in the leaves and calyx, but rarely in the petals. In the interchanging of colours, which in plants is found to depend upon differences in heat, climate, soil, and culture, a sort of elective attraction is observed to take place. Thus, red is more easily changed into white and blue: blue into white and yellow; yellow into white; and white into purple. A red colour is often changed into a white, in the flowers of heath, mother of thyme, betony, pink, viscous campion, *cucubalus*, trefoil, orchis, fox glove, thistle, cudweed, saw-wort, rose, poppy, fumitory, and geranium. Red passes into blue in pimpernel. Blue is changed into white in bell-flower, greek-valerian, bindweed, columbine, violet, vetch, milk-wort, goat's rue, viper's bugloss, comfrey, borage, hyssop, dragon's head, scabious, blue-bottle, and succory. Blue is changed into yellow in crocus. Yellow passes easily into white in melilot, agrimony, mullein, tulip, *blattaria*, or moth-mullein, and corn marigold. White is changed into purple in wood-sorrel, thorn-apple, pease, and daisy.

As flowers gradually open and are exposed to the air, they throw off their old colour, and acquire a new one. In fact, no flower has its proper colour till it is fully expanded. Many flowers change their colours thrice successively; thus, the very young buds of lady's looking glass, bugloss, and the like, are all white; the larger buds purple, or murrey; and the open flowers blue. Indeed colour is a quality in plants so apt to change, that it ought never to be employed in distinguishing their species, which ought to be characterised from circumstances not liable to alteration by culture or other accidents. The same inconstancy of colour observed in the flowers, is likewise to be found in almost all the other parts of plants, though not in any equal degree.

Of all sensible qualities, colour is the least useful in indicating the virtues and powers of vegetables. The following general positions on this subject are laid down by Linnæus, and seem sufficiently confirmed by experiment: A yellow colour generally indicates a bitter taste; as in gentian, aloe, celandine, turmeric, and other yellow flowers. Red indicates an acid or sour taste; as in cranberries, barberries, currants, raspberries, mulberries, cherries; the fruit of the rose, sea-buckthorn, and service-tree. Herbs that are turned towards autumn, have like-

wise a sour taste; as sorrel, wood-sorrel, and bloody dock. Green indicates a crude alkaline taste, as in leaves and unripe fruits. A pale colour denotes an insipid taste, as in endive, asparagus, and lettuce. White promises a sweet luscious taste; as in white currants and plums, sweet apples, &c. Lastly, black indicates a harsh, nauseous, disagreeable taste; as in the berries of deadly night-shade, myrtle-leaved sumach, herb-christopher, and others; many of which are not only unpleasant to the taste, but pernicious and deadly in their effects.

Colour *of the Human Species, Difference of*. See Complexion.

Colour, in heraldry. The colours generally used in heraldry are, red, blue, black, green, and purple; which the heralds call *gules*, *azure*, *sable*, *vert* or *sinople*, and *purpure*; tenne, or tawny, and sanguine, are not so common: as to yellow and white, called *or* and *argent*, they are metals, not colours. The metals and colours are sometimes expressed in blazon by the names of precious stones, and sometimes by those of planets or stars. See Blazoning.

Colours, in the military art, include the banners, flags, ensigns, &c. of all kinds, borne in the army or fleet. See Flag and Standard.

Colours, in the Latin and Greek churches, are used to distinguish several mysteries and feasts celebrated therein. Five colours only are regularly admitted into the Latin church: these are white, green, red, violet, and black. The white is for the mysteries of our Saviour, the feast of the Virgin, those of the angels, saints, and confessors; the red is for the mysteries and solemnities of the holy sacrament, the feasts of the apostles and martyrs; the green for the time between pentecost and advent, and from epiphany to septuagesima; the violet in advent and Christmas, in vigils, rogations, &c. and in votive masses in time of war; lastly, the black is for the dead, and the ceremonies thereto belonging. In the Greek church, the use of colours is almost abolished, as well as among us. Red was, in the Greek church, the colour for Christmas and the dead, as black is among us.

To Colour *Stranger's Goods*, is when a freeman allows a foreigner to enter goods at the custom-house in his name.

Colour-*Making*, the art of preparing the different kinds of colours used in painting. This art properly belongs to chemistry; but the principles on which it depends are imperfectly understood; and the practical part mostly in the hands of those who find it their interest to keep it secret.

The first general division of colours is into opaque and transparent. By the first are meant such colours as, when laid over paper, wood, &c. cover them fully so as to efface any other painting or stain that might have been there before; the others are of such a nature as to leave the ground on which they are laid, visible through them. Of the first kind are white-lead, red-lead, vermilion, &c.; of the latter kind are the colours used for illuminating maps, &c.

Another division is into oil-colours and water-colours; by which is meant, such as are appropriated to painting in oil and in water. Most of those which are proper for painting in water, are also proper for being used in oil. There is, however, this remarkable difference betwixt colours when mixed with water and with oil, that such as are quite opaque in water will become perfectly transparent in oil. Thus, blue verditer, though exceedingly opaque in water, if ground with oil, seems totally to dissolve, and becomes very transparent. The most perfectly opaque colours in oil are such as have lead, mercury, or iron, for their basis: to the latter, however, Prussian blue is an exception: for though the basis of that colour is iron, it proves nearly transparent when ground with oil. In water-colours, those prepared from metals, Prussian blue alone excepted, are always opaque; from vegetables or animals, transparent. Coals, however, whether vegetable or animal, are opaque both in water and oil.

Colours, again, may be considered as either simple or compound. The simple ones are such as require nothing to be superadded to them, in order to make a full strong colour, without regarding whether they are formed of many or few ingredients: and in this view, white-lead, red-lead, vermilion, calces of iron, &c. are simple colours. The compound ones are formed by the union of two or more colouring substances; as blue and yellow united together to form a green, red and yellow to form an orange, a white earth or calx with the red colour of cochineal or brazil to form a lake, &c.; and thus carmine, lake, rose-pink, Dutch-pink, English-pink, &c. are compound colours.

The last and most important division of colours is into true and false. By the former are meant those which retain their colour under every possible variety of circumstances, without fading in the least; the other are such as do not; but either lose their colour altogether, or change to some other. What is chiefly apt to affect colours, is their being exposed to the sun in summer, and to the cold air in winter: but to this there is one exception, *viz.* white-lead; which, when ground with oil, retains its whiteness if exposed to the weather, but degenerates into a brownish or yellowish colour if close kept. In water this substance is very apt to lose its colour, whether exposed to the air or not. The great desideratum in colour-making is to produce the first kind of colours, *viz.* such as will not fade by exposure to the weather; and indeed it is to be regretted, that the most beautiful are in general the least permanent. It may, for the most part, however, be expected, that the more simple any colour is, the less liable will it be to change upon exposure to the air.

The great difficulty of knowing *à priori* whether a colour will fade or not, is owing to our ignorance concerning the nature of colouring substances. With all our disadvantages, however, we may observe, that whatever change of colour is produced in any substance by exposure to the sun and air, that colour to which it changes will bid fair for being permanent, and therefore ought to be employed where it can be done. Of these changes the instances are but very rare. One is in the purple of the ancients, which assumed its colour by exposure to the sun, and consequently was exceedingly permanent. Another is in the solution of silver: which, being mixed with chalk, the precipitate turns to purplish black where it is exposed to the sun. A third is in solutions of indigo by alkaline substances, which constantly appear green till exposed to the air by spreading them very thin, upon which they become almost instantaneously blue, and continue so ever after. Sometimes, though still more rarely, a very remarkable change of colour happens, upon mixing two vegetable juices together. Almost the only instance of this we have on the authority of Mr. Forster, who informs us, that the inhabitants of Otaheite dye their cloth of a crimson colour, by mixing together the yellow juice of a small species of fig with the greenish juice of a kind of fern. But the most remarkable alterations of colour are effected by different metallic and saline solutions mixed with certain animal or vegetable substances; and with these the colour-maker will be principally conversant.

It is a common observation in chemistry, that acids mixed with blue vegetable juices turn them red, and alkalies green. It is equally certain, though not so generally known, that acids of all kinds generally tend to heighten red colours, so as to make them approach to the scarlet or true crimson: and alkalies to darken, or make them approach to blue or purple. Mixed with yellow colours, acids also universally tend to brighten the yellow; and alkalies to turn it to an orange, and make

it become more dull. But though this is very generally the cafe, we are not to expect that all acids are equally powerful in this refpect. The nitrous acid is found to heighten the moft of any, and the marine acid the leaft of the mineral ones. The vegetable, as might be expected, are lefs powerful than the mineral acids. Thus, if with a tincture of cochineal, either in water or fpirit of wine, is mixed the pure nitrous acid, it will change the colour to an exceeding high orange or flame colour, which it will impart to cloth. If the vitriolic acid is ufed, a full fcarlet, inclining to crimfon rather than orange, is produced. With marine acid a true crimfon colour, bordering on purple, is the confequence. Alkalies, both fixed and volatile, change the colour to a purple, which is brighter with the volatile than the fixed alkalies.

As all colours, whether derived from the animal or vegetable kingdom, muft be extracted either by pure water or fome other liquid menftruum, they cannot be ufed for the purpofes of painting till the colouring fubftance is united with fome earthy or folid matter, capable of giving it a *body*, as the workmen call it: and according to the nature of this fubftance, the colour will be tranfparent or otherwife. This bafis ought to be of the moft fixed and durable nature; and alfo of a pure white colour, and eafily reducible into an impalpable powder. In a great many inftances, *alumine* (See Chemiftry, p. 427.) anfwers for this purpofe; but the fubftance to be chofen in preference to all others, is faid to be a calx of tin, prepared either by fire or the nitrous acid.

If what we have juft now obferved is attended to, the general method of extracting colours from any vegetable or animal fubftance, and fixing them on a proper bafis, muft be very eafily underftood. For this purpofe, a quantity of calx of tin (or whatever other matter is determined on) is to be procured in proportion to the quantity of colour defired. This muft be well rubbed in a glafs mortar, with as much of the coloured tincture or infufion as will compleatly moiften it. If the colour is to be a very fine one, fuppofe from cochineal, the colouring matter muft be extracted with fpirit of wine without heat. When the fpirit is fufficiently impregnated, it is to be poured by little and little upon the calx, rubbing it conftantly, in order to diftribute the colour equally through all parts of the calx. The fpirit foon evaporates, and leaves the calx coloured with the cochineal. More of the tincture is then to be poured on, rubbing the mixture conftantly as before; and thus, with proper management, may very beautiful colours, not inferior to the beft carmine, be prepared at a moderate expence. If, inftead of cochineal, we fubftitute brazil-wood, turmeric, logwood, &c. different kinds of red, yellow, and purple, will be produced. For the coarfer colours, aqueous decoctions are to be ufed in a fimilar manner; only as thefe are much longer evaporating than the fpirit of wine, very little muft be poured on at a time, and the colours ought to be made in large quantity, on account of the tedioufnefs of the procefs.

Hitherto we have confidered only the effects of the pure and fimple falts, *viz.* acids and alkalies, on different colours; but by combining the acids with alkalies, earths, or metals, thefe effects may be varied almoft *in infinitum*; neither is there any rule yet laid down by which we can judge *à priori* of the changes of colour that will happen on the admixture of different alkalies, acids, or falts with any colouring fubftance. Alum and fal ammoniac confiderably heighten the colour of cochineal, brazil, turmeric, fuftic, madder, logwood, &c. The fame thing is done, though in a lefs degree, by common falt, Glauber's falt, falt-petre, and many other of the neutral falts. Solutions of iron in all the acids ftrike a black with every one of the above-mentioned fubftances; and likewife with fumach, galls, and other aftringents. Solutions of lead univerfally debafe red colours to a dull purple. Solution of copper changes the purple colour of logwood to a pretty good blue; and, in general, folutions of this metal are friendly to blue colours. The effects of folutions of gold, filver, and mercury, are not fo well known: they feem to produce dark colours of no great beauty. The moft powerful folution, however, with regard to a great number of colours, is that of tin, made in aqua regia. Hence we may fee the fallacy of Mr. Delaval's hypothefis concerning colours, (See CHROMATICS, page 513.) that the leaft refrangible ones are produced by the moft denfe metals: for tin, which hath the leaft denfity of any metal, hath yet, in a ftate of folution, the moft extraordinary effects upon the leaft refrangible colours as well as thofe that are moft fo. The colour of cochineal is changed by it into the moft beautiful fcarlet; a fimilar change is made upon the colouring matter of gum lac. Brazil-wood is made to yield a fine purplifh crimfon; logwood, a beautiful dark purple; turmeric, fuftic, weld, and all yellow-colouring woods and flowers, are made to communicate colours far more beautiful than can be got from them by any other method. The blue colour of the flowers of violets, eye-bright, iris, &c. are heightened fo as to equal, if not excel, the blue produced by a folution of copper in volatile alkali. In fhort, this folution feems to be of much more extenfive ufe in colour-making, when properly applied, than any thing hitherto thought of. It is not, however, univerfally ferviceable. The colour of madder it totally deftroys, and likewife that of faf-flower, changing them both to a dull orange. It likewife fpoils the colour of archil: and what is very remarkable, the fine red colour of tincture of rofes made with oil of vitriol, is by folution of tin changed to a dirty green.

The moft important confideration in colour-making is to make choice of fuch materials as produce the moft durable colours; and if thefe can be procured, an ordinary colour from them is to be preferred to a bright one from thofe which fade fooner. In what the difference confifts between the colours that fade and thofe which do not, is not known with any degree of certainty. From fome circumftances it would feem, that thofe fubftances which are moft remarkable for keeping their colour, contain a gummy matter, fo combined with a refinous one as to be foluble both in water and fpirit of wine. The moft durable red colour is prepared from gum-lac. This is very ftrongly refinous, though at the fame time fo far glutinous, that the colouring-matter can be extracted from it by water. Next to gum-lac are madder roots and cochineal. The colouring-matter of the former is foluble both in water and fpirit of wine. Along with the pure red, however, there is in madder a kind of vifcous aftringent fubftance, of a dark brown colour, which feems to give durability to the whole. The colouring-matter of cochineal, though foluble both in water and fpirit of wine, is very tenacious and mucilaginous, in which it bears fome refemblance to the *purpura* of the ancients, which kept its colour exceedingly well. Where the colours are fugitive, the tinging fubftance feems to be either too refinous or too mucilaginous.

Having thus ftated all that can as yet be depended upon for eftablifhing a general theory of colour-making, we fhall now proceed to give an account of the different pigments generally to be met with in the colour-fhops.

1. *Black.* Thefe are *lamp-black*, ivory-black, blue-black, and Indian-ink. The firft is the fineft of what are called the foot-blacks, and is more ufed than any other. Its preparation is defcribed in the Swedifh Tranfactions for the year 1754, as a procefs dependent on the making of common refin. The dregs and pieces of bark left after ftraining the turpentine are burnt in a low oven, from which the fmoke is conveyed through a long paffage into a fquare chamber, having an opening on the

top on which is a large ſack made of thin woollen ſtuff: the ſoot, or lamp-black, concretes partly in the chamber, from whence it is ſwept out once in two or three days, and partly in the ſack, which is now and then gently ſtruck upon, both for ſhaking down the ſoot, and for cleaning the interſtices betwixt the threads, ſo as to procure a ſufficient draught of air through it. In this manner lamp-black is prepared at the turpentine houſes in England, from the dregs and refuſe of the reſinous matters which are there manufactured.

Ivory-black is prepared from ivory or bones burnt in a cloſe veſſel. This, when finely ground, forms a ſtill more beautiful and deep colour than lamp-black; but in the common methods of manufacturing, it is very much adulterated, and ſo groſsly levigated, as to be almoſt unfit for uſe. An opaque deep black for water-colours, is made by grinding ivory-black with gum-water on a marble ſlab, or with ſize. A deep jet-black, however, is ſeldom wanted in painting.

Blue-black is ſaid to be prepared from the burnt ſtalks and tendrils of the vine. Theſe, however, the colour-makers ſeldom give themſelves the trouble of procuring, but ſubſtitute in its place a mixture of ivory-black and the common blue uſed for clothes.

Indian-ink is an excellent black for water-colours. Dr. Lewis ſuppoſes it to conſiſt of a mixture of lamp-black and common glue: but it is probable that gum arabic is alſo added.

2. *White.* The white colours commonly to be met with are, flake-white, white-lead, pearl-white, Spaniſh-white, and magiſtery of biſmuth. The *flake-white* and white-lead are, properly ſpeaking, the ſame; though the preparation of the former is kept a ſecret; the method of preparing the latter is well known. Theſe are the only whites that can be uſed in oil, all the reſt being tranſparent unleſs they are laid on with water. *Spaniſh-white* is only a finely prepared chalk; and *Pearl-white* is made from oyſter-ſhells. The magiſtery of biſmuth is apt to turn black, as are alſo flake-white, and white-lead, when uſed as water-colours.

3. *Red.* The red colours uſed in painting are of two ſorts; *viz.* thoſe which incline to the purple, and ſuch as are of a full ſcarlet and tend rather to the orange. The firſt are carmine, lake, roſe-pink, red-ochre, and Venetian-red. The ſecond are vermilion, red-lead, ſcarlet-ochre, common Indian-red, Spaniſh-brown, and terra di Sienna, burnt. *Carmine* is the brighteſt and moſt beautiful red colour known at preſent; the beſt comes from France. *Lake* differs from it in being capable of mixture with oil; which carmine is not, unleſs with great difficulty. The former is alſo much more inclined to purple than carmine. This laſt quality, however, is reckoned a defect; and accordingly, the more that lake approaches to the ſcarlet or true crimſon, the more it is valued. On dropping ſolution of tin into an aqueous tincture of brazil-wood, a beautiful precipitate falls, of a purpliſh crimſon colour. This may be very well ſubſtituted in place of the dearer lakes on many occaſions. *Roſe-pink* inclines more to purple than ſcarlet. It ſeems to be made of chalk, coloured with a decoction of brazil-wood; but it is exceedingly periſhable. *Red ochre* and *Venetian red* differ in nothing from the calces of iron when made to incline either to a purple or ſcarlet, by the manner in which the calcination is performed. If the matter is perfectly deprived of its phlogiſton, and ſubjected to an intenſe fire, it always turns out red: but the mixture of a ſmall quantity of inflammable matter gives it a purpliſh caſt. Hence various paints are kept in the ſhops under different names which yet differ from each other only in the ſlight circumſtance above mentioned: and ſuch are the *ſcarlet-ochre*, *Spaniſh-brown*, and *terra di Sienna* burnt. It is remarkable, that the calces of iron never ſhow their colour till they become cold.

Of the preparation of vermilion and red lead, an account is given under thoſe articles. They are very durable colours; but the firſt is the beſt.

4. *Orange.* The only true orange-coloured paints are red orpiment and orange lake. The firſt is a ſublimate formed of arſenic and ſulphur; the other may be prepared from turmeric infuſed in ſpirit of wine, having its colour ſtruck upon calx of tin, and brightened by a ſolution of that metal. All the ſhades of orange, however, may be extemporaneouſly prepared by mixing red and yellow together, in due proportions.

5. *Yellow.* The yellow paints moſt commonly in uſe are, king's-yellow, Naples-yellow, Dutch-pink, Engliſh-pink, maſticot, common orpiment, yellow-ochre, and terra di Sienna unburnt. *King's-yellow* is evidently an arſenical preparation. Its colour is exceedingly beautiful, but apt to fade; on which account, and its great price, it is ſeldom uſed. *Naples-yellow* has lead for its baſis. It is therefore apt to turn black and loſe its colour, which makes it the leſs valuable. It is nevertheleſs uſed inſtead of king's yellow, on account of its cheapneſs. *Dutch-pink* is ſaid to be prepared by ſtriking the colour of yellow berries upon alumine: but this is doubtful. The baſis of Dutch-pink ſeems hard and gritty, and its colour more durable than thoſe ſtruck upon earths uſually are. *Maſticot* is prepared by calcining white-lead till it aſſumes a yellowiſh colour. It is not apt to change, but the colour is ſo dull that it is ſeldom uſed either in oil or water. Common *orpiment* is a pretty bright greeniſh-yellow, prepared by ſubliming arſenic with ſulphur. It has a nauſeous ſmell; nor does it keep its colour for any length of time. *Yellow-ochre* and *terra di Sienna*, are ferruginous earths, capable of becoming red by calcination. Vitriolated iron precipitated by lime may be advantageouſly ſubſtituted for either of them. Gamboge is a paint that can only be uſed in water, and is the moſt common and uſeful yellow for colouring maps, &c.

6. *Green.* The only ſimple green colour that has a tolerable degree of brightneſs is verdigris, or at leaſt the preparations of it. It is improved in colour, though not in durability, by diſſolution and cryſtallization in diſtilled vinegar; in which ſtate it is called *diſtilled verdigris.* A more durable water-colour is made by diſſolving the verdigris in cryſtals of tartar: but in oil this is found to be equally fugitive with the verdigris itſelf. Compound greens are either made of Pruſſian or ſome other blue, mixed with yellow. *Sap-green* is a ſimple colour, but exceedingly inferior to diſtilled verdigris, or even to the tartarous ſolution of verdigris joined with gamboge. It is prepared from the juice of unripe buckthorn berries evaporated to the conſiſtence of a gum. Its green colour is greatly inclined to yellow.

Another green ſometimes uſed is called *terre verte*, which is a native earth, probably impregnated with copper. It is of a blueiſh green colour, much of that tint called *ſea-green.*

7. *Blue.* The blue colours are ultramarine, Pruſſian-blue, verditer, ſmalt, bice, and indigo. Of theſe the *ultramarine* is the fineſt, but its great price hinders its being much uſed. It is a preparation from lapis lazuli; is an exceeding bright colour, and never fades with whatever ſubſtance it is mixed. It is now, however, in a great meaſure ſuperſeded by Pruſſian blue, to the diſadvantage of painting in general; as Pruſſian blue, though very beautiful, is far from being durable. For an account of it ſee the article ULTRAMARINE. The proceſs for making *Pruſſian blue* is deſcribed and its nature fully conſidered, under CHEMISTRY, page 440; ſo that it is ſufficient here to obſerve, that Pruſſian blue is to be accounted of the beſt quality when it is deep, bright, and not inclined to purple. It ought to be tried by a mixture with white lead, as the brightneſs of the colour will appear much more when diluted than when

concentrated in the lumps of the blue itself. The preparation of *blue verditer* is kept a secret, and the best chemists have been puzzled to find out the method. The colour is exceedingly bright, and has a considerable tinge of green. A method of preparing a colour equally beautiful, and agreeing in all respects with what is sold in the shops, except that of effervescing with acids, is to dissolve copper in strong caustic alkali, until the liquid has assumed a very deep blue colour; and afterwards to evaporate it till the verditer precipitates. Dr. Priestley takes notice, that solution of copper in volatile alkali affords a blue precipitate by heat, but without stating the requisites for its success. *Smalt* is glass coloured with zaffre, a preparation from cobalt. It is commonly so grossly powdered that it cannot be used in painting, and its texture is so hard that it cannot easily be levigated. Its colour, however, is exceedingly bright and durable. See Zaffre and the Treatise on CHEMISTRY, page 432. For the preparation and qualities of bice, see the articles ARMENUS *Lapis* and BICE. *Indigo* is but little used in painting either in oil or water, on account of the dulness of the colour. It requires no other preparation than being washed over. Its goodness is known by the darkness and brightness of the colour. See INDIGO.

8. *Purple.* The only simple colour of this kind used at present is the substance usually called *colcothar* of vitriol. A beautiful purple lake may be prepared from logwood by means of solution of tin; but this method of preparing colours is very little known as yet.

9. *Brown.* The brown colours are, bistre, brown-ochre, Cologne-earth, umbre, and brown-pink. Under the article BISTRE is given a process for making that colour, by infusing soot in water, pouring off the tincture, and then evaporating it to an extract; but Dr. Lewis is of opinion, with Mr. Landois in the French *Encyclopédie*, that the soot is either boiled in water, or ground with a little liquid of some kind into a smooth paste; it is then diluted with more water, and after standing for about half an hour till the grosser substance of the soot has settled, the liquor is poured off into another vessel, and set by for two or three days, that the finer parts may fall to the bottom, and this fine matter is the bistre. This is a very useful colour in water, being exceedingly fine, durable, and not apt to spoil any other colours with which it is mixed. The brown-pink is said to consist of chalk tinged with the colouring matter of fustic, heightened by fixed alkaline salts. It is therefore very perishable, and seldom used. The other browns are a kind of ochreous earths; for a description of which see their proper articles.

COLOURING, among painters, the manner of applying and conducting the colour of a picture; or the mixtures of light and shadows, formed by the various colours employed in painting. See PAINTING.

COLOURING *of Glass.* See GLASS.

COLOURING *of Porcelain.* See PORCELAIN.

COLT, in zoology, a general name for the young of the horse kind; the male being likewise, for distinction's sake, called a *horse-colt*; the female, a *filly*. See HORSE.

COLT-*Evil*, among farriers. See FARRIERY.

COLT-*Taming*, is the breaking of a colt so as to endure a rider. Colts are most easily broke at three or four years of age; but he who will have patience to see his horse at full five, will have him much more free from diseases than if broke sooner. See farther the article HORSE.

COLTIE, a term used by timber-merchants for a defect or blemish in some of the annular circles of a tree, whereby its value is much diminished.

COLUBER, in zoology, a genus of serpents belonging to the order of amphibia. The characters are these: they have a number of scuta or hard crusts on the belly; and scutellæ or scales on the tail. Linnæus enumerates no less than 97 species under this name, distinguished solely by the number of scuta and scutellæ. See an account of the most remarkable under the article PUNCTATUS.

COLUMB-KILL. See IONA.

COLUMBA. See PIGEON.

COLUMBINE, in botany. See AQUILEGIA.

COLUMBO-ROOT, an article lately introduced into the materia medica, the natural history of which is not yet well known. This root comes to us from Columbo a town in Ceylon, in circular pieces, which are from half an inch or an inch to three inches in diameter; and divided into *frusta*, which measure from two inches to one quarter of an inch. The sides are covered with a thick corrugated bark, of a dark brown hue on its external surface, but internally of a light yellow colour. From Dr. Percival's experiments on this root, it appears, that rectified spirit of wine extracts its virtues in the greatest perfection. The watery infusion is more perishable than that of other bitters. An ounce of the powdered root, half an ounce of orange peel, two ounces of brandy, and 14 ounces of water, macerated 12 hours without heat, and then filtered through paper, afford a sufficiently strong and tolerably pleasant infusion. The extract made first by spirit and then with water, and reduced by evaporation to a pilular consistence, is found to be equal if not superior in efficacy to the powder. As an antiseptic, Columbo-root is inferior to the bark; but as a corrector of putrid bile, it is much superior to the bark; whence also it is probable that it would be of service in the West India yellow fever. It also restrains alimentary fermentation, without impairing digestion; in which property it resembles mustard. It does not appear to have the least heating quality; and therefore may be used in phthisis pulmonalis and in hectic cases, to strengthen digestion. It occasions no disturbance, and agrees very well with a milk diet, as it abates flatulence, and is indisposed to acidity.

COLUMBO, a maritime town in the island of Ceylon in the East Indies, seated on the south west part of its coast. E. long. 80. 10. N. lat. 7. 5.

COLUMBUS, or *Congregation of St.* COLUMBUS, a society of regular canons, who formerly had 100 abbeys or monasteries in the British Isles.

COLUMBUS (Christopher), a Genoese, the celebrated navigator, and first discoverer of the islands of America, was a subject of the republic of Genoa. Neither the time nor the place of his birth, however, are known with certainty; only he was descended of an honourable family, who, by various misfortunes, had been reduced to indigence. His parents were sea-faring people; and Columbus having discovered, in his early youth, a capacity and inclination for that way of life, was encouraged by them to follow the same profession. He went to sea at the age of 14: his first voyages were to those ports in the Mediterranean frequented by the Genoese; after which he took a voyage to Iceland; and proceeding still further north, advanced several degrees within the polar circle. After this, Columbus entered into the service of a famous sea-captain of his own name and family. This man commanded a small squadron, fitted out at his own expence; and by cruising, sometimes against the Mahometans, and sometimes against the Venetians, the rivals of his country in trade, had acquired both wealth and reputation. With him Columbus continued for several years, no less distinguished for his courage than his experience as a sailor. At length, in an obstinate engagement off the coast of Portugal, with some Venetian caravals returning richly laden from the Low Countries, the vessel on board which he served, took fire, together with one of the enemy's ships to

which it was firſt grappled. Columbus threw himſelf into the ſea; laid hold of a floating oar; and by the ſupport of it, and his dexterity in ſwimming, he reached the ſhore, though above two leagues diſtant.

After this diſaſter, Columbus repaired to Liſbon, where he married a daughter of Bartholomew Pereſtrello, one of the captains employed by Prince Henry in his early navigations, and who had diſcovered and planted the iſlands of Porto Santo and Madeira. Having got poſſeſſion of the journals and charts of this experienced navigator, Columbus was ſeized with an irreſiſtible deſire of viſiting unknown countries. In order to indulge it, he made a voyage to Madeira, and continued during ſeveral years to trade with that iſland, the Canaries, Azores, the ſettlements in Guinea, and all the other places which the Portugueſe had diſcovered on the continent of Africa.

By the experience acquired in ſuch a number of voyages, Columbus now became one of the moſt ſkilful navigators in Europe. At this time, the great object of diſcovery was a paſſage by ſea to the Eaſt Indies. This was attempted, and at laſt accompliſhed by the Portugueſe, by doubling the Cape of Good Hope. The danger and tediouſneſs of the paſſage, however, ſuppoſing it to be really accompliſhed, which as yet it was not, ſet Columbus on conſidering whether a ſhorter and more direct paſſage to theſe regions might not be found out; and after long conſideration, he became thoroughly convinced, that, by ſailing acroſs the Atlantic Ocean, directly towards the weſt, new countries, which probably formed a part of the vaſt continent of India, muſt infallibly be diſcovered. His reaſons for this were, in the firſt place, a knowledge he had acquired of the true figure of the earth. The continents of Europe, Aſia, and Africa, as far as then known, form but a ſmall part of the globe. It was ſuitable to our ideas, concerning the wiſdom and beneficence of the Author of nature, to believe, that the vaſt ſpace, ſtill unexplored, was not entirely covered by a waſte and barren ocean, but occupied by countries fit for the habitation of man. It appeared likewiſe extremely probable, that the continent on this ſide the globe was balanced by a proportional quantity of land in the other hemiſphere. Theſe conjectures were confirmed by the obſervations of modern navigators. A Portugueſe pilot having ſtretched farther to the weſt than was uſual at that time, took up a piece of timber, artificially carved, floating upon the ſea; and as it was driven towards him by a weſterly wind, he concluded that it came from ſome unknown land ſituated in that quarter. Columbus's brother-in-law had found to the weſt of the Maderia iſles a piece of timber faſhioned in the ſame manner, and brought by the ſame wind; and had ſeen alſo canes of an enormous ſize floating upon the waves, which reſembled thoſe deſcribed by Ptolemy, as productions peculiar to the Eaſt Indies. After a courſe of weſterly winds, trees torn up by the roots were often driven upon the coaſt of the Azores; and at one time the dead bodies of two men, with ſingular features, which reſembled neither the inhabitants of Europe nor Africa, were caſt aſhore there. The moſt cogent reaſon, however, was a miſtaken notion of the ancient geographers concerning the immenſe extent of the continent of India. Cteſias affirmed that India was as large as all the reſt of Aſia; and Oneſicritus, whom Pliny the naturaliſt follows, contended that it was equal to the third part of the habitable earth.

In 1474, Columbus communicated his ideas on this ſubject to one Paul a phyſician in Florence, a man eminent for his knowledge in coſmography. He approved of the plan, ſuggeſted ſeveral facts in confirmation of it, and warmly encouraged Columbus to perſevere in an undertaking ſo laudable, and which muſt redound ſo much to the honour of his country and the benefit of Europe. Columbus, fully ſatisfied of the truth of his ſyſtem, was impatient to ſet out on a voyage of diſcovery; and to ſecure the patronage of ſome of the conſiderable powers of Europe capable of undertaking ſuch an enterpriſe. He applied firſt to the republic of Genoa; afterwards to the courts of Portugal, Spain and England ſucceſſively, but met with a variety of mortifying interruptions. At laſt his project was ſo far countenanced by Ferdinand of Spain and Queen Iſabella, that our adventurer ſet ſail with three ſmall ſhips, the whole expence of which did not exceed 4000l. During his voyage he met with many difficulties from the mutinous and timid diſpoſition of his men. He was the firſt who obſerved the variation of the compaſs, which threw the ſailors into the utmoſt terror. For this pheuomenon Columbus was obliged to invent a reaſon, which, though it did not ſatisfy himſelf, yet ſerved to diſpel their fears, or ſilence their murmurs. At laſt, however, the ſailors loſt all patience; and the admiral was obliged to promiſe ſolemnly, that in caſe land was not diſcovered in three days he ſhould return to Europe. That very night, however, the iſland of San Salvador was diſcovered, which quickly put an end to all their fears. The ſailors were then as extravagant in the praiſe of Columbus as they had before been inſolent in reviling and threatening him. They threw themſelves at his feet, implored his pardon, and pronounced him to be a perſon inſpired by heaven with more than human ſagacity and fortitude, in order to accompliſh a deſign ſo far beyond the ideas and conception of all former ages. Having viſited ſeveral of the Weſt India iſlands, and ſettled a colony in Hiſpaniola, he again ſet ſail for Spain; and after eſcaping great dangers from violent tempeſts, arrived at the port of Palos on the 15th of March 1493.

As ſoon as Columbus's ſhip was diſcovered approaching, all the inhabitants of Palos ran eagerly to the ſhore, where they received the admiral with royal honours. The court was then at Barcelona, and Columbus took care immediately to acquaint the king and queen of his arrival. They were no leſs delighted than aſtoniſhed with this unexpected event. They gave orders for conducting him into the city with all imaginable pomp; and received him clad in their royal robes, and ſeated on a throne under a magnificent canopy. Notwithſtanding all this reſpect, however, Columbus was no longer regarded than he was ſucceſsful. The coloniſts he afterwards carried over were to the laſt degree unreaſonable and unmanageable; ſo that he was obliged to uſe ſome ſeverities with them; and complaints were made to the court of Spain againſt him for cruelty. On this, Francis de Bovadilla, a knight of Calatrava, was appointed to inquire into the conduct of Columbus; with orders, in caſe he found the charge of mal-adminiſtration proved, to ſuperſede him, and aſſume the office of governor of Hiſpaniola. The conſeqence of this was, that Columbus was ſent to Spain in chains. From theſe, however, he was freed immediately on his arrival, and had an opportunity granted him of vindicating his innocence. He was, however, deprived of all power; and notwithſtanding his great ſervices, and the ſolemnity of the agreement between him and Ferdinand, Columbus never could obtain the fulfilment of any part of that treaty. At laſt, diſguſted with the ingratitude of a monarch whom he had ſerved with ſuch fidelity and ſucceſs, and exhauſted with fatigues, he ended his life on the 29th of May 1506.

Columbus (Bartholomew), brother to Chriſtopher, famous for his marine charts and ſpheres, which he preſented to Henry VII. of England. He died in 1514.

Columbus (Don Ferdinand), ſon of Chriſtopher, and writer of his life. He entered into the eccleſiaſtical ſtate; and founded a library, which he bequeathed to the church of Seville, to this day called the *Columbine library*. He died in 1560.

COLUMELLA, (Lucius Junius Moderatus), a Roman philoſopher, was a native of Cadiz, and lived under the emperor Claudius about the year 42. He wrote a book on agriculture intitled *De Re ruſtica*, and another *De Arboribus*.

COLUMEY, a town of Red Ruſſia in Poland, ſeated on the river Pruth, towards the confines of Moldavia, about 38 miles from Haliez, and 63 ſouth of Leopol. E. long. 16. 25. N. lat. 48. 45.

COLUMN, in architecture, a round pillar made to ſupport and adorn a building, and compoſed of a baſe, a ſhaft, and capital. See ARCHITECTURE.

COLUMNS are variouſly denominated from their uſe: thus an *Aſtronomical* column is a kind of obſervatory, in form of a very high tower built hollow, and with a ſpiral aſcent to an armillary ſphere placed a-top for obſerving the motions of the heavenly bodies. A *Chronological* COLUMN, is that which bears ſome hiſtorical inſcription digeſted according to the order of the time; as by luſtres, olympiads, faſti, epochas, annals, &c. At Athens, there were columns of this kind, whereon were inſcribed the whole hiſtory of Greece digeſted into olympiads. A *Funeral* COLUMN is that which bears an urn, wherein are ſuppoſed to be incloſed the aſhes of ſome deceaſed hero; and whoſe ſhaft is ſometimes overſpread with tears and flames, which are ſymbols of grief and immortality. A *Gnomonic* COLUMN; is a cylinder whereon the hour of the day is repreſented by the ſhadow of a ſtile. See DIAL. An *Hiſtoric* COLUMN, is that whoſe ſhaft is adorned with a baſſo-relievo, running in a ſpiral line its whole length, and containing the hiſtory of ſome great perſonage; ſuch are the Trajan and Antonine columns at Rome. A *Hollow* COLUMN; is that which has a ſpiral ſtair-caſe withinſide for the convenience of aſcending to the top; as the Trajan column, the ſtair-caſe whereof conſiſts of 185 ſteps, and is illuminated by 43 little windows, each of which is divided by tambours of white marble. The monument, or fire-column, at London, has alſo a ſtair-caſe; but does not quite reach the top. Theſe kinds of columns are alſo called *columnæ coclideæ* or *cochlideæ*. *Indicative* COLUMN, is that which ſerves to ſhow the tides, &c. along the ſea-coaſts. Of this kind there is one at Grand Cairo of marble, whereon the overflowings of the Nile are expreſſed: by this they form a judgment of the ſucceeding ſeaſon; when the water, for inſtance, aſcends to 23 feet, it is a ſign of great fertility in Egypt. See NILOMETER. *Inſtructive* COLUMN, is that raiſed, according to Joſephus, lib. i. cap. 3. by the ſons of Adam, whereon were engraven the principles of arts and ſciences. Baudelot tells us, that the ſon of Piſiſtratus raiſed another of this kind, of ſtone, containing the rules and precepts of agriculture. *Itinerary* COLUMN, is a column with ſeveral faces, placed in the croſs ways in large roads; ſerving to ſhow the different routes by inſcriptions on it. The *Lactary* COLUMN, at Rome, according to Feſtus, was a column erected in the herb-market, now the place *Montanara*, which had a cavity in its pedeſtal, wherein young children abandoned by their parents, out of poverty or inhumanity, were expoſed, to be brought up at the public expence. *Legal* COLUMN: among the Lacedemonians there were columns raiſed in public places, whereon were engraven the fundamental laws of the ſtate. *Limitrophous* or *boundary* COLUMN: that which ſhows the limits of a kingdom or country conquered. Such was that which Pliny ſays Alexander the Great erected at the extremity of the Indies. *Manubiary* COLUMN, from the Latin *manubiæ*, "ſpoils of the enemy;" a column adorned with trophies built in imitation of trees, whereon the ſpoils of enemies were anciently hung. See TROPHY. *Memorial* COLUMN: that raiſed on occaſion of any remarkable event; as the monument of London, built to perpetuate the memory of the burning of that city in 1666. It is of the Doric order, fluted, hollow, with a winding ſtair-caſe; and terminated atop with waving flames. There is alſo another of the kind, in the form of an obeliſk, on the banks of the Rhine in the Palatinate, in memory of the famous paſſage of that river by the great Guſtavus Adolphus and his army.

Menian COLUMN, any column which ſupports a balcony or meniana. The origin of this kind of column, Suetonius and Aſcanius refer to one Menias; who having ſold his houſe to Cato and Flaccus, conſuls, to be converted into a public edifice, reſerved to himſelf the right of raiſing a column withoutſide, to bear a balcony, whence he might ſee the ſhews.

Milliary COLUMN, was a column of marble raiſed by order of Auguſtus in the middle of the Roman forum; from whence, as a centre, the diſtances of the ſeveral cities, &c. of the empire were reckoned, by other milliary columns diſpoſed at equal diſtances on all the grand roads. This column was of white marble, the ſame with that which is now ſeen on the balluſtrade of the perron of the capital of Rome. Its proportion is maſſive, being a ſhort cylinder, the ſymbol of the globe of the earth. It was called *milliarium aureum*, as having been gilt, at leaſt the ball, by order of Auguſtus. It was reſtored by the emperors Veſpaſian and Adrian, as appears by the inſcriptions.

Military COLUMN, among the Romans, a column whereon was engraven a liſt of the forces in the Roman army, ranged by legions, in their proper order; with deſign to preſerve the memory of the number of ſoldiers, and of the order preſerved in any military expedition. They had another kind of military column, which they called *columna bellica*, ſtanding before the temple of Janus; at the foot whereof the counſel declared war, by throwing a javelin towards the enemies countries.

Sepulchral COLUMN, anciently was a column erected on a tomb or ſepulchre, with an inſcription on its baſe. Thoſe over the tombs of perſons of diſtinction were very large; thoſe for the common people ſmall: theſe laſt are called *ſtelæ* and *cippi*.

Statuary COLUMN, that which ſupports a ſtatue. Such was that erected by pope Paul V. on a pedeſtal before the church of St. Maria at Rome; to ſupport a ſtatue of the Virgin, which is of gilt braſs. This column was dug up in the temple of peace; its ſhaft is a ſingle block of white marble 49½ feet high, and five feet eight inches diameter, of the Corinthian order. The term *ſtatuary column* may likewiſe be applied to Caryatides, perſians, termini, and other human figures, which do the office of columns; and which Vitruvius calls *telomoxes* and *atlantes*. See ARCHITECTURE, page 291.

Triumphal COLUMN, a column erected among the ancients in honour of an hero; the joints of the ſtones, or courſes whereof, were covered with as many crowns as he had made different military expeditions. Each crown had its particular name, as *vallaris*, which was beſet with ſpikes, in memory of having forced a paliſade. *Muralis*, adorned with little turrets or battlements, for having mounted an aſſault. *Navalis*, of prows and beaks of veſſels; for having overcome at ſea. *Obſidionales*, or *graminales*, of graſs; for having raiſed a ſiege. *Ovans*, of myrtle; which expreſſed an ovation, or little triumph; and *triumphalis*, of laurel, for a grand triumph. See CROWN.

COLUMNARIUM, in Roman antiquity, a heavy tribute, demanded for every pillar of a houſe. It was firſt laid on by Julius Cæſar, in order to put a ſtop to the extravagant expences laid out on ſumptuous buildings.

COLUMNEA, in botany; a genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 40th order, *Perſonatæ*. The calyx is quinquepartite; the upper lip of the corolla arched and entire; gibbous above the baſe; the antheræ convex; the capſule bilocular. There is but one ſpecies, a native of Martinico, of which we have no particular deſcription.

COLUMNIFERÆ, in botany, an order of plants in the *fragmenta methodi naturalis* of Linnæus. For the genera of this order, ſee BOTANY, page 52.

COLURES, in aſtronomy and geography, two great circles ſuppoſed to interſect each other at right angles in the poles of

the world, and to paſs through the ſolſtitial and equinoctial points of the ecliptic. See GEOGRAPHY.

COLURI, a little iſland in the gulph of Engia, in the Archipelago, formerly called *Salamis*. The principal town is of the ſame name, and ſeated on the ſouth ſide, at the bottom of the harbour, which is one of the fineſt in the world. The famous Grecian hero, Ajax, who makes ſuch a figure in Homer's Iliad, was king of this iſland. It is now, however, but a poor place.

COLUTEA, BASTARD-SENA, in botany; a genus of the decandria order, belonging to the diadelphia claſs of plants; and in the natural method ranking under the 32d order, *Papilionaceæ*. The calyx is quinquefid; the legumen inflated, opening at the upper part of the baſe. There are three ſpecies, all of them deciduous flowering ſhrubs, adorned with many-lobed leaves, and butterfly-ſhaped flowers, of a deep yellow or red colour. They are propagated both by ſeeds and layers, and are hardy enough, though they ſometimes require a little ſhelter when the weather is very cold.

COLYBA, or COLYBUS; a term in the Greek liturgy, ſignifying an offering of corn and boiled pulſe, made in honour of the ſaints, and for the ſake of the dead. Balſamon, P. Goar, Leo, Allatius, and others, have written on the ſubject of *colybæ*.

COLYMBUS, in ornithology, a genus belonging to the order of anſeres. The bill has no teeth, is ſubulated, ſtraight and ſharp pointed; the teeth are in the throat; the noſtrils are linear, and at the baſe of the bill; and the legs are unfit for walking. This genus includes the divers, guillemots, and grebes; of which the following are the moſt remarkable ſpecies:

1. The *grylle*, or black guillemot, is in length 14 inches, in breadth 22; the bill is an inch and an half long, ſtraight, ſlender, and black; the inſide of the mouth red; on each wing is a large bed of white, which in young birds is ſpotted; the tips of the leſſer quill-feathers, and the coverts of the wings, are white: except thoſe, the whole plumage is black. In winter it is ſaid to change to white; and a variety ſpotted with black and white is not uncommon in Scotland. The tail conſiſts of 12 feathers; the legs are red. Theſe birds are found on the Baſs iſle in Scotland; in the iſland of St. Kilda; and, as Mr. Ray imagines, in the Farn iſlands off the coaſt of Northumberland. It has alſo been ſeen on the rocks of Llandidno, in Caernarvonſhire, in Wales. Except in breeding-time it keeps always at ſea; and is very difficult to be ſhot, diving at the flaſh of the pan. The Welch call this bird *caſcan longur*, or "the ſailor's hatred," from a notion that its appearance forebodes a ſtorm. It viſits St Kilda's in March; makes its neſt far under ground; and lays a grey egg, or, as Steller ſays, whitiſh and ſpotted with ruſt, and ſpeckled with aſh-colour.

2. The *troile*, or fooliſh guillemot, weighs 24 ounces; its length is 17 inches, the breadth $27\frac{1}{2}$: the bill is three inches long, black, ſtraight, and ſharp-pointed; near the end of the lower mandible is a ſmall proceſs; the inſide of the mouth yellow; the feathers on the upper part of the bill are ſhort and ſoft like velvet; from the eye to the hind part of the head is a ſmall diviſion of the feathers. The head, neck, back, wings, and tail, are of a deep mouſe-colour; the tips of the leſſer quill-feathers white; the whole under part of the body is of a pure white; the ſides under the wings marked with duſky lines. Immediately above the thighs are ſome long feathers that curl over them. The legs are duſky. The chief places they are known to breed in are the uninhabited iſle of Prieſtholm, near the iſle of Angleſey; on a rock called *Godreve*, not far from St. Ives in Cornwall; the Farn iſles, near the coaſt of Northumberland; and the cliffs about Scarborough in Yorkſhire. They are alſo found in moſt of the northern parts of Europe; and this bird is called by ſeveral names; by the Welch, *guillem*; at Northumberland and Durham, *guillemot* or *ſea-hen*; in Yorkſhire, a *ſcout*; by the Corniſh, *kiddah*; in the ſouthern parts, *willock*; and in Kamtſchatka, *aru* or *kara*.

3. The *ſeptentrionalis*, or red-throated diver, is more elegantly ſhaped than the others. It weighs three pounds. The length to the end of the tail is two feet; to the toes two feet four inches: the breadth three feet five inches. The head is ſmall and taper, the bill ſtraight; the head and chin are of a fine uniform grey; the hind part of the neck marked with duſky and white lines pointing downwards; the throat is of a dull red; the whole upper part of the body, tail, and wings, of a deep grey, almoſt duſky; but the coverts of the wings and the back are marked with a few white ſpots: the under ſide of the body is white; the legs duſky. This ſpecies breeds in the northern parts of Scotland, on the borders of the lakes. It is found alſo in Ruſſia, Siberia, and Kamtſchatka; but does not haunt the inland lakes.

4. The *arcticus*, or black-throated diver, is ſomewhat larger than the laſt: the bill is black, and alſo the front; the hind part of the head and neck cinereous: the ſides of the neck marked with black and white lines pointing downwards; the fore-part of a gloſſy variable black, purple, and green. The back, ſcapulars, and coverts of the wings, are black, marked, the two firſt with ſquare, the laſt with round ſpots of white; the quill-feathers duſky; the breaſt and belly white; the tail ſhort and black; legs partly duſky, and partly reddiſh. This ſpecies is now and then found in England, but is not common. It is ſufficiently plenty in the northern parts of Europe, Norway, Sweden, and Denmark.

5. The *glacialis*, or northern diver, is three feet five inches in length; the breadth four feet eight; the bill to the corners of the mouth four inches long, black and ſtrongly made. The head and neck are of a deep black; the hind part of the latter is marked with a large ſemilunar white band; immediately under the throat is another; both marked with black oblong ſtrokes pointing down: the lower part of the neck is of a deep black; gloſſed with a rich purple; the whole under ſide of the body is white; the ſides of the breaſt marked with black lines; the back, coverts of the wings, and ſcapulars, are black marked with white ſpots; thoſe on the ſcapulars are very large, and of a ſquare ſhape; two at the end of each feather. The tail is very ſhort, and almoſt concealed by the coverts, which are duſky, ſpotted with white; the legs are black. This ſpecies inhabits ſeveral parts of the north of Europe, but is not very frequent on our ſhores; nor ever ſeen ſouthward except in very ſevere winters. It is ſeldom met with on land, being for the moſt part on the open ſea, where it is continually diving for fiſh, which it does with great agility, and flies high and well. It is common in Iceland and Greenland, where it breeds, and at that time frequents the freſh waters. It is ſufficiently plentiful in Norway, and all along the arctic coaſts, as far as the river Ob, in the Ruſſian dominions. The natives of Greenland uſe the ſkins for cloathing; and the Indians about Hudſon's bay adorn their heads with circlets of their feathers. At the laſt place it is known by the name of *athinue-moqua*. As they are ſeldom ſeen on the ſea-coaſts, but chiefly among the lakes, they are called by the Indians *inland loons*.

6. The *immer*, or ember-gooſe, is ſuperior in ſize to a common gooſe. The head is duſky; the back, coverts of the wings, and tail, clouded with lighter and darker ſhades of the ſame. The primaries and tail are black; the under ſide of the neck ſpotted with duſky; the breaſt and belly ſilvery: the legs black. They inhabit the ſeas about the Orkney Iſlands; but in ſevere winters viſit the ſouthern parts of Great Britain. They are found alſo in Iceland, and moſt parts of northern Europe; likewiſe in Kamtſchatka; but not in any part of Siberia or Ruſſia. It likewiſe inhabits Switzerland, particularly on the

lake Conſtance, where it is known by the name of *ſluder*. It is ſaid to dive wonderfully well, and to riſe to an amazing diſtance from the place where it plunged. The female makes its neſt among the reeds and flags, and places it in the water; ſo that it is continually wet, as in ſome of the grebe genus. It is difficult to be taken, either on land or ſwimming on the water; but is not unfrequently caught under the water by a hook baited with a ſmall fiſh, its uſual food.

7. The *Chineſe diver*, deſcribed by Mr. Latham; the ſize uncertain, but in the drawing the length was 14 inches. The bill duſky: irides aſh-colour: the upper parts of the head, neck, body, wings, and tail, duſky greeniſh brown; the middle of the feathers much darker: the fore part of the neck the ſame, but conſiderably paler: chin pale rufous: breaſt and under parts of the body pale rufous white, marked with duſky rufous ſpots: the quills and tail are plain brown, the laſt ſhort: legs aſh-colour. Suppoſed to inhabit China, as Mr. Latham ſaw it among other well painted drawings at Sir Joſeph Banks's; it was in the attitude of fiſhing, with a braſs ring round the middle of the neck, in the manner of the figure in plate 78. From the various and uncertain accounts of authors, we are not clear what birds the Chineſe uſe for catching fiſh; the cuſtom, however, of doing it, is manifeſt, from the relations of many travellers. The bird uſed for this purpoſe has a ring faſtened round the middle of the neck, in order to prevent its ſwallowing; beſides this it has a ſlender long ſtring faſtened to it; and, thus accoutred, is taken by its maſter into his fiſhing-boat, from the edge of which it is taught to plunge after the fiſh as they paſs by.

8. The *ſtellatus*, or ſpeckled diver, a ſpecies leſs than the former, weighs two pounds and a half: and is 27 inches in length and three feet nine in breadth. The bill is three inches long, bending a trifle upwards; and is of a pale horn colour, the top of the upper mandible duſky; the head is duſky, dotted with grey; hind part of the neck plain duſky; the ſides under the eye, the chin, and throat, white; fore part of the neck very pale aſh-colour; back duſky, marked with oval ſpots of white; ſides of the breaſt and body the ſame, but ſmaller; the ſpots on the rump and tail minute; breaſt and under parts white; quills duſky; legs brown; webs and claws pale. This bird is pretty frequent in England; ſufficiently ſo on the river Thames, where it is called by the fiſhermen *ſprat loon*, being often ſeen in vaſt numbers among the ſhoals of that fiſh.

9. The *cryſtatus*, creſted diver, or cargooſe, weighs two pounds and an half. Its length is 21 inches, the breadth 30; the bill is two inches and a quarter long, red at the baſe, and black at the point; between the bill and the eyes is a ſtripe of black naked ſkin; the irides are of a fine pale red; the tongue is a third part ſhorter than the bill, ſlender, hard at the end, and a little divided; on the head is a large duſky creſt, ſeparated in the middle. The cheeks and throat are ſurrounded with a long pendent ruff, of a bright tawney colour, edged with black; the chin is white; from the bill to the eye is a black line, and above that a white one; the hind part of the neck and the back are of a ſooty hue; the rump, for it wants a tail, is covered with long ſoft down. The covert-feathers on the ſecond and third joints of the wing, and the under coverts, are white; all the other wing-feathers, except the ſecondaries, are duſky, thoſe being white; the breaſt and belly are of a moſt beautiful ſilvery white, gloſſy as ſatin; the outſide of the legs and the bottom of the feet are duſky; the inſide of the legs and the toes of a pale green. Theſe birds frequent the meres of Shropſhire and Cheſhire, where they breed; and the great fen of Lincolnſhire, where they are called *gaunts*.

10. The *urinator*, or tippet-grebe, thought by Mr. Latham not to be a different ſpecies from the former, being only ſomewhat leſs, and wanting the creſt and ruff. The ſides of the neck are ſtriped downwards from the head with narrow lines of black and white: in other reſpects the colours and marks agree with that bird. This ſpecies has been ſhot on Roſtern Mere in Cheſhire. It is rather ſcarce in England, but is common in the winter time on the lake of Geneva. They appear there in flocks of 10 or 12; and are killed for the ſake of their beautiful ſkins. The under ſide of them being dreſſed with the feathers on, are made into muffs and tippets: each bird ſells for about 14 ſhillings.

11. The *auritus*, eared grebe, or dob-chick, is in length one foot to the rump; the extent is 22 inches; the bill black, ſlender, and ſlightly recurvated; the irides crimſon; the head and neck are black; the throat ſpotted with white; the whole upper ſide of a blackiſh brown, except the ridge of the wing about the firſt joint, and the ſecondary feathers, which are white; the breaſt, belly, and inner coverts of the wings are white; the ſubaxillary feathers, and ſome on the ſide of the rump, ferruginous. Behind the eyes, on each ſide, is a tuft of long, looſe, ruſt-coloured feathers hanging backwards; the legs are of a duſky green. They inhabit the fens near Spalding, where they breed. No external difference is to be obſerved between the male and the female of this ſpecies. They make their neſt not unlike that of the former; and lay four or five ſmall eggs.

12. The horned grebe, is about the ſize of a teal; weight, one pound; length, one foot; breadth, 16 inches. Bill one inch, duſky; head very full of feathers, and of a gloſſy deep green, nearly black: through each eye is a ſtreak of yellow feathers, elongated into a tuft as it paſſes to the hind head: the upper part of the neck and back is a duſky brown; the fore part of the neck and breaſt, dark orange red; the leſſer wing coverts cinerous; the greater and quills, black; middle ones, white; belly, gloſſy white; legs, cinerous blue before, pale behind.—It inhabits Hudſon's bay; and firſt appears in May, about the freſh waters. It lays from two to four white eggs in June, among the aquatic plants; and is ſaid to cover them when abroad. It retires ſouth in autumn; appears then at New York, ſtaying till ſpring, when it returns to the north. For its vaſt quickneſs in diving it is called the *water-witch*. At Hudſon's bay, this bird is moſtly known by the name of *ſeekeep*.

COM, a town of Aſia in the empire of Perſia, and province of Iracagemi. It is a large populous place, but has ſuffered greatly by the civil wars. E. long. 49. 1. N. lat. 34. 0.

COMA, or COMA-VIGIL, a preternatural propenſity to ſleep, when, nevertheleſs, the patient does not ſleep, or if he does, awakes immediately without any relief. See MEDICINE.

COMA *Berenices*, Berenice's hair, in aſtronomy, a modern conſtellation of the northern hemiſphere, compoſed of unformed ſtars between the Lion's tail and Bootes. This conſtellation is ſaid to have been formed by Conon, an aſtronomer, in order to conſole the queen of Ptolemy Evergetes for the loſs of a lock of her hair, which was ſtolen out of the temple of Venus, where ſhe had dedicated it on account of a victory obtained by her huſband. The ſtars of this conſtellation, in Tycho's Catalogue, are 14; in Hevelius's, 21; and in the Britannic Catalogue, 43.

COMA *Somnolentum*, is when the patient continues in a profound ſleep; and, when awakened, immediately relapſes, without being able to keep open his eyes.

COMARUM, MARSH-CINQUEFOIL; a genus of the polygynia order, belonging to the icoſandria claſs of plants; and in the natural method ranking under the 35th order, *Senticoſæ*. The calyx is decemfid; the petals five, leſs than the calyx; the receptacle of the ſeeds ovate, ſpongy, and perſiſting. There is but one ſpecies, a native of Britain. It riſes about two feet high, and bears fruit ſomewhat like that of the ſtrawberry. It

grows naturally in bogs, ſo is not eaſily preſerved in gardens. The root dyes a dirty red. The Iriſh rub their milking-pails with it, and it makes the milk appear thicker and richer. Goats eat this herb; cows and ſheep are not fond of it; horſes and ſwine refuſe it.

COMB, an inſtrument to clean, untangle, and dreſs flax, wool, hair, &c. Combs for *wool* are not allowed to be imported into England.

Comb is alſo the creſt, or red fleſhy tuft, growing upon a cock's head.

COMBAT, in a general ſenſe, denotes an engagement, or a difference decided by arms. See Battle.

Combat, in our ancient law, was a formal trial of ſome doubtful cauſe or quarrel, by the ſwords or baſtons of two champions. This form of proceeding was very frequent, not only in criminal but in civil cauſes; being built on a ſuppoſition that God would never grant the victory but to him who had the beſt right. The laſt trial of this kind in England was between Donald lord Ray appellant, and David Ramſay, Eſq. defendant, when, after many formalities, the matter was referred to the king's pleaſure. See the article Battle.

COMBINATIONS, in mathematics, denote the alterations or variations of any number of quantities, letters, ſounds, or the like, in all poſſible ways.

Father Merſenne gives the combinations of all the notes and ſounds in muſic, as far as 64; the ſum of which amounts to a number expreſſed by 90 places of figures. And the number of poſſible combinations of the 24 letters of the alphabet, taken firſt two by two, then three by three, and ſo on, according to Preſtet's calculation, amounts to

1391724288887252999425128493402200.

Father Truchet, in Mem. de l'Acad. ſhews, that two ſquare pieces, each divided diagonally into two colours, may be arranged and combined 64 different ways, ſo as to form ſo many different kinds of chequer-work: a thing that may be of uſe to maſons, paviours, &c.

Doctrine of Combinations.

I. *Having given any number of things, with the number in each combination; to find the number of combinations.*

1. *When only two are combined together.*

One thing admits of no combination.

Two, *a* and *b*, admit of one only, viz. *ab*.

Three, *a*, *b*, *c*, admit of three, viz. *ab*, *ac*, *bc*.

Four admit of ſix, viz. *ab*, *ac*, *ad*, *bc*, *bd*, *cd*.

Five admit of 10, viz. *ab*, *ac*, *ad*, *ae*, *bc*, *bd*, *be*, *cd*, *ce*, *de*.

Whence it appears that the numbers of combinations, of two and two only, proceed according to the triangular numbers 1, 3, 6, 10, 15, 21 &c., which are produced by the continual addition of the ordinal ſeries 0, 1, 2, 3, 4, 5, &c. And if n be the number of things, then the general formula for expreſſing the ſum of all their combinations by twos, will be $\frac{n.n-1}{1.2}$

Thus, if $n = 2$; this becomes $\frac{2.1}{2} = 1$.

If $n = 3$; it is $\frac{3\cdot 2}{2}$ - - $= 3$.

If $n = 4$; it is $\frac{4\cdot 3}{2}$ - - $= 6$, &c.

2. *When three are combined together; then*

Three things admit of one order, *abc*.

Four admit of 4; viz. *abc*, *abd*, *acd*, *bcd*.

Five admit of 10; viz. *abc*, *abd*, *abe*, *acd*, *ace*, *ade*, *bcd*, *bce*, *bde*, *cde*. And ſo on according to the firſt pyramidal numbers 1, 4, 10, 20, &c. which are formed by the continual addition of the former, or triangular numbers 1, 3, 6, 10, &c. And the general formula for any number n of combinations, taken by threes, is $\frac{n.n-1.n-2}{1.2.3}$

So if $n = 3$; it is $\frac{3\cdot 2\cdot 1}{1\cdot 2\cdot 3} = 1$.

If $n = 4$; it is $\frac{4\cdot 3\cdot 2}{6} = 4$.

If $n = 5$; it is $\frac{5\cdot 4\cdot 3}{2} = 6$, &c.

Proceeding thus, it is found that a general formula for any number n of things, combined by m at each time, is $s = \frac{n\,.\,n-1\,.\,n-2\,.\,n-3.\ \&c.}{1\,.\quad 2\,.\quad 3\,.\quad 4,\ \&c.}$, continued to m factors, or terms, or till the laſt factor in the denominator be m.

So, in 6 things, combined by 4's, the number of combinations is $\frac{6\cdot 5\cdot 4\cdot 3}{1\cdot 2\cdot 3\cdot 4} = 15$.

3. By adding all theſe ſeries together, their ſum will be the whole number of poſſible combinations of n things combined both by twos, by threes, by fours, &c. And as the ſaid ſeries are evidently the coefficients of the power n of a binomial, wanting only the firſt two 1 and n; therefore the ſaid ſum, or whole number of all ſuch combinations, will be $\overline{1+1}^{\,n} - n - 1$, or $2^n - n - 1$. Thus if the number of things be 5; then $2^5 - 5 - 1 = 32 - 6 = 26$.

II. *To find the number of Changes and Alterations which any number of quantities can undergo, when combined in all poſſible varieties of ways, with themſelves and each other, both as to the things themſelves, and the Order and Poſition of them.*

One thing admits but of one order or poſition.

Two things may be varied four ways; thus, *aa*, *ab*, *ba*, *bb*.

Three quantities, taken by twos, may be varied nine ways; thus *aa*, *ab*, *ac*, *ba*, *ca*, *bb*, *bc*, *cb*, *cc*.

In like manner four things, taken by twos, may be varied 4^2 or 16 ways; and five things by twos, 5^2 or 25 ways; and, in general, n things taken by twos, may be changed or varied n^2 different ways.

For the ſame reaſon, when taken by threes, the changes will be n^3; and when taken by fours, they will be n^4; and ſo generally, when taken by n's, the changes will be n^n.

Hence, then, adding all theſe together, the whole number of changes, or combinations in n things, taken both by 2's, by 3's, by 4's, &c., to n's, will be the ſum of the geometrical ſeries $n + n^2 + n^3 + n^4 - - - - n^n$, which ſum is $= \frac{n^n - 1}{n - 1} \times n$.

For example, if the number of things n be 4; this gives $\frac{4^4 - 1}{4 - 1} \times 4 = \frac{255}{3} \times 4 = 340$.

And if n be 24, the number of letters in the alphabet; the theorem gives $\frac{24^{24} - 1}{24 - 1} \times 24 = \overline{24^{24} - 1} \times \frac{24}{23} =$ 1391724288887252999425128493402200. In ſo many different ways, therefore, may the 24 letters of the alphabet be varied or combined among themſelves, or ſo many different words may be made out of them.

Combination, in chemiſtry, ſignifies the union of two bodies of different natures, from which a new compound body reſults. For example, when an acid is united with an alkali, we ſay that a combination betwixt theſe two ſaline ſubſtances takes place; becauſe from this union a neutral ſalt reſults, which is compoſed of an acid and an alkali.

COMBUST, in aſtronomy. When a planet is in con-

junction with the sun, or not distant from it above half its disk; it is said to be combust, or in combustion. According to Argol, a planet is *combust*, or in combustion, when not above eight degrees and thirty minutes distant from the sun, either before or after him.

COMBUSTIO PECUNIÆ, the ancient way of trying mixed and corrupt money, by melting it down, upon payments into the Exchequer. In the time of king Henry II. a constitution was made, called the trial by *combustion*; the practice of which differed little or nothing from the present method of assaying silver. But whether this examination of money by combustion was to reduce an equation of money only of sterling, *viz.* a due proportion of alloy with copper, or to reduce it to pure fine silver, does not appear. On making the constitution of trial it was considered, that though the money did answer *numero et pondere*, it might be deficient in value; because mixed with copper or brass, &c.

COMBUSTION, a term denoting the operation of fire upon any inflammable substance, by which it smokes, flames, and is reduced to ashes. See FIRE.

COMEDY, a sort of dramatic poetry, which gives a view of common and private life, recommends virtue, and corrects the vices and follies of mankind by means of ridicule. (See the article POETRY). This last kind alone was received among the Romans, who nevertheless made a new subdivision of it into ancient, middle, and new, according to the various periods of the commonwealth. Among the ancient comedies were reckoned those of Livius Andronicus; among the middle those of Pacuvius; and among the new ones, those of Terence. They likewise distinguished comedy according to the quality of the persons represented, and the dress they wore, into togatæ, prætextatæ, trabeatæ, and tabernariæ, which last agrees pretty nearly with our farces. Among us, comedy is distinguished from farce, as the former represents nature as she is; the other distorts and overcharges her. They both paint from the life, but with different views: the one to make nature known, the other to make her ridiculous.

COMET, an opaque, spherical, and solid body like a planet, performing revolutions about the sun in elliptical orbits, which have the sun in one of their foci.

There is a popular division of comets into *tailed*, *bearded*, and *hairy* comets: though this division rather relates to the different circumstances of the same comet, than to the phenomena of several. Thus when the light is westward of the sun, and sets after it, the comet is said to be *tailed*, because the train follows it in the manner of a tail: when the comet is eastward of the sun, and moves from it, the comet is said to be *bearded*, because the light marches before it in the manner of a beard. Lastly, when the comet and the sun are diametrically opposite (the earth between them), the train is hid behind the body of the comet, except a little that appears round it in form of a border of *hair*: and from this last appearance the word comet is derived; as κομητης, *cometa*, comes from κομη, *coma*, hair. But there have been comets whose disk was as clear, as round, and as well defined, as that of Jupiter, without either tail, beard, or coma. See ASTRONOMY.

COMETARIUM, a curious machine, exhibiting an idea of the revolution of a comet about the sun. See ASTRONOMY.

COMETEAN, a town of Bohemia in the circle of Saltz, with a handsome town-house. It was taken by storm in 1421, and all the inhabitants, men, women, and children, put to the sword. It is seated in a fertile plain, in E. long. 13. 25. N. lat. 50. 30.

COMETES, in botany; a genus of the monogynia order, belonging to the tetrandria class of plants. The involucrum is tetraphyllous and triflorous; the calyx tetraphyllous; the capsule tricoccous.

COMFREY. See SYMPHYTUM.

COMINES (Philip de); an excellent historian, born of a noble family in Flanders in 1446. He lived in a kind of intimacy with Charles the Bold, duke of Burgundy, for about eight years; but being seduced to the court of France by Louis XI. he was highly promoted by him, and executed several successful negociations. After this king's death he experienced many troubles on account of being a foreigner, by the envy of other courtiers, and lay long in prison before he was discharged: he died in 1509. Comines was a man of more natural abilities than learning; he spoke several living, but knew nothing of the dead languages: he has left behind him some memoirs of his own times, that are admired by all true judges of history. Catharine de Medicis used to say, that Comines made as many heretics in politics as Luther had in religion.

COMINES, a town of France in the department of the North and late French Flanders, seated on the river Lis, five miles S. W. of Menin. E. long. 3. 4. N. lat. 50. 45.

COMITATUS, in law, a county. Ingulphus tells us, that England was first divided into counties by King Alfred; and the counties into hundreds, and these again into tythings: and Fortescue writes, that *regnum Angliæ per comitatus, ut regnum Franciæ per ballivatus distinguitur.* Sometimes it is taken for a territory or jurisdiction of a particular place; as in Mat. Paris, anno 1234. See COUNTY.

COMITIA, an assembly of the Roman people, either in the Comitium, or Campus Martius, i. e. FIELD *of Mars*; meeting for the election of magistrates, or for consulting on the important affairs of the republic. The word comes from the verb *coco*, or *comeo, to go together*. There were certain days fixed for these assemblies, called *dies comitiales*; marked with a C in the calendar of Julius Cæsar. *Comitial* assemblies, held for the election of consuls, were called *consular comitia*: in like manner, the other *comitia* were named from the officer to be created; whether a tribune, a pontiff, ædile, or the like. There were three kinds of these *comitia*, viz. *curiata*, *centuriata*, and *tributa*; so distinguished from the manner wherein the people voted, and gave their suffrages, viz. by curiæ or parishes, tribes, or centuries. The power of calling these assemblies pertained to most of the chief magistrates, and sometimes to the sovereign pontiff. Authors make the difference between *comitia* and *concilia*, to consist in this; that in the former the whole people were called together, in the latter only a part.

COMITIA *curiata*. Romulus instituted the *comitia curiata*, or the public assemblies of the people, called to vote in their several curiæ; and it is agreed by all, that the matters subjected to their decision, were the choice of all the magistrates, and the right of making laws, war, and peace: an ample jurisdiction, and the most important articles of government, yet not wholly absolute, according to Dionysius, unless the senate concurred with them. This method of transacting all the greater affairs by the people, assembled in their curiæ, after it had subsisted through five successive reigns, was found to be inconvenient; and, therefore, Servius Tullius, the sixth king of Rome, instituted a new division of the people into six classes, according to a census, or valuation of their estates: whence proceed the *comitia centuriata*: then he subdivided these classes into one hundred and ninety-three centuries, and contrived to throw a majority of these centuries, that is ninety-eight of them, into the first class of the richest citizens. By which regulation, though every man voted now in his century, as before in his curia; yet, as all matters were decided by a majority of the centuries, so the balance of power was wholly transferred into the hands of the rich; and the poorer sort deprived of their former weight and influence in the affairs of state: which wise institution was ever after observed, through all succeeding ages, in the elections of the principal magistrates, and

the determination of all the principal tranſactions of the republic.

COMITIALIS Morbus, an appellation given to the Epilepsy, by reaſon the comitia of ancient Rome were diſſolved if any perſon in the aſſembly happened to be taken with this diſeaſe.

COMITIUM, in Roman antiquity, a large hall in the forum, where the Comitia were ordinarily held.

COMMA, among grammarians, a point or character marked thus (,), ſerving to denote a ſhort ſtop, and to divide the members of a period. Different authors define and uſe it differently. According to F. Buffier, the comma ſerves to diſtinguiſh the members of a period, in each of which is a verb and the nominative caſe of the verb: thus, "That ſo many people are pleaſed with trifles, is owing to a weakneſs of mind, which makes them love things eaſy to be comprehended." Beſides this, the comma is uſed to diſtinguiſh, in the ſame member of a period, ſeveral nouns-ſubſtantive, or nouns-adjective, or verbs not united by a conjunction: thus, "Virtue, wit, knowledge, are the chief advantages of a man:" or, "A man never becomes learned without ſtudying conſtantly, methodically, with a guſt, application," &c. If thoſe words are united in the ſame phraſe with a conjunction, the comma is omitted: thus, "the imagination and the judgment do not always agree." See Punctuation.

Comma, in muſic. See Interval.

COMMANDRY, a kind of benefice or fixed revenue belonging to a military order, and conferred on ancient knights who had done conſiderable ſervices to the order. There are ſtrict or regular commandries, obtained in order, and by merit; there are others of grace and favour, conferred at the pleaſure of the grand maſter; there are alſo commandries for the religious, in the orders of St. Bernard and St. Anthony. The kings of France converted ſeveral of the hoſpitals for lepers into commandries of the order of St. Lazarus. The commandries of Malta are of different kinds; for as the order conſiſts of knights, chaplains, and brothers-ſervitors, there are peculiar commandries or revenues attached to each. The knight to whom one of theſe benefices or commandries is given is called *commander*: which agrees pretty nearly with the præpoſitus ſet over the monks in places at a diſtance from the monaſtery, whoſe adminiſtration was called *obedientia*; becauſe depending entirely upon the abbot who gave him his commiſſion. Thus it is with the ſimple commanders of Malta, who are rather farmers of the order than beneficiaries; paying a certain tribute or rent, called *reſponſio*, to the common treaſure of the order.

COMMELINA, in botany; a genus of the monogynia order, belonging to the triandria claſs of plants; and in the natural method ranking under the 6th order, *Enſatæ*. The corolla is hexapetalous; there are three nectaria, of a cruciform figure, and inſerted into their proper filaments. There are ten ſpecies, all of them natives of warm climates. They are herbaceous plants, riſing from two to four feet high, and adorned with blue or yellow flowers. Their culture differs in nothing from that of the common exotics.

COMMEMORATION, in a general ſenſe, the remembrance of any perſon or thing, or the doing any thing to the honour of a perſon's memory, or in remembrance of any paſt event. Thus, the euchariſt is a commemoration of the ſufferings of Jeſus Chriſt.

COMMENDAM, in the eccleſiaſtical law, the truſt or adminiſtration of the revenues of a benefice, given either to a layman, to hold by way of depoſitum for ſix months, in order to repairs, &c. or to an eccleſiaſtic or beneficed perſon, to perform the paſtoral duties thereof, till the benefice can be provided with a regular incumbent. Formerly the adminiſtration of vacant biſhoprics belonged to the neareſt neighbouring biſhop; which cuſtom appears to be very ancient. S. Athanaſius ſays of himſelf, according to Nicephorus, that there had been given him *in commendam*, *i. e.* in adminiſtration, another church beſides that of Alexandria whereof he was ſtated biſhop. When a parſon is made biſhop, his parſonage becomes vacant; but if the king give him power, he may ſtill hold it *in commendam*.

COMMENDATUS, one who lives under the protection of a great man. *Commendati homines*, were perſons who, by voluntary homage, put themſelves under the protection of any ſuperior lord: for ancient homage was either *predial*, due for ſome tenure; or *perſonal*, which was by compulſion, as a ſign of neceſſary ſubjection; or *voluntary*, with a deſire of protection: and thoſe who, by voluntary homage, put themſelves under the protection of any man of power, were ſometimes called *homines ejus commendati*, as often occurs in Doomſday. *Commendati dimidii* were thoſe who depended on two ſeveral lords, and paid one half of their homage to each; and *ſub-commendati* were like under-tenants under the command of perſons that were themſelves under the command of ſome ſuperior lord: alſo there were *dimidii ſub-commendati*, who bore a double relation to ſuch depending lords. This phraſe ſeems to be ſtill in uſe in the uſual compliment, "Commend me to ſuch a friend," &c. which is to let him know, "I am his humble ſervant."

COMMENSURABLE, among geometricians, an appellation given to ſuch quantities as are meaſured by one and the ſame common meaſure.

Commensurable *Numbers*, whether integers or fractions, are ſuch as can be meaſured or divided by ſome other number without any remainder: ſuch are 12 and 18, as being meaſured by 6 and 3.

Commensurable *in Power*, is ſaid of right lines, when their ſquares are meaſured by one and the ſame ſpace or ſuperficies.

Commensurable *Surds*, thoſe that being reduced to their leaſt terms, become true figurative quantities of their kind; and are therefore as a rational quantity to a rational one.

COMMENTARY, or Comment, in matters of literature, an illuſtration of the difficult or obſcure paſſages of an author.

Commentary, or *Commentaries*, likewiſe denotes a kind of hiſtory, or memoirs of certain tranſactions, wherein the author had a conſiderable hand: ſuch are the Commentaries of Cæſar.

COMMERCE; an operation by which the wealth, or work, either of individuals or of ſocieties, may be exchanged by a ſet of men called *merchants*, for an equivalent, proper for ſupplying every want, without any interruption to induſtry, or any check upon conſumption. There is no doubt but commerce is nearly as ancient as the world itſelf; neceſſity ſet it on foot; the deſire of convenience improved it; and vanity, luxury, and avarice, have brought it to its preſent pitch. At firſt it could only conſiſt in the *exchange* of things neceſſary for life: the ploughman gave his corn and his pulſe to the ſhepherd, and received milk and wool in exchange. Indeed, this method of commerce by exchange ſubſiſts ſtill in many places: as about the coaſts of Siberia, and the Daniſh and Muſcovite Lapland; among ſeveral nations on the coaſts of Africa; among ſome of thoſe of America, and many of Aſia.

It is not preciſely known when commerce by *buying and ſelling* firſt began; nor when the ſeveral coins of gold, ſilver, and copper, had their origin. The firſt money conſiſted of wood, leather or iron; and even at this day, it is the cuſtom in ſome parts of both Indies, to give a certain value in ſea-ſhells and cocoa-nuts, for merchandiſe, drugs, &c. The firſt inſtance of this kind of commerce in the ſacred writings, is in the time

of the patriarch Abraham. As for prophane authors, they usually fix its epocha to the reign of Saturn and Janus in Italy; and the ancient authors, according to Cæsar, attribute its invention to the god Mercury. The Egyptians, Phœnicians, and Carthaginians, who were a Tyrian colony, were the first, the most daring and expert traders of all antiquity: at least, it is evident they were the first who ran the hazard of long voyages; and who set on foot a *traffic by sea* between coasts very remote.

Among the ancients, commerce did not appear unworthy the attention of persons of the first rank. Solomon, we are told, frequently joined his merchant-fleets with those of the king of Tyre, for their voyage to Ophir; and by this means rendered himself, though in a little kingdom, the richest king of his time. Under the Asiatic and Grecian empires, ancient history gives us from time to time the traces of a commerce cultivated by several nations: but it flourished more considerably under the dominion of the Romans; as appears from that vast number of colleges and companies of merchants in the several cities mentioned by historians and in ancient inscriptions.

The destruction of the Roman empire by the irruptions of the barbarians, brought that of commerce along with it: or at least suspended its ordinary operations for some time: but by degrees it began to recover itself, and made a new progress; especially in Italy. Hence, the Pisans, Florentines, Genoese, and Venetians, who abounding in shipping, took occasion to spread themselves through all the ports of the Levant and Egypt; bringing from thence, silk, spices, and other useful articles; and furnishing the greatest part of Europe therewith. Thus was the modern commerce founded on the ruins of that of the ancient Greeks and Romans to the same places: and thus did those famous republics acquire their lustre and power; which were considerably increased by the commercial effects of the crusades. These republics furnished the crusaders with transports, military stores and provisions, and obtained charters very favourable to the establishment and extension of their commerce. When Constantinople was taken under the banner of the holy cross, many valuable branches of trade, which formerly centered in that city, were transferred to Venice, Genoa, or Pisa. Robertson's Hist. vol. i. chap. v. p. 34. &c. 8vo. The Germans, however, had a long time carried on a separate commerce; which was not borrowed from the Romans, nor did it fall with theirs. Towards the end of the twelfth century, the German cities situate on the coast of the Baltic, and the rivers that run into it, got into a considerable traffic with the neighbouring states. As their commerce was much interrupted by pirates, seventy-two of them united together for their mutual defence; and were thence called *Hanseatic*, or *Hans towns*. See Hans *Towns*. Thus they flourished till the end of the 15th, or the beginning of the 16th century; when a division arising among them, and about the same time a new passage to the Indies, by the Cape of Good Hope, being discovered by the Portuguese, and settlements made on the coast of Africa, Arabia, and the Indies, the ancient Italian and Hanseatic commerce sunk; and the chief trade came into the hands of the Portuguese.

The Portuguese had not possessed those different trades above a hundred years, when, about the beginning of the 17th century, the Dutch began to share it with them: and in a little time dispossessed them of almost the whole. The English, French, Danes, and Hamburghers, excited by their success, have likewise made settlements in the Indies, and on the coasts of Africa; though much less considerable ones, those of the English excepted.

Lastly, America, discovered by Columbus in 1492, in favour of the Spaniards, soon after the Portuguese had discovered the new way to the Indies, likewise became the object of a new, vast, and most important commerce for all the nations of Europe; whereof Cadiz and Seville were made the centre. It is true, the first conquerors of this new world still possess the richest and greatest part of it; and preserve the commerce thereof to themselves with great jealousy: yet, besides that the English, French, Portuguese, and Dutch, have several rich and flourishing colonies, both in the islands and the continent; it is certain, that it is as much for other nations as themselves that the Spaniards every year send their flotas for the treasures of Peru and Mexico.

The trade of Europe was no sufferer by this new one of America; the north and south have still the same mutual occasion for each other as before. The navigation from the Baltic to the Mediterranean was tedious and difficult: the situation of Flanders, and the manufactures which there flourished from the tenth century, together with the free fairs of that country, engaged the merchants, both of the north and south, to establish their magazines first in Bruges, and then in Antwerp. The establishment of the republic of Holland, the favourable reception it gave to strangers, and the refuge it afforded to religionists, drew store of manufacturers to it, and caused the establishing of various manufactures, which soon reduced the commerce of Antwerp. The same reasons, together with the convenience and multitude of the ports of England, the goodness of our wools, and the industry of our workmen, have brought hither a considerable part of the commerce of Europe. A great part of the foreign commerce of England is now carried on by collective companies: some incorporated by charter, with exclusive privileges, as the East India company; others only private associations, as the Turkey and Hamburgh companies.

COMMERCY, a handsome town of France, in the department of Meuse and late duchy of Bar, with a magnificent castle, built by cardinal de Retz. It is seated on the Meuse, 160 miles E. of Paris. E. long. 5. 44. N. lat. 48. 40.

COMMERSONIA, in botany; a genus of the pentagynia order, belonging to the pentandria class of plants. The calyx is a monophyllous, five-parted, corolliferous perianthium, with sharp ovated segments; the corolla has five linear petals; the stamina are five very short filaments at the bases of the petals; the pericarpium a globular, hard, quinquelocular nut, with two ovated seeds in each division.

COMMINATION, an office in the liturgy of the church of England, appointed to be read on Ash-Wednesday, or the first day of Lent.

COMMINATORY, an appellation given to whatever threatens punishment, or some penalty. Thus, in France, before the establishment of the republic, when an exile was enjoined not to return under pain of death, it was deemed a *comminatory* penalty; since, if he did return, it was not strictly executed; but a second injunction was laid on him, which was more than comminatory, and, from the day of the date of which, he became liable to the punishment of death.

COMMIRE (John), a celebrated Latin poet, born at Amboise in 1625, entered into the society of the Jesuits, and taught polite literature and divinity. He died at Paris in 1702. We have a volume of his Latin poems, and a collection of his posthumous works. His odes and fables are more particularly admired.

COMMISSARY, in the ecclesiastical law, an officer of the bishop, who exercises spiritual jurisdiction in places of a diocese so far from the episcopal see, that the chancellor cannot call the people to the bishop's principal consistory court, without giving them too much inconvenience.

Commissary, in a military sense, is used differently. Thus, Commissary-*General of the Musters*, an officer appointed to muster the army, as often as the general thinks proper, in order to know the strength of each regiment and company, to receive

and inspect the muster-rolls, and to keep an exact state of the strength of the army.

Commissary *of Horses*, an officer in the artillery, appointed to have the inspection of the artillery-horses, to see them mustered, and to send such orders as he receives from the commanding officer of the artillery, by some of the conductors of horses, of which he has a certain number for his assistants.

Commissary *of Provisions*, an officer who has the charge of furnishing the army with provisions.

Commissary *of Stores*, an officer in the artillery, who has the charge of all the stores, for which he is accountable to the office of ordnance.

COMMISSION, in common law, the warrant or letters patent, which all persons exercising jurisdiction have to empower them to hear or determine any cause or suit, as the commission of the judges, &c.

Commission *of Bankruptcy*, is the commission that issues from the lord chancellor, on a person's becoming a bankrupt within any of the statutes, directed to certain commissioners appointed to examine into it, and to secure the bankrupt's lands and effects for the satisfaction of his creditors. See the article Bankrupt. The proceedings on a commission of bankrupt may be divided, 1. Into those which affect the bankrupt himself. 2. Into those which affect his property.

1. As to those of the former kind, there must in the first place be a petition to the lord chancellor by one creditor to the amount of 100l. or by two to the amount of 150l. or by three or more to the amount of 200l.; upon which he grants a commission to such discreet persons as to him shall seem good, who are then styled commissioners of bankrupt. The petitioners, to prevent malicious applications, must be bound in a security of 200l. to make the party amends, in case they do not prove him a bankrupt. And if, on the other hand, they receive any money or effects from the bankrupt, as a recompense for suing out the commission, so as to receive more than their rateable dividends of the bankrupt's estate, they forfeit not only what they shall have so received, but their whole debt. When the commission is awarded and issued, the commissioners are to meet at their own expence, and to take an oath for the due execution of their commission, and to be allowed a sum not exceeding 20s. *per diem* each, at every sitting. And no commission of bankruptcy shall abate or be void on any demise of the crown.

When the commissioners have received their commission, they are first to receive proof of the person's being a trader, and having committed some act of bankruptcy; and then to declare him bankrupt, if proved so; and to give notice thereof in the gazette, and at the same time to appoint three meetings. At one of these meetings an election must be made of assignees, or persons to whom the bankrupt's estate shall be assigned, and in whom it shall be vested for the benefit of the creditors; which assignees are chosen by the major part, in value, of the creditors who shall then have proved their debts; but may be originally appointed by the commissioners, and afterwards approved or rejected by the creditors: but no creditor shall be admitted to vote in the choice of assignees, whose debt, on the balance of accounts, does not amount to 10l. And at the third meeting at farthest, which must be on the 42d day after the advertisement in the gazette, the bankrupt, upon notice also personally served upon him, or left at his usual place of abode, must surrender himself personally to the commissioners, and must thenceforth in all respects conform to the directions of the statutes of bankruptcy; or, in default thereof, shall be guilty of felony without benefit of clergy, and shall suffer death, and his goods and estate shall be divided among his creditors.

In case the bankrupt absconds, or is likely to run away between the time of the commission issued and the last day of surrender, he may, by warrant from any judge or justice of the peace, be apprehended and committed to the county gaol, in order to be forthcoming to the commissioners, who are also empowered immediately to grant a warrant for seizing his goods and papers.

When the bankrupt appears, the commissioners are to examine him touching all matters relating to his trade and effects. They may also summon before them, and examine, the bankrupt's wife, and any other person whatsoever, as to all matters relating to the bankrupt's affairs: and in case any of them shall refuse to answer, or shall not answer fully, to any lawful question, or shall refuse to subscribe such their examination, the commissioners may commit them to prison without bail, till they make and sign a full answer; the commissioners specifying in their warrant of commitment the question so refused to be answered. And any gaoler, permitting such person to escape or go out of prison, shall forfeit 500l. to the creditors.

The bankrupt, upon this examination, is bound, upon pain of death, to make a full discovery of all his estate and effects as well in expectancy as possession, and how he has disposed of the same; together with all books and writings relating thereto: and is to deliver up all in his power to the commissioners (except the necessary apparel of himself, his wife, and his children); or, in case he conceals or embezzles any effects to the amount of 20l. or withholds any book or writings, with intent to defraud his creditors, he shall be guilty of felony without benefit of clergy.

After the time allowed the bankrupt for such discovery is expired, any other person voluntarily discovering any part of his estate before unknown to the assignees, shall be entitled to five *per cent.* out of the effects so discovered, and such farther reward as the assignees and commissioners shall think proper. And any trustee wilfully concealing the estate of any bankrupt, after the expiration of 42 days, shall forfeit 100l. and double the value of the estate concealed, to the creditors.

Hitherto every thing is in favour of the creditors; and the law seems to be pretty rigid and severe against the bankrupt; but, in case he proves honest, it makes him full amends for all this rigour and severity. For, if the bankrupt hath made an ingenuous discovery, hath conformed to the directions of the law, and hath acted in all points to the satisfaction of his creditors; and if they, or four parts in five of them in number and value (but none of them creditors for less than 20l.), will sign a certificate to that purport; the commissioners are then to authenticate such certificate under their hands and seals, and to transmit it to the lord chancellor: and he, or two judges whom he shall appoint, on oath made by the bankrupt that such certificate was obtained without fraud, may allow the same; or disallow it, upon cause shown by any one of the creditors of the bankrupt.

If no cause be shown to the contrary, the certificate is allowed of course; and then the bankrupt is intitled to a decent and reasonable allowance out of his effects, for his future support and maintenance, and to put him in a way of honest industry. This allowance is also in proportion to his former good behaviour, in the early discovery of the decline of his affairs, and thereby giving his creditors a large dividend. For if his effects will not pay one half of his debts, or 10s. in the pound, he is left to the discretion of the commissioners and assignees, to have a competent sum allowed him, not exceeding 3 *per cent.*; but if they pay 10s. in the pound, he is to be allowed 5 *per cent.*; if 12s. 6d. then $7\frac{1}{2}$ *per cent.*; and if 15s. in the pound, then the bankrupt shall be allowed 10 *per cent.*; provided that such allowance do not in the first case exceed 200l. in the second 250l. and in the third 300l.

Besides this allowance, he has also an indemnity granted him, of being free and discharged for ever from all debts owing by

him at the time he became a bankrupt; even though judgment ſhall have been obtained againſt him, and he lies in priſon upon execution for ſuch debts; and, for that among other purpoſes, all proceedings on commiſſion of bankrupt are, on petition, to be entered on record, as a perpetual bar againſt actions to be commenced upon this account: though, in general, the production of the certificate properly allowed ſhall be ſufficient evidence of all previous proceedings. Thus the bankrupt becomes a clear man again; and, by the aſſiſtance of his allowance and his own induſtry, may become a uſeful member of the commonwealth: which is the rather to be expected, as he cannot be entitled to theſe benefits, but by the teſtimony of his creditors themſelves of his honeſt and ingenuous diſpoſition; and unleſs his failures have been owing to misfortunes, rather than to miſconduct and extravagance.

2. As to the proceedings which affect the bankrupt's property—By virtue of the ſtatutes before mentioned, all the perſonal eſtate and effects of the bankrupt are conſidered as veſted, by the act of bankruptcy, in the future aſſignees of his commiſſioners, whether they be goods in actual poſſeſſion, or debts, contracts, and other choſes in action; and the commiſſioners by their warrant may cauſe any houſe or tenement of the bankrupt to be broke open, in order to enter upon and ſeize the ſame. And when the aſſignees are choſen or approved by the creditors, the commiſſioners are to aſſign every thing over to them; and the property of every part of the eſtate is thereby as fully veſted in them as it was in the bankrupt himſelf, and they have the ſame remedies to recover it.

The property veſted in the aſſignees is the whole that the bankrupt had in himſelf, at the time he committed the firſt act of bankruptcy, or that has been inveſted in him ſince, before his debts are ſatisfied or agreed for. Therefore it is uſually ſaid, that once a bankrupt, and always a bankrupt: by which is meant, that a plain direct act of bankruptcy once committed, cannot be purged, or explained away, by any ſubſequent conduct, as a dubious equivocal act may be; but that, if a commiſſion is afterwards awarded, the commiſſion and the property of the aſſignees ſhall have a relation, or reference, back to the firſt and original act of bankruptcy; inſomuch that all tranſactions of the bankrupt are from that time abſolutely null and void, either with regard to the alienation of his property, or the receipt of his debts from ſuch as are privy to his bankruptcy; for they are no longer his property, or his debts, but thoſe of the future aſſignees. And if an execution be ſued out, but not ſerved on the bankrupt's effects till after the act of bankruptcy, it is void, as againſt the aſſignees. But the king is not bound by this fictitious relation, nor is within the ſtatutes of bankrupts; for if, after the act of bankruptcy committed, and before the aſſignment of his effects, an extent iſſues for the debt of the crown, the goods are bound thereby. In France this doctrine of relation is carried to a very great length; for there, every act of a merchant, for 10 days precedent to the act of bankruptcy, is preſumed to be fraudulent, and is therefore void. But with us the law ſtands upon a more reaſonable footing: for as theſe acts of bankruptcy may ſometimes be ſecret to all but a few, and it would be prejudicial to trade to carry this notion to its utmoſt length, it is provided by ſtat. 19 Geo. II. c. 32. that no money paid by a bankrupt to a *bona fide*, or real creditor, in a courſe of trade, even after an act of bankruptcy done, ſhall be liable to be refunded. Nor by ſtat. 1. Jac. I. c. 15. ſhall any debtor of a bankrupt that pays him his debt without knowing of his bankruptcy, be liable to account for it again. The intention of this relative power being only to reach fraudulent tranſactions, and not to diſtreſs the fair trader.

The aſſignees may purſue any legal method of recovering this property ſo veſted in them by their own authority; but cannot commence a ſuit in equity, nor compound any debts owing to the bankrupt, nor refer any matters to arbitration, without the conſent of the creditors, or the major part of them in value, at a meeting to be held in purſuance of notice in the gazette. When they have got in all the effects they can reaſonably hope for, and reduced them to ready money, the aſſignees muſt, within 12 months after the commiſſion iſſued, give 21 days notice to the creditors of a meeting for a dividend or diſtribution; at which time they muſt produce their accounts, and verify them upon oath, if required. And then the commiſſioners ſhall direct a dividend to be made, at ſo much in the pound, to all creditors who have before proved, or ſhall then prove, their debts. This dividend muſt be made equally, and in a rateable proportion, to all the creditors, according to the quantity of their debts; no regard being had to the quality of them. Mortgages, indeed, for which the creditor has a real ſecurity in his own hands, are entirely ſafe; for the commiſſion of bankrupt reaches only the equity of redemption. So are all perſonal debts, where the creditor has a chattel in his hands, or a pledge or pawn, for the payment, or has taken the debtor's lands or goods in execution. And, upon the equity of the ſtat. 8 An. c. 14. (which directs, that upon all executions of goods being on any premiſſes demiſed to a tenant, one year's rent and no more ſhall, if due, be paid to the landlord) it hath alſo been held, that under a commiſſion of bankrupt, which is in the nature of a ſtatute execution, the landlord ſhall be allowed his arrears of rent to the ſame amount, in preference to other creditors, even though he hath neglected to diſtrein while the goods remained on the premiſſes: which he is otherwiſe intitled to do for his entire rent, be the quantum what it may. But otherwiſe judgments and recognizances (both which are debts of record, and therefore at other times have a priority), and alſo bonds and obligations by deed or ſpecial inſtrument (which are called debts by ſpecialty, and are uſually the next in order); theſe are all put on a level with debts by mere ſimple contract, and all paid *pari paſſu*. Nay, ſo far is this matter carried, that, by the expreſs proviſion of the ſtatutes, debts not due at the time of the dividend made, as bonds or notes of hand, payable at a future day, ſhall be paid equally with the reſt, allowing a diſcount or drawback in proportion. And inſurances, and obligations upon bottomry or reſpondentia, *bona fide*, made by the bankrupt, though forfeited after the commiſſion is awarded, ſhall be looked upon in the ſame light as debts contracted before any act of bankruptcy.

Within 18 months after the commiſſion iſſued a ſecond and final dividend ſhall be made, unleſs all the effects were exhauſted by the firſt. And if any ſurplus remains, after paying every creditor his full debt, it ſhall be reſtored to the bankrupt. This is a caſe which ſometimes happens to men in trade, who involuntarily, or at leaſt unwarily, commit acts of bankruptcy, by abſconding and the like, while their effects are more than ſufficient to pay their creditors. And if any ſuſpicious or malevolent creditor will take the advantage of ſuch acts, and ſue out a commiſſion, the bankrupt has no remedy, but muſt quietly ſubmit to the effects of his own imprudence: except that, upon ſatisfaction made to all the creditors, the commiſſion may be ſuperſeded. This caſe may alſo happen when a knave is deſirous of defrauding his creditors, and is compelled, by a commiſſion, to do them that juſtice which otherwiſe he wanted to evade. And therefore, though the uſual rule is, that all intereſt on debts carrying intereſt ſhall ceaſe from the time of iſſuing the commiſſion, yet in caſe of a ſurplus left after payment of every debt, ſuch intereſt ſhall again revive, and be chargeable on the bankrupt or his repreſentatives.

Commission *of Lunacy*, iſſues out of the court of chancery, whether a perſon repreſented to be a lunatic, be ſo or not. See Lunacy.

COMMISSION-*officers*. See OFFICERS.

COMMISSION, in commerce. See FACTORAGE.

COMMISSIONER, a perſon authoriſed by commiſſion, letters patent, or other lawful warrant, to examine any matters, or execute any lawful commiſſion.

COMMISSIONERS *of the Cuſtoms, of Exciſe, of the Navy*, &c. See CUSTOMS, EXCISE, &c.

Lords COMMISSIONERS *of the Treaſury*. See TREASURY and EXCHEQUER.

COMMISSURE, a term uſed by ſome authors, for the ſmall metuſes or interſtices of bodies; or the little clefts between the particles; eſpecially when thoſe particles are broadiſh and flat, and lie contiguous to one another, like thin plates or lamellæ. The word literally ſignifies *a joining*, or connecting of one thing to another. Among anatomiſts, commiſſure is ſometimes alſo uſed for a ſuture of the cranium or ſkull. See SUTURE.

COMMISSURE, in architecture, &c. denotes the joint of two ſtones, or the application of the ſurface of the one to that of the other. See MASONRY.

COMMITMENT, in the criminal law, is the ſending to priſon a perſon who hath been guilty of any crime. This takes place where the offence is not bailable, or the party cannot find BAIL; muſt be by proper warrant, containing the cauſe of the commitment; and continues till put an end to by the courſe of law (ſee TRIAL); impriſonment being intended only for ſafe cuſtody, and not for puniſhment. See ARRESTMENT and BAIL.

COMMITTEE, one or more perſons to whom the conſideration or ordering of a matter is referred, either by ſome court, or public ſociety, or by the conſent of parties to whom it belongs. Thus, a COMMITTEE *of Parliament*, is a certain number of members appointed by the houſe for the examination of a bill, making a report of an inquiry, proceſs of the houſe, &c. See PARLIAMENT. Sometimes the whole houſe is reſolved into a committee; on which occaſion each perſon has a right to ſpeak and reply as much and as often as he pleaſes: an expedient uſually had recourſe to in extraordinary caſes, and where any thing is to be thoroughly canvaſſed. When the houſe is not in a committee, each gives his opinion regularly, and is only allowed to ſpeak once, unleſs to explain himſelf. The *ſtanding* committees, appointed by every new parliament, are thoſe of privileges and elections, of religion, of grievances, of courts of juſtice, and of trade; though only the former act.

COMMODATE, COMMODATUM, in the civil juriſprudence, the loan or free conceſſion of any thing moveable or immoveable, for a certain time, on condition of reſtoring again the ſame individual after a certain term. The commodate is a kind of loan; there is this difference, however, between a loan and a commodate, that the latter is gratis, and does not transfer the property: the thing muſt be returned in eſſence, and without impairment; ſo that things which conſume by uſe or time cannot be objects of a commodate, but of a loan; in regard they may be returned in kind, though not in identity.

COMMODITY, in a general ſenſe, denotes all ſorts of wares and merchandizes whatſoever that a perſon deals or trades in.

Staple COMMODITIES, ſuch wares and merchandizes as are commonly and readily ſold in a market or exported abroad; being for the moſt part the proper produce or manufacture of the country.

COMMODORE, a general officer in the Britiſh marine, inveſted with the command of a detachment of ſhips of war deſtined on a particular enterpriſe, during which time he bears the rank of brigadier-general in the army, and is diſtinguiſhed from the inferior ſhips of his ſquadron by a broad red pendant tapering towards the outer end, and ſometimes forked. The word is corrupted from the Spaniſh, *commendador*. The title of COMMODORE is alſo given to ſome ſelect ſhip in a fleet of merchantmen, who leads the van in time of war, and carries a light in his top to conduct the reſt, and keep them together. He is always the oldeſt captain in the fleet he commands.

COMMODUS (L. Aurelius Antoninus), ſon of M. Antoninus, ſucceeded his father in the Roman empire. He was naturally cruel, and fond of indulging his licentious propenſities. He wiſhed to be called Hercules; and, like that hero, he adorned his ſhoulders with a lion's ſkin, and armed his hand with a knotted club. He publicly fought with the gladiators, and boaſted of his dexterity in killing the wild beaſts in the amphitheatre. He required divine honours from the ſenate, and they were granted. He was wont to put ſuch an immenſe quantity of gold duſt in his hair, that when he appeared bareheaded in the ſun-ſhine, his head glittered as if ſurrounded by ſun-beams. Martia, one of his concubines, whoſe death he had prepared, poiſoned him; but as the poiſon did not quickly operate, he was ſtrangled by a wreſtler. He died in the 31ſt year of his age, and the 13th of his reign. It has been obſerved, that he never truſted himſelf to a barber; but always burnt his beard, in imitation of the tyrant Dionyſius. A. D. 192.

COMMON, *Communia*, (i. e. *quod ad omnes pertinet)*, in law, ſignifies that ſoil, the uſe whereof is common to a particular town or lordſhip; or it is a profit that a man hath in the land of another perſon, uſually in common with others; or a right which a perſon hath to put his cattle to paſture into ground that is not his own. And there is not only common of paſture, but alſo common of piſcary, common of eſtovers, common of turbary, &c. And in all caſes of common, the law doth much reſpect the cuſtom of the place; for there the rule is, *conſuetudo loci eſt obſervanda*. See COMMONTY.

COMMON *Council*. See COUNCIL.

COMMON *Law*, that body of law received as rules in theſe kingdoms, before any ſtatute was enacted in parliament to alter the ſame. See LAW.

COMMON-PLACE *Book*, is a regiſter of what things occur, worthy to be noted, in the courſe of a man's thinking or ſtudy, ſo diſpoſed as that among a number of ſubjects any one may be eaſily found. The advantages of keeping a common-place book are many: it not only makes a man read with accuracy and attention, but induces him inſenſibly to think for himſelf, provided he conſiders it not ſo much as a regiſter of ſentiments that ſtrike him in the courſe of reading, but as a regiſter of his own thoughts upon various ſubjects. Many valuable thoughts occur even to men of no extraordinary genius. Theſe, without the aſſiſtance of a common-place book, are generally loſt both to himſelf and others. There are various methods of arranging common-place books; that of Mr. Locke is the beſt of any that have hitherto been contrived.

The firſt page of the book you intend to take down the different articles in, is to ſerve as a kind of index to the whole, and to contain references to every place or matter therein: in the commodious contrivance of which index, ſo as it may admit of a ſufficient copia or variety of materials, without any confuſion, all the ſecret of the methods conſiſts. In order to this, the firſt page, as already mentioned, or, for more room, the two firſt pages that front each other, are to be divided by parallel lines, into 25 equal parts; whereof every fifth line is to be diſtinguiſhed by its colour. Theſe lines are to be cut perpendicularly by others, drawn from top to bottom; and in the ſeveral ſpaces thereof, the ſeveral letters of the alphabet, both capital and minuſcle, are to be duly written. The form of the lines and diviſions, both horizontal and perpendicular, with the manner of writing the letters therein, will be conceived from the following ſpecimen; wherein, what is to be done in the book for all the letters of the alphabet, is here ſhown in the firſt four, *A*, *B*, *C*, and *D*.

A	a		C	a	
	e			e	
	i			i	
	o			o	
	u			u	
B	a		D	a	
	e	2, 3.		e	
	i			i	
	o			o	
	u			u	

The index of the common-place book thus formed, matters are ready for the taking down any thing therein; and in order to this, conſider to what head the thing you would enter is moſt naturally referred; and under which one would be led to look for ſuch a thing: in this head, or word, regard is to be had to the initial letter, and the firſt vowel that follows it; which are the characteriſtic letters whereon all the uſe of the index depends. Suppoſe, *e. g.* I would enter down a paſſage that refers to the head *beauty*. *B*, I conſider, is the initial letter, and *e* the firſt vowel: then looking upon the index for the partition *B*, and therein the line *e* (which is the place for all words whoſe firſt letter is *b*, and firſt vowel *e*; as *beauty*, *beneficence*, *bread*, *breeding*, *blemiſhes*), and finding no numbers already down to direct me to any page of the book where words of this characteriſtic have been entered, I turn forward to the firſt blank page I find (which, in a freſh book, as this is ſuppoſed to be, will be page 2.), and here write what I have occaſion for on the head *beauty*; beginning the head in the margin, and indenting all the other ſubſervient lines, that the head may ſtand out and ſhow itſelf: this done, I enter the page where it is wrote, viz. 2, in the index in the ſpace *B e*; from which time, the claſs *b e* becomes wholly in poſſeſſion of the 2d and 3d pages, which are conſigned to letters of this characteriſtic.

Had I found any page or number already entered in the ſpace *Be*, I muſt have turned to the page, and have wrote my matter in what room was left therein: ſo, if after entering the paſſage on beauty, I ſhould have occaſion for *benevolence*, or the like, finding the number 2 already poſſeſſed of the ſpace of this characteriſtic, I begin the paſſage on benevolence in the remainder of the page; which not containing the whole, I carry it on to page 3d, which is alſo for *be*; and add the number 3 in the index.

Common *Pleas* is one of the king's courts now held conſtantly in Weſtminſter-hall, but in former times was moveable. All civil cauſes, as well real as perſonal, are, or were formerly, tried in this court, according to the ſtrict law of the land. In perſonal and mixed actions it has a concurrent juriſdiction with the king's bench, but has no cognizance of pleas of the crown. The actions belonging to the court of common pleas come thither by original, as arreſts and outlawries; or by privilege, or attachment for or againſt privileged perſons; or out of inferior courts, not of record, by *pone*, *recordari*, *accedas ad curiam*, writ of falſe judgment, &c. The chief judge of this court is called *lord chief juſtice of the common pleas*, who is aſſiſted by three other judges. The other officers of the court are the *cuſtos brevium*, who is the chief clerk; three prothonotaries, and their ſecondaries; the clerk of the warrants, clerk of the eſſoins, 14 filazers, 4 exigentors, a clerk of the juries, the chirographer, the clerk of the king's ſilver, clerk of the treaſury, clerk of the ſeal, clerk of the outlawries, clerk of the inrolment of fines and recoveries, and clerk of the errors.

Common-*Prayer* is the liturgy in the church of England. See Liturgy. Clergymen are to uſe the public form of prayers preſcribed by the Book of Common Prayer: and refuſing to do ſo, or uſing any other public prayers, are puniſhable by ſtat. 1 Eliz. c. ii.

Common, in grammar, denotes the gender of nouns which are equally applicable to both ſexes: thus, *parens* "a parent" is of the common gender.

Common, in geometry, is applied to an angle, line, or the like, which belongs equally to two figures.

Common *Diviſor*, a quantity or number which exactly divides two or more other quantities or numbers, without leaving any remainder.

COMMONALTY, the lower of the two diviſions of the civil ſtate. The commonalty, like the nobility, are divided into ſeveral degrees: and as the lords, though different in rank, yet all of them are peers in reſpect of their nobility; ſo the commoners, though ſome are greatly ſuperior to others, yet all are in law commonalty, in reſpect of their want of nobility.

COMMONER, or Gentleman Commoner, in the univerſities, a ſtudent entered in a certain rank.

COMMONS, or House of Commons, a denomination given to the lower houſe of parliament. See Parliament.

Doctors Commons. See College *of Civilians*.

Proctors of the Commons. See Proctor.

COMMONWEALTH. See Republic.

COMMOTE, an ancient term in Wales, denoting half a cantred, or hundred; containing 50 villages. See Hundred. Wales was anciently divided into three provinces; each of theſe ſubdivided into cantreds, and every cantred into two commotes or hundreds. Silveſter Girald, however, tells us in his itinerary, that a commote is but a quarter of a hundred.

COMMUNES, in botany, the name of a claſs in Linnæus's *methodus Calycina*, conſiſting of two plants, which, like teazel and dandelion, have a calyx or flower-cup common to many flowers or florets. Theſe are the aggregate or compound flowers of other ſyſtems.

COMMUNIBUS locis, a Latin term, in frequent uſe among philoſophical, and other writers; implying ſome medium, or mean relation, between ſeveral places. Dr. Keil ſuppoſes the ocean to be one quarter of a mile deep, *communibus locis*, *q. d.* at a medium, or taking one place with another.

Communibus *Annis*, has the ſame import with regard to years, that *communibus locis* has with regard to places. Mr. Derham obſerves that the depth of rain, *communibus annis*, or one year with another, were it to ſtagnate on the earth, would amount in Townley in Lancaſhire, to $42\frac{1}{2}$ inches; at Upminſter in Eſſex, to $19\frac{1}{4}$; at Zurich, $32\frac{1}{4}$; at Piſa, $43\frac{1}{4}$; and at Paris to 19 inches.

COMMUNICATING, in theology, the act of receiving the ſacrament of the euchariſt. Thoſe of the reformed, and of the Greek church, communicate under both kinds; thoſe of the Romiſh, under only one. The oriental communicants uſually receive the wine by a ſpoon; and anciently they ſucked it through a pipe, as has been obſerved by Beat. Rhenanus, on Tertullian.

COMMUNICATION, in a general ſenſe, the act of im-

parting ſomething to another. This term is alſo uſed for the connection of one thing with another, or the paſſage from one place to another: thus a gallery is a communication between two apartments.

COMMUNICATION of motion, the act whereby a body at reſt is put into motion by a moving body; or, it is the acceleration of motion in a body already moving.

Lines of COMMUNICATION, in military matters, trenches made to continue and preſerve a ſafe correſpondence between two forts or poſts; or at a ſiege, between two approaches, that they may relieve one another.

Canal of COMMUNICATION. See CANAL.

COMMUNION, in matters of religion, the being united in doctrine and diſcipline; in which ſenſe of the word, different churches are ſaid to hold communion with each other. In the primitive Chriſtian church, every biſhop was obliged, after his ordination, to ſend circular letters to foreign churches, to ſignify that he was in communion with them. The three grand communions into which the Chriſtian church is at preſent divided, is that of the church of Rome, the Greek church, and the Proteſtant church: but originally all Chriſtians were in communion with each other, having one common faith and diſcipline. *Communion* is alſo uſed for the act of communicating the ſacrament of the euchariſt, or the Lord's ſupper.

COMMUNION *Service*, in the liturgy of the church of England, the office for the adminiſtration of the holy ſacrament, extracted from ſeveral ancient liturgies, as thoſe of St. Baſil, St. Ambroſe, &c. By the laſt rubric, part of this ſervice is appointed to be read every Sunday and holiday, after the morning prayer, even though there be no communicants.

COMMUNITY, denotes a ſociety of men living in the ſame place, under the ſame laws, the ſame regulations, and the ſame cuſtoms.

COMMUTATION, in law, the change of a penalty or puniſhment from a greater to a leſs; as when death is commuted for baniſhment, &c.

COMMENA (Ann) daughter of Alexus Commenus emperor of the Eaſt; memorable for her great learning and virtue, and for her hiſtory of the life and actions of her father, which is highly eſteemed. She flouriſhed about the year 1117. The hiſtory, which is in 15 books, was firſt publiſhed very imperfectly by Heſchelius in 1610; and afterwards printed in the collection of the Byzantine hiſtorians, with a diffuſe and incorrect Latin verſion by the Jeſuit Poſſimus, but with excellent notes by the learned Du Freſne.

COMO, a ſtrong and populous town of Italy, in the duchy of Milan, and in the Comaſco, with a biſhop's ſee. It is ſeated on a lake of the ſame name, which is 88 miles in circumference, though no more than ſix miles over in any part.

COMORA iſlands, lie between the north end of the iſland of Madagaſcar and the coaſt of Zanguebar, from 10 to 15 degrees ſouth latitude. Authors differ greatly with regard to their number, ſome ſpeaking of three, others of five, and ſome of eight of theſe iſlands. They all abound in horned cattle, ſheep, hogs, and a variety of fruits common in warm countries. They are ſaid alſo to produce a kind of rice which turns of a violet colour when boiled. The moſt remarkable of them, and which the Europeans are beſt acquainted with, is the iſland of Johanna. See that article.

COMORIN, or CAPE COMORIN, the moſt ſoutherly promontory of the Hither India, lying north-weſt of the iſland of Ceylon.

COMORRA, a handſome and large town of Lower Hungary, and capital of a territory of the ſame name. It is ſo well fortified, that the Turks could never take it. The greateſt part of the inhabitants are Hungarians or Ruſſians, who are very rich, and are of the Greek religion. It is ſeated on the river Danube, in the iſland of Sihut. E. long. 18. 25. N. lat. 47. 50.

COMOSÆ, in botany, from *Coma*. An order of plants in the former editions of Linnæus's Fragments of a Natural Method, conſiſting of the ſpiked willow or ſpiræa frutex, dropwort, and greater meadow-ſweet. Theſe, though formerly diſtinct genera, are by Linnæus collected into one, under the name of *ſpiræa*. The flowers growing in a head, reſemble a buſh, or tuft of hair, which probably gave riſe to the epithet *Comoſæ*.

COMPACT, in a legal ſenſe, an agreement or contract ſtipulated between ſeveral parties.

COMPANY, a collective term, underſtood of ſeveral perſons aſſembled together in the ſame place, or with the ſame deſign. The word is formed of the French *compagnie*, and that of *companio*, or *companies*, which, Chifflet obſerves, are found in the Salic law, tit. 66. and are properly military words, underſtood of ſoldiers, who, according to the modern phraſe, are comrades or meſs-mates, *i. e.* lodge together, eat together, &c. of the Latin *cum* "with", and *panis* "bread." It may be added, that in ſome Greek authors under the weſtern empire, the word κομπανια occurs in the ſenſe of ſociety.

COMPANY, in a commercial ſenſe, is a ſociety of merchants, mechanics, or other traders, joined together in one common intereſt. When there are only two or three joined in this manner, it is called, a partnerſhip; the term *company* being reſtrained to ſocieties conſiſting of a conſiderable number of members, aſſociated together by a charter obtained from the prince. The mechanics of all corporations, or towns incorporate, are thus erected into *companies*, which have charters of privileges and large immunities.

COMPANY ſeems more particularly appropriated to thoſe grand aſſociations ſet on foot for the commerce of the remote parts of the world, and veſted by charter with peculiar privileges. When companies do not trade upon a joint ſtock, but are obliged to admit any perſon, properly qualified, upon paying a certain fine and agreeing to ſubmit to the regulations of the company, each member trading upon his own ſtock, and at his own riſk, they are called *Regulated Companies*. When they trade upon a joint ſtock, each member ſharing in the common profit or loſs in proportion to his ſhare in this ſtock, they are called *Joint-ſtock Companies*. Such companies, whether regulated or joint-ſtock, ſometimes have, and ſometimes have not, excluſive privileges.

However injurious companies with joint-ſtock, and incorporated with excluſive privileges, may at this time be reckoned to the nation in general, it is yet certain that they were the general parents of all our foreign commerce; private traders being diſcouraged from hazarding their fortunes in foreign countries, until the method of traffic had been firſt ſettled by joint-ſtock companies. But ſince the trade of this kingdom and the number of traders have increaſed, and the methods of aſſurance of ſhipping and merchandize, and the navigation to all parts of the known world have become familiar to us, experience has ſhown, that the trade of the nation has advanced in proportion as theſe monopolies have been diſcouraged; all reſtrictions of trade whatever having been found manifeſtly hurtful.

I. REGULATED Companies reſemble, in every reſpect, the corporations of trades, ſo common in the cities and towns of all the different countries of Europe; and are a ſort of enlarged monopolies of the ſame kind. As no inhabitant of a town can exerciſe an incorporated trade, without firſt obtaining his freedom in the corporation; ſo in moſt caſes no ſubject of the ſtate can lawfully carry on any branch of foreign trade, for which a regulated company is eſtabliſhed, without firſt becoming a member of that company. The monopoly is more or leſs ſtrict according as the terms of admiſſion are more or leſs difficult;

and according as the directors of the company have more or less authority, or have it more or less in their power to manage in such a manner as to confine the greater part of the trade to themselves and their particular friends. In the most antient regulated companies the privileges of apprenticeship were the same as in other corporations; and intitled the person who had served his time to a member of the company, to become himself a member, either without paying any fine, or upon paying a much smaller one than what was exacted of other people. The usual corporation spirit, wherever the law does not restrain it, prevails in all regulated companies. When they have been allowed to act according to their natural genius, they have always, in order to confine the competition to as small a number of persons as possible, endeavoured to subject the trade to many burdensome regulations. When the law has restrained them from doing this, they have become altogether useless and insignificant. The regulated companies for foreign commerce, which at present subsist in Great Britain, are, The Hamburgh Company, the Russia Company, the Eastland Company, the Turkey Company, and the African Company.

1. *The Hamburgh Company* is the oldest trading establishment in the kingdom; though not always known by that name, nor restrained to those narrow bounds under which it is now confined. It was first called the *Company of merchants trading to Calais, Holland, Zealand, Brabant, and Flanders:* then it acquired the general title of *Merchant-adventurers of England:* as being composed of all the English merchants who traded to the Low Countries, the Baltic, and the German ocean. Lastly, it was called the *Company of Merchant-adventurers of England trading to Hamburgh*. This company was first incorporated by Edward I. in 1296; and their privileges have been confirmed by many of his successors. The revolutions which happened in the Low Countries towards the end of the sixteenth century, and which laid the foundation of the republic of Holland, having hindered the company from continuing their commerce with their ancient freedom, it was obliged to turn it almost wholly to the side of Hamburgh, and the cities on the German ocean; from which change some people took occasion to change its name to that of the *Hamburgh Company*; though the ancient title of *Merchant-adventurers* is still retained in all their writings.

About the middle of the last century, the fine for admission was fifty, and at one time one hundred pounds, and the conduct of the company was said to be extremely oppressive. In 1643, in 1645, and in 1661, the clothiers and free traders of the west of England complained of them to parliament, as of monopolists who confined the trade and oppressed the manufactures of the country. Though those complaints produced no act of parliament, they probably intimidated the company so far, as to oblige them to reform their conduct. The terms of admission are now said to be quite easy; and the directors either have it not in their power to subject the trade to any burdensome restraint or regulation, or at least have not of late exercised that power.

2. *The Russia Company* was first projected towards the end of the reign of King Edward VI. and executed in the first and second years of Philip and Mary; but had not its perfection till its charter was confirmed by act of parliament, under Queen Elizabeth, in 1566. It had its rise from certain adventurers, who were sent in three vessels on the discovery of new countries; and to find out a north-east passage to China: these, falling into the White Sea, and making up to the port of Archangel, were exceedingly well received by the Muscovites; and at their return, solicited letters patent to secure to themselves the commerce of Russia, for which they had formed an association. This company subsisted with reputation almost a whole century, till the time of the civil wars. It is said, the czar then reigning, hearing of the murder of King Charles I. ordered all the English in his states to be expelled; which the Dutch taking the advantage of, settled in their room. After the Restoration, the remains of the company re-established part of their commerce at Archangel, but never with the same success as before; the Russians being now well accustomed to the Dutch merchants and merchandize. This company subsists still, under the direction of a governor, four consuls, and assistants; and by the 10th and 11th of William III. c. 6. the fine for admission was reduced to 5l.

3. The *Eastland Company* was incorporated by Queen Elizabeth. Its charter is dated in the year 1579. By the first article the company is erected into a body politic, under the title of the *Company of Merchants of the East*; to consist of Englishmen, all real merchants, who have exercised the business thereof, and trafficked through the Sound, before the year 1568, into Norway, Sweden, Poland, Livonia, Prussia, Pomerania, &c. excepting Narva, Muscovy, and its dependencies. Most of the remaining articles grant them the usual prerogatives of such companies; as a seal, governor, courts, laws, &c. This company was complained of as a monopoly, and first curtailed by legal authority in 1672; and since the declaration of rights in 1689, exist only in name; but still continue to elect their annual officers, who are a governor, a deputy, and twenty four assistants.

4. *The Turkey or Levant company*, had its rise under Queen Elizabeth, in 1581. James I. confirmed its charter in 1605, adding new privileges. During the civil wars, there happened some innovations in the government of the company; many having been admitted members, not qualified by the charters of queen Elizabeth and king James, or that did not conform to the regulations prescribed. Charles II. upon his restoration, endeavoured to set it upon its ancient basis; to which end, he gave them a charter, containing not only a confirmation of their old one, but also several new articles of reformation. By this, the company is erected into a body politic, capable of making laws, &c. under the title of the *Company of Merchants of England trading to the seas of the Levant*. The number of members is not limited, but is ordinarily about three hundred. The principal qualification required is, that the candidate be a freeman of London, and a wholesale merchant, either by family or serving an apprenticeship of seven years. The company has a court or board at London, which is composed of a governor, deputy-governor, and fifteen directors or assistants; who are all actually to live in London or the suburbs. They have also a deputy-governor in every city and port, where there are any members of the company. The assembly at London sends out two vessels, regulates the tariff for the price at which the European merchandizes sent to the Levant are to be sold, and for the quality of those returned. It raises taxes on merchandizes, to defray impositions, and the common expences of the company; presents the ambassador which the king is to keep at the Porte, elects two consuls for Smyrna and Constantinople, &c.

One of the best regulations of the company is, not to leave the consuls, or even ambassador, to fix the imposition on vessels for defraying the common expences (a thing fatal to the companies of most other nations); but to allow a pension to the ambassador and consuls, and even to the chief officers, as secretary, chaplain, interpreters, and janizaries, that there may not be any pretence for their raising any sum at all on the merchants or merchandizes. In extraordinary cases, the consuls, and even the ambassador, have recourse to two deputies of the company, residing in the Levant; or, if the affair be very important, they assemble the whole body. Here are regulated the presents to be given, the voyages to be made, and every thing to be deliberated; and on the resolutions here taken, the deputies appoint the treasurer to furnish the moneys, &c. required. The

ordinary commerce of this company employs from 20 to 25 veffels, carrying from 25 to 30 pieces of cannon.

5. *The Company of Merchants trading to Africa*, eftablifhed in 1750. Contrary to the former practice with regard to regulated companies, who were reckoned unfit for fuch fort of fervice, this company was fubjected to the obligation of maintaining forts and garrifons. It was exprefsly charged at firft with the maintenance of all the Britifh forts and garrifons that lie between Cape Blanc and the Cape of Good Hope, and afterwards that of thofe only which lie between Cape Rouge and the Cape of Good Hope. The act which eftablifhes this company (the 23d of George II. c. 31.) feems to have had two diftinct objects in view; firft, to reftrain effectually the oppreffive and monopolizing fpirit which is natural to the directors of a regulated company; and, fecondly, to force them as much as poffible to give an attention, which is not natural to them, towards the maintenance of forts and garrifons.

For the firft of thefe purpofes, the fine for admiffion is limited to forty fhillings. The company is prohibited from trading in their corporate capacity, or upon a joint-ftock; from borrowing money upon common feal, or from laying any reftraints upon the trade which may be carried on freely from all places, and by all perfons being Britifh fubjects, and paying the fine. The government is in a committee of nine perfons, who meet in London, but who are chofen annually by the freemen of the company at London, Briftol, and Liverpool; three from each place. No committee-man can be continued in office for more than three years together. Any committee-man might formerly be removed by the board of trade and plantations; now by a committee of council, after being heard in his defence. The committee are forbid to export negroes from Africa, or to import any African goods into Great Britain. But as they are charged with the maintenance of forts and garrifons, they may for that purpofe export from Great Britain to Africa goods and ftores of different kinds. Out of the money which they fhall receive from the company, they are allowed a fum not exceeding eight hundred pounds for the falaries of their clerks and agents at London, Briftol, and Liverpool; the houfe-rent of their office in London; and all other expences of management, commiffion, and agency in England. What remains of this fum, after defraying thofe different expences, they may divide among themfelves, as a compenfation for their trouble, in what manner they think proper.

For the fecond purpofe mentioned, the maintenance of the forts and garrifons, an annual fum has been allotted to them by parliament, generally about 13,000l. For the proper application of this fum, the committee is obliged to account annually to the curfitor baron of the exchequer; which account is afterwards to be laid before parliament. But it is faid, great abufes have notwithftanding fubfifted with regard to this part of the company's engagements.

II. Joint-Stock *Companies*, eftablifhed either by royal charter or by act of parliament, differ in feveral refpects, not only from regulated companies, but from private copartneries. 1. In a private copartnery, no partner, without the confent of the company, can transfer his fhare to another perfon, or introduce a new member into the company. Each member, however, may, upon proper warning, withdraw from the copartnery, and demand payment from them of his fhare of the common ftock. In a joint-ftock company, on the contrary, no member can demand payment of his fhare from the company; but each member can, without their confent, transfer his fhare to another perfon, and thereby introduce a new member. The value of a fhare in a joint-ftock is always the price which it will bring in the market; and this may be either greater or lefs, in any proportion, than the fum which its owner ftands credited for in the ftock of the company. 2. In a private copartnery, each partner is bound for the debts contracted by the company to the whole extent of his fortune. In a joint-ftock company, on the contrary, each partner is bound only to the extent of his fhare.

The trade of a joint-ftock company is always managed by a court of directors. This court indeed is frequently fubject, in many refpects, to the controul of a general court of proprietors. But the greater part of thofe proprietors feldom pretend to underftand any thing of the bufinefs of the company; and when the fpirit of faction happens not to prevail among them, give themfelves no trouble about it, but receive contentedly fuch half yearly or yearly dividend as the directors think proper to make to them. This total exemption from trouble and from rifk, beyond a limited fum, encourages many people to become adventurers in joint-ftock companies, who would upon no account hazard their fortunes in any private copartnery. Such companies, therefore, commonly draw to themfelves much greater ftocks than any private copartnery can boaft of. The trading ftock of the South Sea company, at one time, amounted to upwards of thirty-three millions eight hundred thoufand pounds. The directors of fuch companies, however, being the managers rather of other peoples money than of their own, it cannot well be expected that they fhould watch over it with the fame anxious vigilance with which the partners in a private copartnery frequently watch over their own. Like the ftewards of a rich man, they are apt to confider attention to fmall matters as not for their mafter's honour, and very eafily give themfelves a difpenfation from fhowing it. Negligence and profufion, therefore, muft always prevail, more or lefs, in the management of the affairs of fuch a company. It is upon this account that joint-ftock companies for foreign trade have feldom been able to maintain the competition againft private adventurers. They have, accordingly, very feldom fucceeded without an exclufive privilege; and frequently have not fucceeded with one. Without an exclufive privilege they have commonly mifmanaged the trade: with an exclufive privilege they have both mifmanaged and confined it.—The principal joint-ftock companies at prefent fubfifting in Great Britain are, the *South Sea* and the *Eaft India* companies; to which may be added, though of very inferior magnitude, the *Hudfon's Bay* company.

1. *The South-Sea Company*. During the long war with France in the reign of Queen Anne, the payment of the failors of the royal navy being neglected, they received tickets inftead of money, and were frequently obliged, by their neceffities, to fell thefe tickets to avaricious men at a difcount of 40 and fometimes 50 *per cent*. By this and other means, the debts of the nation unprovided for by parliament, and which amounted to 9,471,321l. fell into the hands of thefe ufurers. On which Mr. Harley, at that time Chancellor of the Exchequer, and afterwards earl of Oxford, propofed a fcheme to allow the proprietors of thefe debts and deficiencies 6 *per cent. per annum*, and to incorporate them for the purpofe of carrying on a trade to the South Sea; and they were accordingly incorporated under the title of "the Governor and Company of Merchants of Great Britain trading to the South Seas, and other parts of America, and for encouraging the Fifhery," &c.

Though this company feem formed for the fake of commerce, the miniftry never thought ferioufly, during the courfe of the war, about making any fettlement on the coaft of South America, which was what flattered the expectations of the people; nor was it ever carried into execution by this company.

Some other fums were lent to the government in the reign of Queen Anne at 6 *per cent*. In the third of George I. the intereft of the whole was reduced to 5 *per cent*. and the company advanced two millions more to the government at the fame intereft. By the ftatute of the 6th of George I. it was declared, that they might redeem all or any of the redeemable national debts; in confideration of which, the company were empowered

to augment their capital according to the fums they fhould dif-charge: and for enabling them to raife fuch fums for purchafing annuities, exchanging for ready money new exchequer bills, carrying on their trade, &c. they might, by fuch means as they fhould think proper, raife fuch fums of money as in a general court of the company fhould be judged neceffary. · The company were alfo empowered to raife money on the contracts, bonds, or obligations under their common feal, on the credit of their capital ftock. But if the fub-governor, deputy-governor, or other members of the company, fhould purchafe lands or revenues of the crown upon account of the corporation, or lend money by loan or anticipation on any branch of the revenue, other than fuch part only on which a credit of loan was granted by parliament, fuch fub-governor, or other member of the company, fhould forfeit treble the value of the money fo lent. The fatal South Sea fcheme, tranfacted in the year 1720, and the particulars of which are very generally known, was executed upon the laft mentioned ftatute.

The South Sea company never had any forts or garrifons to maintain, and therefore were entirely exempted from one great expence, to which other joint-ftock companies for foreign trade are fubject. But they had an immenfe capital divided among an immenfe number of proprietors. It was naturally to be expected, therefore, that folly, negligence, and profufion, fhould prevail in the whole management of their affairs. Their ftock-jobbing fpeculations were fucceeded by mercantile projects, which, Dr. Smith obferves, were not much better conducted. At length, in the year 1722, this company petitioned parliament to be allowed to divide their immenfe capital of more than 33,800,000l. the whole of which had been lent to government, into two equal parts: the one half, or upwards of 16,900,000, to be put upon the fame footing with other government annuities, and not to be fubject to the debts contracted, or loffes incurred, by the directors of the company, in the profecution of their mercantile projects; the other half to remain as before, a trading ftock, and to be fubject to thofe debts and loffes. The petition was too reafonable not to be granted. In 1733, they again petitioned the parliament, that three-fourths of their trading-ftock might be turned into annuity-ftock, and only one-fourth remain as trading-ftock, or expofed to the hazards arifing from the bad management of their directors. Both their annuity and trading-ftocks had, by this time, been reduced more than 2,000,000l. each, by feveral different payments from government; fo that this fourth amounted only to 3,662,784l. 8s. 6d. In 1748, all the demands of the company upon the king of Spain, in confequence of the Affiento contract, were, by the treaty of Aix-la-Chapelle, given up for what was fuppofed an equivalent. An end was put to their trade with the Spanifh Weft Indies, the remainder of their trading ftock was turned into an annuity ftock, and the company ceafed in every refpect to be a trading company.

This company is under the direction of a governor, fub-governor, deputy-governor, and 21 directors; but no perfon is qualified to be a governor, his majefty excepted, unlefs fuch governor has, in his own name and right, 5000l. in the trading ftock; the fub-governor is to have 4000l. the deputy-governor 3000l. and a director 2000l. in the fame ftock. In every general court, every member having in his own name and right 500l. in trading ftock, has one vote; if 2000l. two votes; if 3000l. three votes; and if 5000l. four votes.

2. *The Eaft India Company.* The firft, or as it is called the *Old Eaft India Company*, was eftablifhed by a charter from Queen Elizabeth in 1600; but for fome time the partners feem to have traded with feparate ftocks, though only in the fhips belonging to the whole company. In 1612, they joined their ftocks into one common capital; and though their charter was not as yet confirmed by act of parliament, it was looked upon in that early period to be fufficiently valid, and no body ventured to interfere with their trade. At this time their capital amounted to about 740,000l. and the fhares were as low as 50l. Their trade was in general fuccefsful, notwithftanding fome heavy loffes, chiefly fuftained through the malice of the Dutch Eaft India company. In procefs of time, however, it came to be underftood that a royal charter could not by itfelf convey an exclufive privilege to traders, and the company was reduced to diftrefs by reafon of the multitude of interlopers who carried off the moft of their trade. This continued during the latter part of the reign of Charles II. the whole of that of James II. and part of William III. when in 1698 a propofal was made to parliament for advancing the fum of 2,000,000l. to government, on condition of erecting the fubfcribers into a new company with exclufive privileges. The old company endeavoured to prevent the appearance of fuch a formidable rival, by offering government 700,000l. nearly the amount of their capital at that time; but fuch were the exigencies of the ftate at that time, that the larger fum, though at eight *per cent.* intereft, was preferred to the fmaller at one half the expence.

Thus were two Eaft India companies erected in the fame kingdom, which could not but be very prejudicial to each other. Through the negligence of thofe who prepared the act of parliament alfo, the new company were not obliged to unite in a joint-ftock. The confequence of this was, that a few private traders, whofe fubfcriptions fcarce exceeded 7200l. infifted on a right of trading feparately at their own rifk. Thus a kind of third company was eftablifhed; and by their mutual contentions with one another, all the three were brought to the brink of ruin. Upon a fubfequent occafion, in 1700, a propofal was made to parliament for putting the trade under the management of a regulated company, and thus laying it in fome meafure open. This, however, was oppofed by the company, who reprefented in ftrong terms the mifchiefs likely to arife from fuch a proceeding. In 1702 the companies were in fome meafure united by an indenture tripartite, to which the queen was the third party; and, in 1708, they were, by act of parliament, perfectly confolidated into one company by their prefent name of The United Company of Merchants trading to the Eaft Indies. Into this act it was thought worthy to infert a claufe, allowing the feparate traders to continue their traffic till Michaelmas 1711, but at the fame time empowering the directors, upon three years notice, to redeem their capital of 7200l. and thereby convert the whole capital of the company into a joint-ftock. By the fame act, the capital of the company, in confequence of a new loan to government, was augmented from 2,000,000l. to 3,200,000l. In 1743, another million was advanced to government. But this being raifed, not by a call upon the proprietors, but by felling annuities and contracting bond-debts, it did not augment the ftock upon which the proprietors could claim a dividend. Thus, however, their trading ftock was augmented; it being equally liable with the other 3,200,000l. to the loffes fuftained, and debts contracted by the company, in the profecution of their mercantile projects. From 1708, or at leaft from 1711, this company being freed from all competitors, and fully eftablifhed in the monopoly of the Englifh commerce to the Eaft Indies, carried on a fuccefsful trade; and from their profits made annually a moderate dividend to their proprietors. Unhappily, however, in a fhort time, an inclination for war and conqueft began to take place among its fervants; which, though it put them in poffeffion of extenfive territories and vaft nominal revenues, yet embarraffed their affairs in fuch a manner, that they have not to this day been able to recover themfelves. During the war of 1755, indeed, they acquired the revenues of a rich and extenfive territory, amounting, as was then faid, to near 3,000,000l. *per annum.*

For feveral years they remained in quiet poffeffion of the revenue arifing from this territory, though it certainly never anfwered the expectations that had been formed concerning it. But in 1767 the Britifh miniftry laid claim to the territorial poffeffions of the company, and the revenue arifing from them, as of right belonging to the crown; and the company, rather than yield up their territories in this manner, agreed to pay government a yearly fum of 400,000l. They had before this gradually augmented their dividend from about fix to ten *per cent.* that is, on their capital of 3,200,000l. they had raifed it from 192,000l. to 320,000l. a year. About this time alfo they were attempting to raife it ftill further, viz. from 10 to 12½ *per cent.* but from this they were prevented by two fucceffive acts of parliament, the defign of which was to enable them to make a more fpeedy payment of their debts, at this time eftimated at more than fix or feven millions fterling. In 1769 they renewed their agreement with government for five years more, ftipulating, that during the courfe of that period they fhould be allowed gradually to augment their dividend to 12½ *per cent.* never increafing it, however, more than one *per cent.* annually. Thus their annual payments could only be augmented by 608,000l. beyond what they had been before their late territorial acquifitions. By accounts from India in the year 1768, this revenue, clear of all deductions and military charges, was ftated at 2,048,747l. At the fame time they were faid to poffefs another revenue, arifing partly from lands, but chiefly from the cuftoms eftablifhed at their different fettlements, amounting to about 439,000l. The profits of their trade, too, according to the evidence of their chairman before the houfe of commons, amounted to at leaft 400,000l. *per annum*; their accountant made it 500,000l. and the loweft account ftated it at leaft equal to the higheft dividend paid to their proprietors. Notwithftanding this apparent wealth, however, the affairs of the company from this time fell into diforder; infomuch, that in 1773, their debts were augmented by an arrear to the treafury in the payment of the 400,000l. ftipulated; by another to the cuftom-houfe for duties unpaid; by a large fum borrowed from the bank; and by bills drawn upon them from India to the amount of more than 1,200,000l. Thus they were not only obliged to reduce their dividend all at once to fix *per cent.* but to apply to government for affiftance. A particular account of this tranfaction is given in the Annual Regifters. Here it may be mentioned in general, that the event proved very unfavourable to the company, as they were now fubjected to an interference of government altogether unknown before. Several important alterations were made in their conftitution both at home and abroad. The fettlements of Madras, Bombay, and Calcutta, which had hitherto been entirely independent of one another, were fubjected to a governor-general, affifted by a council of four affeffors. The nomination of the firft governor and council, who were to refide at Calcutta, was affumed by parliament; the power of the court of Calcutta, which had gradually extended its jurifdiction over the reft, was now reduced and confined to the trial of mercantile caufes, the purpofe for which it was originally inftituted. Inftead of it, a new fupreme court of judicature was eftablifhed, confifting of a chief juftice and three judges, to be appointed by the crown. Befides thefe alterations, the ftock neceffary to entitle any proprietor to vote at the general courts was raifed from 500l. to 1000l. To vote on this qualification, too, it was neceffary that he fhould have poffeffed it, if acquired by his own purchafe and not by inheritance, for at leaft one year, inftead of fix months, the term requifite formerly. The court of 24 directors had before been chofen annually; but it was now enacted, that each director fhould for the future be chofen for four years; fix of them, however, to go out of office by rotation every year, and not to be capable of being re-chofen at the election of the fix new directors for the enfuing year. It was expected that in confequence of thefe alterations, the courts both of the proprietors and directors would be likely to act with more dignity and fteadinefs than formerly. But this was far from being the cafe. The company and its fervants fhowed the utmoft indifference about the happinefs or mifery of the people who had the misfortune to be fubjected to their jurifdiction. This indifference, too, was more likely to be increafed than diminifhed by fome of the new regulations. The houfe of commons, for inftance, had refolved, that when the 1,600,000l. lent to the company by government fhould be paid, and their bond-debts reduced to 1,500,000l. they might then, and not till then, divide eight *per cent.* upon their capital; and that whatever remained of their revenues and nett profits at home fhould be divided into four parts; three of them to be paid into the exchequer for the ufe of the public, and the fourth to be referved as a fund, either for the further reduction of their bond-debts, or for the difcharge of other contingent exigences which the company might labour under. But it could fcarce be expected that, if the company were bad ftewards and bad fovereigns when the whole of their nett revenue and profits belonged to themfelves, they would be better when three-fourths of thefe belonged to other people. The regulations of 1773, therefore, did not put an end to the troubles of the company. Among other inftitutions, it had been at this time enacted, that the prefidency of Bengal fhould have a fuperiority over the other prefidencies in the country; the falary of the chief juftice was fixed at 8000l. *per annum*, and thofe of the other judges at 6000l. each. In confequence of this act, Sir Elijah Impey, who was created a baronet on the occafion, fet fail, with three other judges, for India in the year 1774. The powers with which they were invefted were very extraordinary. They had the title of His Majefty's Supreme Court of Judicature in India. Civil law, common law, ecclefiaftical, criminal, and admiralty jurifdiction, belonged of right to them. They were empowered to try Europeans on perfonal actions, and to affefs damages, without a jury. Every native, either directly or indirectly in the fervice of the company, or in their territories, was made fubject to their jurifdiction, with a view to prevent the Europeans from eluding juftice under the pretence of employing natives in the commiffion of their crimes: fo that in fact they were abfolute lords and fovereigns of the whole country.

Such exceffive and unlimited powers conferred on any fmall number of men, could not but be extremely difagreeable to the Europeans, who had been accuftomed to enjoy a liberty almoft equally unbounded before; nor was it to be fuppofed that the judges, thus fuddenly raifed from the rank of fubjects to the height of defpotifm, would always ufe their power in an unexceptionable manner. The defign of the eftablifhment was to preferve the commerce and revenues of the company from depredation, by fubjecting its fervants to the controul of the court; to relieve the fubject from oppreffion by facilitating the means of redrefs; and to fix a regular courfe of juftice for the fecurity of liberty and property. Inftead of confidering the circumftances of the country, however, or the manners and cuftoms of the natives, the judges now precipitately introduced the Britifh laws in their full extent, without the leaft modification to render them agreeable to the Afiatics, who had been accuftomed to others of a quite different nature; nor did they even pay the leaft regard to the religious inftitutions or habits to which the Indians are fo obftinately attached, that they would fooner part with life itfelf than break through an article of them. To detail the particulars, however, of the events which arofe out of this new fyftem would greatly exceed the limits to be allowed to this article: and in fact would in fome meafure be fuperfluous, fince the various publications which have appeared in confequence of the impeachment and long

trial of Mr. Haftings, have detailed every fact of importance relative to the proceedings which took place in India, fince that period to which this account of the company's affairs extends. We fhall therefore only mention in this place the petition laft prefented to the houfe of commons by the company. This ftated certain pecuniary embarraffments which they apprehended to take place on the firft of March 1790, owing to the arrears of the war, to the government claim of 500,000l. to the debt incurred in China, and to the advances neceffary to be made for the purpofes of the China trade. In compliance with their petition, the chancellor of the exchequer moved on the following day, that they fhould be empowered to borrow a fum not exceeding 1,200,000l. He at the fame time obferved, that in all probability the company in 1791 would have upwards of 3,000,000l. fterling more than fufficient to difcharge their debts. The meafure was carried through both houfes without oppofition.

3. *Hudfon's Bay Company.* The vaft countries which furround Hudfon's Bay abound with animals whofe furs and fkins are excellent, being far fuperior in quality to thofe found in lefs northerly regions. In 1670, a charter was granted to a company, which does not confift of above nine or ten perfons, for the exclufive trade to this bay; and they have acted under it ever fince with great benefit to themfelves. The company employ four fhips and 130 feamen. They have feveral forts, *viz.* Prince of Wales's fort, Churchill river, Nelfon, New Severn, and Albany, which ftand on the weft fide of the bay, and are garrifoned by 186 men. The French, in May 1782, took and deftroyed thefe forts, and the fettlements, &c. valued at 500,000l. They export commodities to the value of 16,000l. and bring home returns to the value of 29,340l. which yield to the revenue 3734l. This includes the fifhery in Hudfon's Bay. This commerce, fmall as it is, affords immenfe profits to the company, and even fome advantages to Great Britain in general: for the commodities we exchange with the Indians for their fkins and furs, are all manufactured in Britain; and as the Indians are not very nice in their choice, fuch things are fent of which we have the greateft plenty, and which, in the mercantile phrafe, are drugs with us. And although the workmanfhip happens to be in many refpects fo deficient, that no civilized people would take it off our hands, it may be admired among the Indians. On the other hand, the fkins and furs we bring from Hudfon's Bay, enter largely into our manufactures, and afford us materials for trading with many nations of Europe to great advantage. Thefe circumftances tend to prove inconteftably the immenfe benefit that would refult to Great Britain, by throwing open the trade to Hudfon's Bay, fince even in its prefent reftrained ftate it is fo advantageous. This company, it is probable, do not find their trade fo advantageous now as it was before we got poffeffion of Canada. The only attempt made to trade with Labrador has been directed towards the fifhery, the annual produce of which exceeds 49,000l.

Greenland Company. See Greenland.

Banking Companies. See Bank.

Company, in military affairs, a fmall body of foot, commanded by a captain, who has under him a lieutenant and enfign. The number of centinels or private foldiers in a company is from 50 to 100; and a battalion or regiment confifts of 9, 10, or 11, fuch companies, one of which is always grenadiers, and pofted on the right: next them ftands the colonel's company, and on the left the light infantry company. Companies not incorporated into regiments are called *irregulars*, or *independent companies.*

Artillery Company. See Artillery.

Company *of Ships*, a fleet of merchantmen, who make a charter-party among themfelves; the principal conditions whereof ufually are, that certain veffels fhall be acknowledged admiral, vice-admiral, and rear-admiral; that fuch and fuch fignals fhall be obferved; that thofe which bear no guns fhall pay fo much *per cent.* of their cargo; and in cafe they be attacked, that what damages are fuftained fhall be reimburfed by the company in general. In the Mediterranean, fuch companies are called *conferves.*

COMPARATIVE Anatomy;

That branch of anatomy which confiders fecondary objects, or the bodies of other animals; ferving for the more accurate diftinctions of feveral parts, and fupplying the defect of human fubjects.

It is otherwife called *the anatomy of beafts*, and fometimes *zootomy*: and ftands in contradiftinction to human anatomy, or that branch of the art which confiders the human body as the primary object of anatomy.

Introduction.

The principal advantages of comparative anatomy are the following: firft, it furnifhes us with a fufficient knowledge of the different parts of animals, to prevent our being impofed upon by thofe authors who have delineated and defcribed feveral parts from brutes as belonging to the human body. Secondly, it helps us to underftand feveral paffages in the ancient writers on medicine, who have taken many of their defcriptions from brutes and reafoned from them. The third and great ufe we reap from this fcience, is the light it cafts on feveral functions in the human economy, about which there have been fo many difputes among anatomifts.

In this view it is altogether needlefs to infift on thofe parts whofe ufe is ufually underftood when once their ftructure is unravelled. Thus, for inftance, if we be acquainted with the action of the mufcles in general, it will not be difficult to determine the ufe of any particular mufcle whofe origin and infertion is known, if we at the fame time confider the various connections of the bones to which it is fixed, and the different degree of mobility they have with refpect to each other. In the fame manner, if we know the ufe of the nerves in general, we can eafily affign the ufe of thofe nerves which are diftributed to any particular part. There is then no occafion for a complete ofteology, myology, &c. of the feveral animals we fhall treat of, nor need we trouble ourfelves about the ftructure of any of the parts, unlefs when it ferves to illuftrate fome of the fore-mentioned purpofes.

That the firft ufe we propofed from examining the ftructure of the parts in brutes is real and of confequence, is evident from looking into the works of fome of the earlieft and greateft mafters of anatomy, who for want of human fubjects have often borrowed their defcriptions from other animals. The great Vefalius, although he juftly reproves Galen for this fault, is guilty of the fame himfelf, as is plain from his delineations of the kidneys, uterus, the mufcles of the eye, and fome other parts. Nor is antiquity only to be charged with this, fince in Willis's *Anatomia Cerebri* (the plates of which were revifed by that accurate anatomift Dr. Lower) there are feveral of the pictures taken from different brutes, efpecially the dog, befides thofe he owns to be fuch. We fhall give feveral examples of the fecond ufe in the fequel of the work.

The animal kingdom, as well as the vegetable, contains the moſt ſurpriſing variety, and the deſcent in each is ſo gradual, that the little tranſitions and deviations are almoſt imperceptible. The bat and flying-ſquirrel, though quadrupeds, have wings to buoy themſelves up in the air. Some birds inhabit the waters; and there are fiſhes that have wings, and are not ſtrangers to the airy regions: the amphibious animals blend the terreſtrial and aquatic together.

As there is then ſuch a vaſt variety, it is not only needleſs, but impoſſible, to conſider all of them particularly. We ſhall take only ſome of the moſt remarkable genera; and hope, from what will be ſaid of them, any of the intermediate degrees may be underſtood.

In treating of quadrupeds, we ſhall divide them into the carnivorous, *i. e.* thoſe that feed indifferently on animal and vegetable ſubſtances, and granivorous: as an inſtance of theſe laſt we ſhall take the ruminant kind. The fowls we ſhall alſo divide into thoſe that feed on grain, and thoſe that feed on fleſh. The diſtinction we ſhall make in treating of fiſhes, ſhall be of thoſe that have lungs, and thoſe that have them not. The firſt indeed are with difficulty procured, and at the ſame time differ very little from quadrupeds. The ſtructure of inſects and worms is ſo very minute, that little aſſiſtance for the ends propoſed by the preſent ſubject has been expected from their anatomical inveſtigation. As they conſtitute, however, one of the great claſſes into which animals are divided, and as every advance in knowledge, with reſpect to the ſtructure of any one animal, muſt either directly or indirectly caſt ſome light on the ſtructure of ſome part of every other, we have thought proper to add a few particulars concerning them.

In inquiring into the ſtructure of different animals, we ought to be previouſly acquainted with the form of their body, manner of life, kind of food; or, in ſhort, with their natural hiſtory; which will lead us to account for the reaſon of their different ſtructure, and hence explain the actions of the human body. Of all thoſe particulars a detail will be found under the titles of the different ſubjects in their alphabetical order.

PART I. ANATOMY OF QUADRUPEDS.

SECT. I. *General Obſervations.*

ALL quadrupeds have a covering of hair, wool, &c. to defend them from the injuries of the weather, which varies in thickneſs according to the ſeaſon of the year and difference of the climate: thus in Ruſſia and the northern countries, the furs are very thick and warm, while the little Spaniſh lap-dogs, and Barbary cows, have little or no hair at all.

The cutis and cuticula in quadrupeds are diſpoſed much in the ſame way as the human, only more elaſtic; immediately under this, there is a very thin cutaneous muſcular ſubſtance called *panniculus carnoſus*, which is common to all quadrupeds, the porcine kind excepted; this principally covers the trunk, ſerving to ſhrivel the ſkin, in order to drive off inſects, their tails and heads not being ſufficient for this purpoſe, while their extremities are employed in their ſupport and progreſſion.

It has probably been from obſerving ſome muſcles of the human body, ſuch as the platyſma myoides, cremaſter, and frontales, and the collapſed tunica celluloſa of emaciated ſubjects, to reſemble this thin muſcle, that ſome of the older anatomiſts reckoned ſuch a panniculus among the common teguments of the human body. This Carolus Stephanus has well obſerved.

Moſt quadrupeds want clavicles, whereby their anterior extremities fall upon their cheſt, ſo as to make their thorax proportionally narrower than the human. This ſmall diſtance of their anterior extremities is very neceſſary for their uniform progreſſion: apes indeed and ſquirrels have clavicles to allow them a more full uſe of their extremities in climbing; but when they walk on all-fours, they move but indifferently.

SECT. II. *Of the Orang Outang.*

WHILE ſome philoſophers have endeavoured to level man to the rank of quadrupeds, others have attempted to elevate certain of the brute creation to the ſame claſs with their reputed lords. The *orang outang* is ranged by Linnæus as congenerous with man (See HOMO); and ſome theoriſts have even conſidered him as the original ſtock of the human race, pretending that he has been the *man of the woods* for many ages before *gardens* were ever thought of. His claims to humanity are founded on his being able to walk upright occaſionally, being furniſhed with a competent ſhare of muſcles requiſite for the purpoſe. The form of his heart, lungs, breaſt, brains, inteſtines, are ſimilar to thoſe of men; the *cæcum* has alſo its *appendix vermiformis*: he can ſit upright with great eaſe; ſhows more deſign in his plans than his aſſociates in the foreſts; and can handle a ſtick on occaſion with tolerable dexterity. His diſqualifications are the following: The poſition of the *foramen magnum occipitis*, which is farther backward than in the human ſpecies, and the ſockets of his lower jaw, made to receive the *dentes inciſores* of the upper, indicate his relationſhip to the *monkey* breed. He has alſo *thirteen ribs* on each ſide; his arms, feet, and toes, are much longer than thoſe of the human ſpecies, &c. and although his foot does not ſo cloſely reſemble a hand as that of the ape, yet the *pollex pedis*, or the great toe, is placed at a greater diſtance from the other toes, which gives it the appearance and uſes of a *thumb*. Theſe differences indicate, that, although the *orang* can occaſionally act the *biped*, yet he is much better qualified to walk on his fore-feet, and to climb trees, than the generality of the modern race of men. But an objection to his claims, ſtill weightier than any of the differences ſtated above, ariſes from his want of *ſpeech*. For there is no nation of men, however ſavage, that is deſtitute of ſpeech; though individuals, ſecluded from ſociety, may in time loſe that faculty. No inſtances are known in which a company of ten or twelve men have been without a language; but upwards of thirty of the orang ſpecies have been found in a herd, without ſhowing the ſmalleſt traces of this faculty. It has been ſuggeſted by Rouſſeau, that they may have loſt the power from their neglect of uſing it; but it is very ſingular that they alone ſhould loſe this power, and not that race of men to whom they are ſuppoſed to be ſo nearly related. This point, however, has been completely decided by the diſcoveries of profeſſor Camper; who, in a paper in the Philoſophical Tranſactions, vol. lxix. part i. art. 14. has demonſtrated, by an anatomical diſſection of the organ of the voice, that articulation is rendered impoſſible in theſe animals in conſequence of the ſtructure of that organ. From the nature and ſituation of thoſe parts in the orang (as well as in the ape and in the monkey) he has proved, that no modulation of the voice reſembling human ſpeech can be produced in theſe creatures; becauſe the air, paſſing through the *rima glottidis*, is immediately loſt in two ventricles or hollow bags in the neck (which are ſometimes united into one), with which all theſe animals are furniſhed, and which have a communication with the mouth through the ſaid *rima* or ſlit, ſo that the air muſt return from thence, without any force or melody, within the throat and mouth in theſe creatures.

Sect. III. *The Anatomy of a Dog.*

We may firſt obſerve of this animal, as indeed of moſt *quadrupeds*, that its legs are much ſhorter in proportion to its trunk than in man, the length of whoſe ſteps depends entirely on the length of his inferior extremities; however, to balance this, the trunk of the animal is proportionally longer and ſmaller, his ſpine more flexible, by which he is able at each ſtep to bring his poſterior extremities nearer to his anterior. His common teguments are much a-kin to thoſe of other quadrupeds, only they allow little or no paſſage for ſweat; but when he is over-heated, the ſuperfluous matter finds an exit by the ſalivary glands, for he lolls out his tongue and ſlavers plentifully. We are not, however, to ſuppoſe, that becauſe a dog does not ſweat, he has no inſenſible perſpiration. That a dog perſpires is evident, becauſe one of theſe animals can trace another by the ſcent of his footſteps; which could not happen if a large quantity of perſpirable matter was not conſtantly going off.

The pyramidal muſcles are wanting, to ſupply which, the rectus is inſerted fleſhy into the os pubis.

The omentum reaches down to the os pubis, which, conſidering the poſture of the animal, we ſhall find to be a wiſe proviſion, ſince its uſe is to ſeparate an oily liquor for lubricating the guts and facilitating their periſtaltic motion; ſo in our erect poſture the natural gravity of the oil will determine it downward, but in the horizontal poſition of theſe creatures, if all the inteſtines were not covered, there would be no favourable derivation of the fluid to the guts lying in the poſterior part of the abdomen, which is the higheſt; and beſides, had the omentum reached much farther down in us, it would not only have ſupplied too great a quantity of oil to the lower part of the abdomen, but we ſhould have been in continual danger of herniæ; and even at preſent the omentum frequently paſſes down with ſome of the other viſcera, and forms part of thoſe tumors. To theſe, however, the dog is not ſubject, as his viſcera do not preſs ſo much on the rings of the abdominal muſcles, and beſides are prevented from paſſing through by a pendulous flap of fat, mentioned hereafter. The inferior and interior lamella of the omentum is fixed to the ſpleen, fundus of the ſtomach, pylorus, liver, &c. in the ſame way as the human; but the ſuperior having no colon to paſs over, goes directly to the back-bone. This ſerves to explain the formation of the ſmall omentum in the human body; which is nothing but the large omentum, having loſt its fat, paſſing over the ſtomach and colon, where it reaſſumes its pinguedo; ſo proceeds, and is firmly attached to the liver, ſpine, &c. The ſtriæ of fat are pretty regularly diſpoſed through it, accompanying the diſtribution of the blood-veſſels to guard them from the preſſure of the ſuperincumbent viſcera.

This animal's ſtomach, though pretty much reſembling the human in its ſhape, is ſomewhat differently ſituated. It lies more longitudinal, as indeed all the other viſcera do, to accommodate themſelves to the ſhape of the cavity in which they are contained; that is, its inferior orifice is much farther down with reſpect to the ſuperior than the human: by this means the groſs food has an eaſier paſſage into the duodenum. Again, the fundus of the human ſtomach, when diſtended, ſtands almoſt directly forwards, which is occaſioned by the little omentum tying it ſo cloſe down to the back-bone, &c. at its two orifices; but it not being fixed in that manner in the dog, the fundus remains always poſterior: this alſo anſwers very well the ſhape of the different cavities, the diſtance betwixt the cardia and fundus being greater than that betwixt the two ſides. It ſeems to be much larger in proportion to the bulk of the animal than the human, that it might contain a greater quantity of food at once; which was very neceſſary, ſince this animal cannot at any time get its ſuſtenance as men do. The turbillion is not ſo large, nor is there any coarction forming the *antrum Willeſii*, as in the ſtomach of man. It is conſiderably thicker and more muſcular than ours, for breaking the coheſion of their food, which they ſwallow without ſufficient chewing. Hence it is evident the force of the ſtomach is not ſo great as ſome would have it, nor its contraction ſo violent: otherwiſe that of dogs would be undoubtedly wounded by the ſharp bones, &c. they always take down; for the contraction here is ſtill greater than in the human ſtomach, which is much thinner. The rugæ of the tunica villoſa are neither ſo large, nor ſituated tranſverſely, as in the human, but go from one orifice to the other: the reaſon of which difference is, perhaps, that they might be in leſs danger of being hurt by the hard ſubſtances this creature frequently feeds upon; and for the ſame reaſon there is not the like coarction at their pylorus.

The inteſtines of this animal are proportionally much ſhorter than ours; for the food which theſe creatures moſtly uſe, ſoon diſſolves, and then putrifies: on which account there was no occaſion for a long tract of inteſtines, but on the contrary that it ſhould be quickly thrown out of the body. The ſame is to be obſerved of all the carnivorous animals. The muſcular coat of the inteſtines is alſo thicker and ſtronger than the human, to protrude the contents quickly and accurately. The *valvulæ conniventes* are leſs numerous, and in a longitudinal direction; and the whole tract of the alimentary canal is covered with a ſlime, which lubricates the inteſtines, ſaves them from the acrimony of the excrementitious part, and facilitates its paſſage.

The *duodenum* differs conſiderably in its ſituation from the human. For in man it firſt mounts from the pylorus upwards, backwards, and to the right ſide; then paſſes down by the gall bladder; and, marching over the right kidney and ſuperior part of the pſoas muſcles, makes a curvature upwards; and paſſes over the back-bone and vena cava inferior, to the left hypochondrium, where it gets through the omentum, meſentery and meſocolon, to commence the *jejunum*, being firmly tied down all the way, the biliary and pancreatic ducts entering at its moſt depending part: whereas, in the dog, the duodenum is fixed at the pyolorus to the concave ſurface of the liver, and hangs looſe and pendulous with the meſentery backwards into the cavity of the abdomen; then turning up again, is fixed to the back-bone, where it ends in the jejunum; the bile and pancreatic juice are poured into it at the moſt depending part. Therefore the ſame intention ſeems to have been had in view in the formation of this part in both, viz. the giving the chyle, after the ſecretions of the liver and pancreas are poured into it, a diſadvantageous courſe, that ſo it might be the more intimately blended with the humours before its entry into the jejunum, where the lacteals are very numerous. And thus, by reaſon of their different poſture, the ſame deſign (though by a very different order of the parts) is brought about in both. The other ſmall guts are much the ſame with ours, only ſhorter. The great guts are alſo ſhorter and leſs capacious than in the human body; and we take it for a general rule, that all animals that live on vegetable food, have not only their ſmall guts conſiderably longer, but alſo their great guts more capacious, than ſuch creatures as feed on other animals. Hence man, from this form of his inteſtines, and that of the teeth, ſeems to have been originally deſigned for feeding on vegetables chiefly; and ſtill the moſt of his food, and all his drink, is of that claſs.

The *appendix vermiformis* juſtly enough deſerves the name of an *inteſtinum cæcum* in this ſubject, though in the human body it does not; and it has probably been from the largeneſs of this part in this and ſome other animals, that the oldeſt anatomiſts came to reckon that ſmall appendicle in man as one of the great guts. On its internal ſurface we obſerve a great number of mucous glands. As all theſe throw out ſlime,

their principal office would feem to be the procuring a fufficient quantity of that matter for the purpofes above-mentioned. Still, however, there feems to be fome unknown ufe for this organ in other animals; for the appendicula vermiformis in them is either of great fize or of great length. In a rat, it is rather larger than the ftomach; in others, as fwine, and fome of the animals which live on vegetables, it has long convolutions, fo that the food muft be lodged in it for a long time. Thus, probably, fome change takes place in the food, which requires a confiderable time to effectuate, and, though unknown to us, may anfwer very ufeful purpofes to the animal.

The *colon* has no longitudinal ligaments: and confequently this gut is not purfed up into different bags or cells as the human: nor does this inteftine make any circular turn round the abdomen; but paffes directly acrofs it to the top of the os facrum, where it gets the name of *rectum*.

At the extremity of the *inteftinum rectum*, or verge of the anus, there are found two bags or pouches, which contain a moft abominable fetid mucus of a yellow colour, for which we know no ufe, unlefs it ferves to lubricate the ftrained extremity of the rectum, and defend it againft the afperity of the fæces, or to feparate fome liquor that might otherwife prove hurtful to their bodies. There is nothing analogous to thofe facs in the human fubject, unlefs we reckon the mucilaginous glands that are found moft frequent and largeft about the lower part of the rectum.

The *mefentery* is confiderably longer than in the human body; that, in his horizontal fituation, the inteftines may reft fecurely on the foft cufhion of the abdominal mufcles. The fat is here difpofed in the fame way, and for the fame reafon, as in the omentum. The interftices betwixt the fat are filled with a fine membrane. Inftead of a great number of glandulæ vagæ to be found in the human mefentery, we find the glands few in number, and thofe are clofely connected together: or there is only one large gland to be obferved in the middle of the mefentery of a dog, which, from its imagined refemblance to the pancreas and the name of its difcoverer, is called *pancreas Afellii*: but the refemblance, if there is any, depends chiefly on the connection, the ftructure being entirely different. The reafon why this in man is at it were fubdivided into many fmaller ones, may poffibly be, that as the guts of a human body are proportionally much longer than thofe of this creature, it would have been inconvenient to have gathered all the *lactea primi generis* into one place; whereas, by collecting a few of thefe veffels into a neighbouring gland, the fame effect is procured much more eafily. Whether the food in this animal needs lefs preparation in its paffage through thefe glands, is a matter very much unknown to us; though it is certain that fome changes really do take place.

The *pancreas* in man lies acrofs the abdomen, tied down by the peritonæum; but the capacity of this creature's abdomen not allowing of that fituation, it is difpofed more longitudinally, being tied to the duodenum, which it accompanies for fome way. Its duct enters the duodenum about an inch and a half below the ductus communis.

The *fpleen* of this animal differs from ours very much, both in figure and fituation. It is much more oblong and thin, and lies more according to the length of the abdomen, like the pancreas. Though the fpleen of this creature is not firmly tied to the diaphragm (which was neceffary in our erect pofture to hinder it from falling downwards), yet by the animal's prone pofition, its pofterior parts being rather higher than the anterior, it comes to be always contiguous to this mufcle, and is as effectually fubjected to an alternate preffure from its action as the human fpleen is.

The human *liver* has no fiffures or divifions, except that fmall one betwixt the two *pilæ*, where the large veffels enter; whereas in a dog, and all other creatures that have a large flexion in their fpine, as lions, leopards, cats, &c. the liver and lungs are divided into a great many lobes by deep fections, reaching the large blood veffels, which in great motions of the back-bone may eafily flide over one another; and fo are in much lefs danger of being torn or bruifed, than if they were formed of one entire piece, as we really fee it is in horfes, cows, and fuch creatures as have their back-bone ftiff and lefs moveable. There is here no *ligamentum latum* connecting the liver to the diaphragm, which in our fituation is neceffary to keep the vifcus in its place: whereas in this creature, it naturally gravitates forwards, and by the horizontal pofition of the animal is in no danger of preffing againft the vena cava; the preventing of which is one ufe generally affigned to this ligament in man. Had the liver of the dog been thus connected to the diaphragm, the refpiration muft neceffarily have fuffered; for, as we fhall fee afterwards, this mufcle is here moveable at the centre as well as at the fides. But in man the liver is fixed to the diaphragm, moftly at its tendinous part; that is, where the pericardium is fixed to it on the other fide; fo that it is in no danger of impeding the refpiration, being fufpended by the mediaftinum and bones of the thorax. In confequence of this vifcus being divided into fo many lobes, it follows, that the hepatic ducts cannot poffibly join into one common trunk till they are quite out of the fubftance of the liver; becaufe a branch comes out from every lobe of the liver; all of which, by their union, form the hepatic duct: whence we are led to conclude, that the hepato-cyftic ducts, mentioned by former authors, do not exift. The gall bladder itfelf is wanting in feveral animals, fuch as the deer, the horfe, the afs, &c.; but in place of it, in fuch animals the hepatic duct, at its beginning, is widened into a refervoir of confiderable fize, which may anfwer the fame purpofe in them that the gall-bladder does in others.

We come next, after having examined the chylopoietic vifcera, to thofe organs that ferve for the fecretion and excretion of urine. And firft of the *kidneys*: which in this animal are fituated much in the fame way as in the human fubject; but have no fat on their inferior furface, where they face the abdomen, and are of a more globular form than the human. The reafon of thefe differences will eafily appear, if you compare their fituation and pofture in this animal with thofe in a man, who walks erect. They are placed in this fubject in the inferior part of the body, fo are not liable to the preffure of the vifcera, which feems to be the principal caufe of the fatnefs of thofe organs in us, and perhaps may likewife be the caufe of our being more fubject to the ftone than other animals. Hence there is no need of any cellular fubftance to ward off this preffure where there would neceffarily be fat collected; but the fuperior part of their kidneys is pretty well covered with fat, left they fhould fuffer any compreffion from the action of the ribs and fpine.

In the internal ftructure there is ftill a more confiderable difference: for the *papillæ* do not here fend out fingle the feveral *tubuli uriniferi*; but being all united, they hang down in form of a loofe pendulous flap in the middle of the pelvis, and form a kind of feptum medium; fo that a dog has a pelvis formed within the fubftance of the kidney. The only thing that is properly analogous to a pelvis in man is that fac or dilatation of the ureters formed at the union of the *ductus uriniferi*. The external part of the kidney of a dog fomewhat refembles one of the lobes of the kidney of a human fœtus: but in a human adult the appearance is very different; becaufe, in man, from the continual preffure of the furrounding vifcera, the lobes, which in the fœtus are quite diftinct and feparated, concrete, but the original cortical fubftance is ftill preferved in the internal parts of the kidney. The reafon of thefe particularities may probably be, that the fluids of this animal, as of all thofe of the carnivorous kind, being much more acrid than thofe that live on vegetable food, its urine muft incline much to an alkalefcency, as indeed the

ſmell and taſte of that liquor in dogs, cats, leopards, &c. evidently ſhow, being fetid and pungent, and therefore not convenient to be long retained in the body. For this end it was proper that the ſecreting organs ſhould have as little impediment as poſſible by preſſure, &c. in the performing their functions; and for that deſign, the mechaniſm of their kidneys ſeems to be excellently adapted. We have moſt elegant pictures in Euſtachius of the kidneys of brutes, delineated as ſuch, with a view to ſhow Veſalius's error in painting and deſcribing them for the human.

The *glandulæ* or *capſulæ atrabilariæ* are thicker and rounder than the human, for the ſame reaſon as the kidneys.

The *ureters* are more muſcular than the human, becauſe of the unfavourable paſſage the urine has through them: they enter the bladder near its fundus.

The *bladder* differs conſiderably from the human; and firſt in its form, which is pretty much pyramidal or pyriform. This ſhape of the dog's bladder is likewiſe common to all quadrupeds, except the ape and thoſe of an erect poſture. In man it is by no means pyriform, but has a large ſac at its poſterior and inferior part: this form depends entirely on the urine gravitating in our erect poſture to its bottom, which it will endeavour to protrude; but as it cannot yield before, being contiguous to the os pubis, it will naturally ſtretch out where there is the leaſt reſiſtance, that is, at the poſterior and lateral parts; and were it not for this fac, we could not ſo readily come at the bladder to extract the ſtone either by the leſſer or lateral operation of lithotomy. Moſt anatomiſts have delineated this wrong; ſo much, that we know of none who has juſtly painted it, excepting Mr. Cowper in his *Myotomia*, and Dr. Hunter. It has certainly been from obſerving it in brutes and young children, that they have been led into this miſtake. The ſame cauſe, viz. the gravity of the urine, makes the bladder of a different form in brutes: In their horizontal poſition the cervix, from which the urethra is continued, is higher than its fundus; the urine muſt therefore diſtend and dilate the moſt depending part by its weight.

As to its *connection*, it is faſtened to the abdominal muſcles by a proceſs of the peritoneum, and that membrane is extended quite over it; whereas in us, its ſuperior and poſterior parts are only covered by it: hence in man alone the high operation of lithotomy can be performed without hazard of opening the cavity of the abdomen. Had the peritoneum been ſpread over the bladder in its whole extent, the weight of the viſcera in our erect poſture would have ſo borne upon it, that they would not have allowed any conſiderable quantity of urine to be collected there; but we muſt have been obliged to diſcharge its contents too frequently to be conſiſtent with the functions of a ſocial life. Whereas by means of the peritoneum, the urine is now collected in ſufficient quantity, the viſcera not gravitating this way.

It may be taken for a general rule, that thoſe creatures that feed upon animal food have their bladder more muſcular and conſiderably ſtronger, and leſs capacious, than thoſe that live on vegetables, ſuch as horſes, cows, ſwine, &c. whoſe bladder of urine is perfectly membranous, and very large. This is wiſely adapted to the nature of their food; for in theſe firſt, as all their juices are more acrid, ſo in a particular manner their urine becomes exalted; which, as its remora might be of very ill conſequence, muſt neceſſarily be quickly expelled. This is chiefly effected by its ſtimulating this viſcus more ſtrongly to contract, and ſo to diſcharge its contents, though the irritation does not altogether depend upon the ſtretching, but likewiſe ariſes from the quality of the liquor.

Their *ſpermatic veſſels* are within the peritoneum, which is ſpread over them, and from which they have a membrane like a meſentery; ſo they hang looſe and pendulous in the abdomen: whereas, in us, they are contained in the cellular part of the peritoneum, which is tenſely ſtretched over them. At their paſſage out of the lower belly, there appears a plain perforation, or hole; hence the adult quadruped, in this reſpect, reſembles the human fœtus. And from obſerving this in quadrupeds, has ariſen the falſe notion of *hernia* or *rupture* among authors. This opening, which leads down to the teſticles, is of no diſadvantage to them, but evidently would have been to us; for from the weight of our viſcera, and our continually gravitating upon theſe holes, we muſt have perpetually laboured under enteroceles. This they are in no hazard of, ſince in them this paſſage is at the higheſt part of their belly, and, in their horizontal poſture, the viſcera cannot bear upon it. And, to prevent even the ſmalleſt hazard, there is a looſe pendulous ſemilunar flap of fat; which ſerves two uſes, as it both hinders the inteſtines from getting into the paſſage, and alſo the courſe of the fluids from being ſtopped in the veſſels, which is ſecured in us by the cellular ſubſtance and tenſe peritoneum. And it may be worth while to obſerve, that this proceſs remains almoſt unaltered, even after the animal has been nearly exhauſted of fat. There is next a paſſage quite down into the cavity where the teſticles lie. Had the ſame ſtructure obtained in man, by the conſtant falling down of the liquor which lubricates the inteſtines, we ſhould always have laboured under an hydrocele; but their poſture ſecures them from any hazard of this kind: indeed your very fat lap-dogs, that conſequently have an overgrown omentum, are ſometimes troubled with an epiplocele.

The *ſcrotum* is ſhorter and not ſo pendulous as the human in all the dog kind that want the *veſiculæ ſeminales*, that the ſeed at each copulation might the ſooner be brought from the teſtes, thus in ſome meaſure ſupplying the place of the *veſiculæ ſeminales*; for the courſe of the ſeed through the *vaſa deferentia* is thus ſhortened, by placing the ſecerning veſſels nearer the excretory organs. Perhaps its paſſage is likewiſe quickened by the muſcular power of the vaſa deferentia, which is ſtronger in this creature than in man. The want of *veſiculæ ſeminales* at the ſame time explains the reaſon why this creature is ſo tedious in copulation. But why theſe bodies are abſent in the dog kind more than in other animals, is a circumſtance we know nothing of.

The ſtructure of the *teſticles* is much the ſame with the human; as are likewiſe the *corpus pyramidale, varicoſum,* or *pampiniforme*, and the *epididymis* or excretory veſſel of the teſticle. The *vaſa deferentia* enter the abdomen where the blood-veſſels come out; and, paſſing along the upper part of the bladder, are inſerted a little below the bulbous part of the urethra.

The preputium has two muſcles fixed to it: one that ariſes from the ſphincter ani, and is inſerted all along the *penis*; and this is called *retractor præputii*. But the other, whoſe office is directly contrary to this, is cutaneous; and ſeems to take its origin from the muſcles of the abdomen, or rather to be a production of their tunica carnoſa. The *corpora cavernoſa* riſe much in the ſame way as the human: but theſe ſoon terminate; and the reſt is ſupplied by a triangular bone, in the inferior part of which there is a groove excavated for lodging the urethra. There are upon the penis two protuberant bulbous fleſhy ſubſtances, reſembling the glans penis in man, at the back of which are two veins, which by the *erectores penis* and other parts are compreſſed in the time of coition; and the circulation being ſtopped, the blood diſtends the large cavernous bodies. After the penis is thus ſwelled, the vagina by its contraction and ſwelling of its corpus cavernoſum, which is conſiderably greater than in other animals, gripes it cloſely; and ſo the male is kept in action ſome time contrary to his will, till time be given for bringing a quantity of ſeed ſufficient to impregnate the female: and thus, by that *orgaſmus veneris* of the female organs, the want of the *veſiculæ ſeminales* is in ſome

meafure fupplied. But as it would be a very uneafy pofture for the dog to fupport himfelf folely upon his hinder feet, and for the bitch to fupport the weight of the dog for fo long a time; therefore, as foon as the bulbous bodies are fufficiently filled, he gets off and turns averfe to her. Had, then, the penis been pliable as in other animals, the urethra muft of neceffity have been compreffed by this twifting; and confequently the courfe of the feed intercepted; but this is wifely provided againft by the urethra's being formed in the hollow of the bone. After the emiffion of the feed, the parts turn flaccid, the circulation is reftored, and the bulbous parts can be eafily extracted.

The *proftata* feems here divided into two, which are proportionably larger than the human, and afford a greater quantity of the ufual fecretions.

The *uterus* of multiparous animals is little elfe but a continuation of their vagina, only feparated from it by a fmall ring or valve. From the *uterus* two long canals mount upon the loins, in which the fœtus are lodged: thefe are divided into different facs, which are ftrongly conftricted betwixt each fœtus; yet thefe coarctions give way in the time of birth. From thefe go out the *tubæ Fallopianæ*, fo that the ovaria are fituated pretty near the kidneys.

We come next to examine the ftructure of the thorax and its contents. But firft it may not be amifs to remark of the *diaphragm* in its natural fituation, that it is in general more loofe and free than the human; which is owing to its connection with the neighbouring parts in a different manner from ours. The human *diaphragm* is connected to the pericardium; which again, by the intervention of the mediaftinum, is tied to the fternum, fpine, &c. but here there is fome diftance between the diaphragm and pericardium. We obferve further, that its middle part is much more moveable, and the tendinous parts not fo large. And indeed it was neceffary their *diaphragm* fhould be fomewhat loofe, they making more ufe of it in difficult refpiration than man. This we may obferve by the ftrong heaving of the flanks of an horfe or dog when out of breath; which correfponds to the rifing of the ribs in us.

The difpofition and fituation of the *mammæ* vary as they bear one or more young. Thofe of the uniparous kind have them placed between the pofterior extremities, which in them is the higheft part of their bodies, whereby their young get at them without the inconvenience of kneeling: neverthelefs, when the creatures are of no great fize, and their breaft large, as in fheep, the young ones are obliged to take this pofture. In multiparous animals, they muft have a great number of nipples, that their feveral young ones may have room at the fame time, and thefe difpofed over both thorax and abdomen; and the creatures generally lie down when the young are to be fuckled, that they may give them the moft favourable fituation. From this it does not appear to be from any particular fitnefs of the veffels at certain places for giving a proper nourifhment to the child, that the breafts are fo placed in women as we find them, but really from that fituation being the moft convenient both for mother and infant.

The *fternum* is very narrow, and confifts of a great number of fmall bones, moveable every way; which always happens in creatures that have a great mobility in their fpine. The ribs are ftraighter, and by no means fo convex as the human; whereby in refpiration the motion forward will very little enlarge their thorax, which is compenfated by the greater mobility of their diaphragm: fo our thorax is principally enlarged according to its breadth and depth, and theirs according to its length. The want of clavicles, and the confequent falling in of the anterior extremities upon the cheft, may contribute fomewhat to the ftraightnefs of the ribs.

The *mediaftinum* in this creature is pretty broad. The pericardium is not here contiguous to the diaphragm, but there is an inch of diftance betwixt them, in which place the fmall lobe of the lungs lodges; and by this means the liver, &c. of this animal, though continually preffing upon the diaphragm, yet cannot difturb the heart's motion.

The heart is fituated with its point almoft directly downwards, according to the creature's pofture, and is but very little inclined to the left fide. Its point is much fharper, and its fhape more conoidal, than the human. Here the names of *right* and *left* ventricles are proper enough, though not fo in the human; which ought rather to be called *anterior* and *pofterior*, or *fuperior* and *inferior*. This animal has the *vena cava* of a confiderable length within the thorax, having near the whole length of the heart to run over, ere it gets at the *finus Lowerianus dexter*. In men, as foon as it pierces the diaphragm, fo foon it enters the pericardium, which is firmly attached to it, and immediately gets into the *finus Lowerianus*; which finus, in the human fubject, by the oblique fituation of the heart, is almoft contiguous to the diaphragm: and by this we difcover, that feveral authors have taken their delineations of the human heart from brutes; which is eafily detected by the fhape and fituation of the heart, and long vena cava, within the thorax.

This fituation of the heart in a dog agrees beft with the fhape of its thorax, which is lower than the abdomen. The egrefs of the large blood-veffels from the heart is fomewhat different from the human; for here the right fubclavian comes off firft: and as a large trunk runs fome way upwards before it gives off the left carotid, and fplits into the carotid and fubclavian of the right fide, then the left fubclavian is fent off. So that neither here, properly fpeaking, is there an *aorta afcendens*, more than in the human; but this name has probably been impofed upon it from obferving this in a cow, where indeed there is an afcending and defcending aorta.

From this peculiarity of the diftribution of the veffels of the right fide, which happens, though not in fo great a degree, in the human fubject, we may perhaps in fome meafure account for the general greater ftrength, readinefs, or facility of motion, which is obfervable in the right arm. Neither is this difference peculiar to man; but is ftill more obfervable in thofe creatures in whom the fame mechanifm obtains in a greater degree. Obferve a dog at a trot, how he bears forward with his right fide; or look at him when a-fcraping up any thing, and you will at once fee that he ufes his right much oftener than he does his left foot. Something analogous to this may alfo be obferved in horfes.

The *thymus* of this creature is proportionably much larger than ours; whereas the glandula thyroidea is much lefs, and is divided into two diftinct parts, or there are two feparate glands; which is not the cafe in man. The reafon of this difference is unknown, as is likewife the ufe of the gland itfelf. It is generally remarked, that thefe two glands do thus always fupply the place of each other; that is, in fuch animals as have a large thymus, the glandula thyroidea is fmaller, and *vice verfa*.

The *thoracic duct* in a dog has no curvature before it enters the fubclavian vein, the horizontal pofition of this animal allowing a favourable enough courfe to the chyle, fo as not to need that turn to force its paffage into the blood. It may likewife be obferved, that fuch animals as walk horizontally have the valves of the thoracic duct fewer in number than others. The horfe has only a fingle pair; while, on the contrary, the ape refembles man in having feveral valves. Thus the lymph is not only forwarded in its paffage, but the weight of the column is diminifhed. The lungs of this creature are divided into more numerous lobes, and deeper, than they are in man, for the fame reafon as the liver. The left fide of the thorax in this animal bears a greater proportion to the right than in man; the one being nearly as three to two, the other as four to three. In

quadrupeds, as well as in man, the lungs are clofely applied to the containing parts; although this has been denied by fome.

We look on it as a general rule, that all quadrupeds, that have occafion to gather their food from the ground, are provided with longer *necks* than man: but as a long neck not only gives the objection of too long a lever to the weight of the head, but alfo, when the animal is gathering his food, makes the brain in danger of being oppreffed with too great a quantity of blood, by the liquor in thefe arteries having the advantage of a defcent, while that in the veins muft remount a confiderable way contrary to its own gravity; it was therefore neceffary that a part of the length of the neck fhould be fupplied by the length of the *jaws*. Thus we fee horfes, cows, &c. who have no occafion for opening their mouths very wide, yet have long jaws. Bull-dogs, indeed, and fuch animals as have occafion for very ftrong jaws, muft of neceffity have them fhort; becaufe the longer they are, the refiftance to be overcome acts with a longer lever. Another exception to this general rule, is, fuch animals as are furnifhed with fomething analogous to hands to convey their food to their mouths, as cats, apes, &c. The *teeth* of this creature plainly fhow it to be of the carnivorous kind; for there are none of them made for grinding its food, but only for tearing and dividing it. It has fix remarkably fharp teeth before, and two very long tufks behind; both of which the ruminating animals want. Thefe are evidently calculated for laying very firm hold of fubftances, and tearing them to pieces; and the vaft ftrength of the mufcles inferted into the lower jaw, affifts greatly in this action; while the molares have fharp cutting edges, calculated for cutting flefh, and breaking the hardeft bones. Even its pofterior teeth are not formed with rough broad furfaces as ours are; but are made confiderably fharper, and prefs over one another when the mouth is fhut, that fo they may take the firmer hold of whatever comes betwixt them.

The *tongue*, in confequence of the length of the jaws, is much longer than ours; and as this creature feeds with his head in a depending pofture, the food would always be in danger of falling out of the mouth, were it not for feveral prominences or papillæ placed moftly at the root of the tongue, and crooked backwards in fuch a manner as to allow any thing to pafs eafily down to the jaws, but to hinder its return. By the papillæ alfo the furface of the tongue is increafed, and a ftronger impreffion is made on the fenfation of tafte. In fome animals who feed on living creatures, thefe tenter-hooks are ftill more confpicuous; as in feveral large fifhes, where they are almoft as large as their teeth in the forepart of their mouth, and near as firm and ftrong.

The *velum pendulum palati* is in this creature confiderably longer than in man, to prevent the food from getting into his nofe; which would happen more frequently in this animal than in man, becaufe of its fituation while feeding. In this fubject, as in fome other quadrupeds, there is no *uvula*; but then the *epiglottis*, when preffed down, covers the whole rima entirely, and naturally continues fo: there is therefore a ligament, or rather mufcle, that comes from the os hyoides and root of the tongue, that is inferted into that part of the epiglottis where it is articulated with the cricoid cartilage, which ferves to raife it from the rima, though not fo ftrongly but that it may with a fmall force be clapped down again. It may be afked, however, why the uvula is wanting here, and not in man? This feems to be, that quadrupeds, who fwallow their food in an horizontal fituation, have no occafion for an uvula, though it is neceffary in man on account of his erect pofture. In the upper part of the pharynx, behind the cricoid cartilage, there is a pretty large gland to be found, which ferves not only for the feparation of a mucous liquor to lubricate the food as it paffes this way, but alfo fupplies the place of a valve, to hinder the food from regurgitating into the mouth, which it would be apt to do by reafon of the defcending fituation of the creature's head. In man, the mufcle of the epiglottis is wanting, its place being fupplied by the elafticity of the cartilage.

The *œfophagus* is formed pretty much in the fame way as the human. Authors indeed generally allege, that quadrupeds have their gullet compofed of a double row of fpiral fibres decuffating one another; but this is peculiar to ruminating animals, who have occafion for fuch a decuffation of fibres. The action of thefe you may eafily obferve in a cow chewing her cud.

The *nofe* is generally longer than in man, and its external paffage much narrower. The internal ftructure is alfo better adapted for an acute fmelling, having a larger convoluted furface on which the *membrana fchneideriana* is fpread; and this is to be obferved in moft quadrupeds, who have the offa fpongiofa commonly large, and thefe too divided into a great number of exceffively fine thin lamellæ. The fenfibility feems to be increafed in proportion to the furface; and this will alfo be found to take place in all the other fenfes. The elephant, which has a head pretty large in proportion to its body, has the greateft part of it taken up with the cavity of the nofe and frontal finufes; which laft extend almoft over their whole head, and leave but a fmall cavity for their brains. A very nice fenfe of fmelling was not fo abfolutely neceffary for man, who has judgment and experience to direct him in the choice of his food; whereas brutes have only their fenfes to direct them.

The external *ear* in different quadrupeds is differently framed, but always calculated to the creature's manner of life. In fhape it commonly refembles the oblique fection of a cone from near the apex to the bafis. Hares, and fuch other animals as are daily expofed to attacks from beafts of prey, have large ears directed backwards, their eyes warning them of any danger before: rapacious animals, on the other hand, have their ears placed directly forwards, as we fee in the lion, cat, &c. The flow hounds, and other animals that are defigned to hear moft diftinctly the founds coming from below, have their ears hanging downwards; or their ears are flexible, becaufe they move their head for the moft part with greater difficulty than man. Man, again, who muft equally hear founds coming from all quarters, but efpecially fuch as are fent from about his own height, has his external ear placed in a vertical manner, fomewhat turned forward. In fhort, wherever we fee a peculiarity in the make of this organ in any creature, we fhall, with very little reflection, difcover this form to be more convenient for that creature than another. The animal alfo has the power of directing the cone of the ear to the fonorous body without moving the head. There are fome differences to be obferved in the ftructure of the internal ear in different animals; but we know fo very little of the ufe of the particular parts of that organ in the human fubject, that it is altogether impoffible to affign reafons for thefe variations in other creatures.

All quadrupeds have at the internal canthus of the eye a ftrong firm membrane with a cartilaginous edge, which may be made to cover fome part of the eye; and this is greater or lefs in different animals as their eyes are more or lefs expofed to danger in fearching after their food. This *membrana nictitans*, as it is called, is not very large in this animal. Cows and horfes have it fo large as to cover one half of the eye like a curtain, and at the fame time tranfparent enough to allow abundance of the rays of light to pafs through it. Fifhes have a cuticle always over their eyes, as they are ever in danger in that inconftant element. In this then we may alfo obferve a fort of gradation.

All quadrupeds have a feventh mufcle belonging to the eye, called *fufpenforius*. It furrounds almoft the whole optic nerve,

and is fixed into the sclerotic coat as the others are. Its use is to sustain the weight of the globe of the eye, and prevent the optic nerve from being too much stretched, without obliging the four straight muscles to be in a continual contraction, which would be inconvenient: at the same time this muscle may be brought to assist any of the other four, by causing one particular portion of it to act at a time.

The next thing to be remarked is the figure of the *pupil*, which is different in different animals, but always exactly accommodated to the creature's way of life, as well as to the different species of objects that are viewed. Man has it circular, for obvious reasons: an ox has it oval, with the longest diameter placed transversely, to take in a larger view of his food: cats, again, have theirs likewise oval, but the longest diameter placed perpendicularly; they can either exclude a bright light altogether, or admit only as much as is necessary. The pupil of different animals varies in width, according as the internal organs of vision are more or less acute. Thus cats and owls, that seek their prey in the night, or in dark places (and consequently must have their eyes so formed as that a few rays of light may make a lively impression on the retina), have their pupils in the day-time contracted into a very narrow space, as a great number of rays would oppress their nice organs; while in the night, or where the light is faint, they open the pupil, and very fully admit the rays. In the same way, when the retina is inflamed, a great number of rays of light would occasion a painful sensation; therefore the pupil is contracted: on the contrary, in dying people, or in a beginning amaurosis, it is generally dilated, as the eyes on such occasions are very difficultly affected, and as it were insensible.

The posterior part of the choroid coat, which is called *tapetum*, is of different colours in different creatures. For oxen, feeding mostly on grass, have this membrane of a green colour, that it may reflect upon the retina all the rays of light which come from objects of that colour, while other rays are absorbed: thus the animal sees its food better than it does other objects. Cats and owls have their tapetum of a whitish colour; and for the same reasons have the pupil very dilatable, and their organs of vision acute. And we shall find, that all animals see more or less distinctly in the dark, according as their tapetum approaches nearer to a white or black colour. Thus dogs, who have it of a greyish colour, distinguish objects better in the night than man, whose tapetum is dark brown; and who, it is believed, sees worst in the dark of any creature: it being originally designed that he should rest from all kinds of employment in the night-time.

We shall now proceed to the *brain*, which we remark in the first place is proportionally much smaller in all quadrupeds than the human; but, as in man, it is divided into cerebrum and cerebellum, and these two parts bear nearly the same proportion to one another as in us. There was no such occasion for so great a quantity of brain in those animals as in man; seeing in them all its energy is employed in their progression, while man has a great waste of spirits in the exercise of his reason and intellectual faculties. And besides all this, a great bulky brain would be inconvenient to these creatures, in so far as it would add considerably to the weight of the head; which having the advantage of a long lever to act with, would require a much greater force to support it than now it does; for the heads of the greater part of quadrupeds are not near so heavy as they would at first sight seem to be, from the *sinus frontalis* being produced a great way upwards to enlarge the organs of smelling.

The pits in the anterior part of their skulls are much more conspicuous than in the human cranium; but the *falx* is not near so large in quadrupeds as in man, as they have little occasion to lie on either side, and the two hemispheres of the brain are in a great measure hindered from justling against one another in violent motions, by the brain's insinuating itself into those pits. The second process of the *dura mater*, or *tentorium cerebello super-expansum*, is considerably thicker and stronger in most quadrupeds than in man; especially in such of them as are very swift of foot, as hares and rabbits, and that most when they are old. This membrane is generally ossified, or we find the place of it supplied by a bone, that it may the more effectually keep off the superincumbent brain from the cerebellum in their rapid motions. The olfactory nerves are very large, and justly deserve the name of *processus mamillares*. They are hollow, and consist of a medullary and cineritious substance, and at first sight appear to be the anterior ventricles of the brain produced; but in man they are small, and without any discernible cavity. The reason of this is pretty evident, if we consider how this animal's head is situated. The cortical and medullary parts, as well as the *corpus callosum*, are similar to those parts in man. The *nates* and *testes* deserve this name much better here than in the human body, with respect to each other. They are larger in the quadruped; and hence we perceive that there is no great reason for ascribing the different operations to any particular size or shape of these parts. They are here also of different colours; the *nates* being of the colour of the cortical, and the *testes* of the medullary substance of the brain; whereas in man they are both of one colour. The reason of these differences, and others of the like nature to be met with, we shall not pretend to determine. The *rete mirabile Galeni*, situated on each side of the *sella turcica*, about which there has been so much dispute, is very remarkable in most quadrupeds. This plexus of vessels is nothing else than a continuation of the internal carotid arteries, which, entering the skull, divide into a vast number of minute branches running along the side of the sella turcica: and, uniting afterwards, are spent on the brain in the common way. Galen seems with justice to suppose, that this plexus of vessels serves for checking the impetuosity of the blood destined for the brain.—The structure of the brain differing but very little in different quadrupeds, it is needless to examine it in any other.

Sect. IV. *The Anatomy of a* Cow.

The next species of quadrupeds we proposed to consider was the *ruminant* kind, of which we have an example in a cow; and accordingly shall take the fœtus of the animal *in utero*, that we may first remark some things that are peculiar to it in that state, and afterwards proceed to examine its viscera. However, before we begin our enquiry respecting the fœtus, it may be right to observe, that from the ovarium something essentially necessary for the production of the fœtus is derived, as well as in the human species.

The form of a cow's *uterus* differs from the human in having two pretty large cornua. This is common to it with other brutes; for a bitch has two long *cornua uteri*: but these again differ (as being multiparous and uniparous) in this, that in the bitch's cornua the fœtus are contained; whereas here there is only part of the secundines, being mostly the allantois with the included liquor. The muscular fibres of the uterus are more easily discovered; its internal surface has a great number of spongy, oblong, protuberant, glandular bodies fixed to it. These are composed of vessels of the uterus terminating here. In an impregnated uterus, we can easily press out of them a chylous mucilaginous liquor; they are composed of a great many processes or digituli, and deep caverns, answering to as many caverns and processes of the placenta. Their resemblance has occasioned the name of *papillæ* to be given them; and hence it was that Hippocrates was induced to believe that the fœtus sucked *in utero*. The papillæ are found in all the different stages of life, in the various stages of pregnancy, and likewise in the

unimpregnated ſtate. It is not eaſy to determine whether the uterus grows thicker or thinner in the time of geſtation. The membranes, it is plain (by the ſtretching of the parts), muſt be made thinner; but then it is as evident, that the veſſels are at that time enlarged, upon which principally the thickneſs of any part depends; ſo there ſeems to be as much gained the one way as loſt the other.

The *os uteri* is entirely ſhut up by a glutinous mucilaginous ſubſtance, that is common to the females of all creatures when with young. The firſt of the proper involucra of the fœtus is the *chorion*, a pretty ſtrong firm membrane, on whoſe external ſurface are diſperſed a great many red fleſhy bodies of the ſame number, ſize, and ſtructure, with the papillæ, with which they are mutually indented. They have been called *cotyledones*, or, more properly, *placentulæ*, ſince they ſerve the ſame uſe as the placenta in women. The ſeparation of theſe from the papillæ without any laceration, and our not being able to inject coloured liquors from the veſſels of the glands of the uterus into the placentulæ, ſeem to prove beyond a reply, that there can be here no anaſtomoſes betwixt the veſſels. On their coats run a great number of veſſels that are ſent to the ſeveral placentulæ, on the external ſide next to the uterus; whereas in creatures that have but one placenta, as in the human ſubject, cats, dogs, &c. the adheſion is ſomewhat firmer. The placentæ are likewiſe joined to the papillæ in the cornua uteri.

The *allantois* is a fine tranſparent membrane contiguous to the former. It is not a general involucrum of the fœtus in the mother, for it covers only a ſmall part of the amnios. It is moſtly lodged in the cornua uteri. In mares, bitches, and cats, it ſurrounds the amnios, being every where interpoſed betwixt it and the chorion. In ſheep and goats it is the ſame as in this animal; and in ſwine and rabbits it covers ſtill leſs of the amnios. This ſac is probably formed by the dilatation of the urachus, which is connected at its other end to the fundus of the bladder, through which it receives its contents; and a great quantity of urine is commonly found in it. The membrane is doubled at the extremity of the canal, to hinder the return of the urine back into the bladder. Its veſſels are ſo exceſſively fine and few, that we cannot force an injected liquor farther than the beginning of this coat. This membrane is ſo far analogous to the cuticula, as not to be liable to corruption, or eaſily irritated by acrid liquors. The exiſtence of this membrane in women has been very warmly diſputed on both ſides.

The third proper integument of the fœtus is the *amnios*. It is thinner and firmer than the chorion; it has numerous ramifications of the umbilical veſſels ſpread upon it, the lateral branches of which ſeparate a liquor into its cavity. This is the proper liquor of the amnios: which at firſt is in a ſmall quantity, afterwards increaſes for ſome months, then again decreaſes; and in a cow near her time, the quantity of this liquor is not above a pound. This membrane does not enter the *cornua uteri* in this creature, being confined to the body of the uterus; whereas the allantois occupies chiefly its cornua. But for what further relates to the ſtructure of the involucra, with the nature of the liquors contained in them, we muſt refer to vol. ii. of the Medical Eſſays.

There are here two *venæ umbilicales*, and but one in the human ſubject; becauſe the extreme branches coming from the ſeveral placentulæ could not unite ſo ſoon as they would have done had they come all from one cake as in the human. There is a ſmall round fleſhy body that ſwims in the urine of this creature, mares, &c. which is the *hippomanes* of the ancients. Several idle opinions and whims have been entertained as to its uſe; but that ſeems to be ſtill unknown, or how it is generated or nouriſhed, for it has no connection with the fœtus or placentulæ.

Having thus conſidered the ſeveral involucra of this animal in a fœtus ſtate, let us next obſerve the ſpecialities in its internal ſtructure peculiar to a fœtus. The *umbilical vein* joins the *vena portarum* in the *capſula Gliſſoniana*, without ſending off any branches as it does in the human ſubject. This veing off after birth turns to a ligament; yet there are ſome inſtances where it has remained pervious for ſeveral years after birth, and occaſioned a hæmorrhage. We may next obſerve the duct called *canalis venoſus*, going ſtraight from the *capſula Gliſſoniana* to the *vena cava*; this turns alſo afterwards to a ligament. The umbilical arteries riſe at acute angles from the internal iliacs, whatever ſome may ſay to the contrary; theſe alſo become impervious.

The pulmonary artery coming from the right ventricle of the heart divides into two; the largeſt, called *canalis arterioſus*, opens into the deſcending aorta; the other divides into two, to ſerve the lungs on each ſide. The *foramen ovale* is placed in the partition betwixt the right and left auricles. At the edge of the hole is fixed a membrane, which when much ſtretched will cover it all over; but more eaſily yields to a force that acts from the right auricle to the left, than from the left to the right. After what has been ſaid, we may eaſily underſtand how the circulation is performed in a fœtus. The blood, being brought from the placenta of the mother, is thrown into the *capſula Gliſſoniana*, where it is intimately blended with the blood in the *vena portarum*: then part of this blood goes directly into the *vena cava* by the *ductus venoſus*; the reſt paſſes through the liver. Firſt, then, the whole is ſent from the *vena cava* into the right auricle, from whence part of it is ſent by the *foramen ovale* into the left auricle; the reſt paſſes into the right ventricle, then into the pulmonary artery; then the greateſt ſhare it receives is ſent immediately into the deſcending aorta by the *canalis arterioſus*, and the remainder circulates through the lungs, and is ſent back by the pulmonary veins into the left auricle; which, with the blood brought there by the *foramen ovale*, is ſent into the left ventricle, from whence it is driven by the aorta through the body. The great deſign of this mechaniſm is, that the whole maſs of blood might not paſs through the collapſed lungs of the fœtus; but that part of it might paſs through the *foramen ovale* and *canalis arterioſus*, without circulating at all through the lungs.

The *kidneys* in the fœtus are compoſed of different lobes, which ſerve to give us an idea of the kidneys being a congeries of different glands; theſe lobes being kept contiguous by the external membrane, are preſſed by the other viſcera, till at length they unite.

We come now to conſider the creature as a ruminant animal. There are no *dentes inciſores* in the upper jaw, but the gums are pretty hard, and the tongue rough. This roughneſs is occaſioned by long ſharp-pointed papillæ, with which the whole ſubſtance of it is covered. Theſe papillæ are turned towards the throat; ſo that by their means the food, having once got into the mouth, is not eaſily pulled back. The animals therefore ſupply the defect of teeth by wrapping their tongue round a tuft of graſs; and ſo, preſſing it againſt the upper jaw, keep it ſtretched, and cut it with the teeth of the under jaw; then, without chewing, throw it down into the œſophagus, which in theſe creatures conſiſts of a double row of ſpiral fibres decuſſating one another. All animals which ruminate muſt have more ventricles than one: ſome have two, ſome three; our preſent ſubject has no leſs than four. The food is carried directly down into the firſt, which lies upon the left ſide, and is the largeſt of all; it is called γαστηρ, *ventriculus*, and κοιλια, by way of eminence. It is what is called by the general name of *paunch* by the vulgar. There are no rugæ upon its internal ſurface; but inſtead of theſe there are a vaſt number of ſmall blunt-pointed proceſſes, by which the whole has a general roughneſs, and the ſurface is extended to ſeveral times the ſize

of the paunch itſelf. The food, by the force of its muſcular coat, and the liquors poured in here, is ſufficiently macerated; after which it is forced up hence by the œſophagus into the mouth, and there it is made very ſmall by maſtication; this is what is properly called *chewing the cud*, or *rumination*; for which purpoſe the *dentes molares* are exceedingly well fitted: for inſtead of being covered with a thin cruſt, the enamel on them conſiſts of perpendicular plates, between which the bone is bare, and conſtantly wearing faſter than the enamel, ſo that the tooth remains good to extreme old age; and by means of theſe teeth the rumination is carried on for a long time without any danger of ſpoiling them. After rumination, the food is ſent down by the gullet into the ſecond ſtomach; for the œſophagus opens indifferently into both. It ends exactly where the two ſtomachs meet; and there is a ſmooth gutter with riſing edges which leads into the ſecond ſtomach, from thence to the third, and alſo to the fourth: however, the creature has a power to direct it into which it will. Some tell us, that the drink goes into the ſecond; but that might be eaſily determined by making them drink before ſlaughter. The ſecond ſtomach, which is the anterior and ſmaller, is called κεκρυφαλος, *reticulum*, *honeycomb*, the *bonnet*, or *king's hood*. It conſiſts of a great number of cells on its internal ſurface, of a regular pentagonal figure, like to a honeycomb. Here the food is farther macerated; from which it is protruded into the third, called εχινος or *omaſum*, *vulgo* the *manyplies*, becauſe the internal ſurface riſes up into a great many plicæ or folds, and *ſtratum ſuper ſtratum*, according to the length of this ſtomach. Some of theſe plicæ are farther produced into the ſtomach than others; *i. e.* firſt two long ones on each ſide, and within theſe, two ſhorter in the middle, &c. There are numberleſs glandular grains like millet-ſeeds diſperſed on its plicæ, from which ſome authors call this ſtomach the *millet*. From this it paſſes into the fourth, whoſe names are ενυστρον, *abomaſſum*, *caillé*, or the *red*, which is the name it commonly has becauſe of its colour. This much reſembles the human ſtomach, or that of a dog; only the inner folds or plicæ are longer and looſer: and it may alſo be obſerved, that in all animals there is only one digeſtive ſtomach, and that has the ſame coagulating power in the fœtus as the fourth ſtomach in this animal; whence this might not improperly be called the only true ſtomach. *Caillé* ſignifies *curdled*; and hence the French have given that as a name to this fourth ſtomach, becauſe any milk that is taken down by young calves is there curdled. It is this fourth ſtomach, with the milk curdled in it, that is commonly taken for making runnet: but after the bile and pancreatic juice enter, this coagulation is not to be found, which ſhows the uſe of theſe liquors. There are other creatures which uſe the ſame food, that have not ſuch a mechaniſm in their digeſtive organs. Horſes, aſſes, &c. have but one ſtomach, where graſs is macerated, and a liquor for their nouriſhment extracted, and the remainder ſent out by the anus very little altered. From this different ſtructure of the ſtomach in theſe creatures, a ruminant animal will be ſerved with one-third leſs food than another of equal bulk: graziers are ſufficiently acquainted with this. The reaſon is, that ruminating animals have many and ſtrong digeſtive organs; all their food is fully prepared, and almoſt wholly converted into chyle: but a horſe's ſtomach is not fitted for this; ſo that he requires a much greater quantity of food to extract the ſame nouriſhment.

The inteſtines of theſe creatures are of a conſiderable length in proportion to the bulk of the body; and this confirms what we ſaid formerly on the ſubject of the inteſtines of a dog, viz. that the length and capacity of the guts were different in different animals, according to the nature of their food.

The *duodenum* is formed here much the ſame way as in a dog, and the general intention kept in view with regard to the mixture of the bile and pancreatic lymph. The great guts here hardly deſerve that name, their diameter differing very little from that of the ſmall ones; but to compenſate this, they are much longer proportionally than a dog's are, being convoluted as the ſmall guts are. The cœcum is very large and long. The digeſtion of the cow, as well as ſome other animals, is accompanied with a peculiar kind of action called *rumination*; the intention of which ſeems to be, that the food may be ſufficiently comminuted, and thus more fully acted upon by the ſtomach: for it is not obſerved that a calf ruminates as long as it is fed only upon milk, though the action takes place as ſoon as it begins to eat ſolid food. But it is to be obſerved, that as long as a calf feeds only upon milk, the food deſcends immediately into the fourth ſtomach (which, as has been already mentioned, ſeems only capable of performing the operation of digeſtion) without ſtopping in any of the firſt three. The rumination does not take place till after the animal has eaten a pretty large quantity; after which ſhe lies down, if ſhe can do it conveniently, and begins to chew; though the operation will take place in a ſtanding poſture, if ſhe cannot lie down. In this action a ball is obſerved to riſe from the ſtomach with great velocity, almoſt as if ſhot from a muſket. This ball the animal chews very accurately, and then ſwallows it again, and ſo on alternately, till all the food ſhe has eaten has undergone this operation. This is eaſily explained from the ſtructure of the œſophagus, which has one ſet of fibres calculated for bringing up the graſs, and another for taking it down. By means of rumination, the cow extracts a much larger proportion of nouriſhment from her food than thoſe animals which do not ruminate; and hence ſhe is contented with much worſe fare, and ſmaller quantities of it, than a horſe; hence alſo the dung of cows, being much more exhauſted of its fine parts than horſe-dung, proves much inferior to it as a manure.

The *ſpleen* differs not much either in figure or ſituation from that of a dog; but it is a little more firmly fixed to the diaphragm, there not being here ſo much danger of this viſcus being hurt in the flexions of the ſpine.

The *liver* is not ſplit into ſo many lobes in this creature as either in a man or dog; which depends on the ſmall motion this creature enjoys in its ſpine, which made ſuch a diviſion needleſs. This alſo confirms what we formerly advanced on this head.

Their *veſica urinaria* is of a pyramidal ſhape. It is very large, and more membranaceous: for the urine of theſe creatures not being ſo acrid as that of carnivorous animals, there was no ſuch occaſion for expelling it ſo ſoon.

The male is provided with a looſe pendulous *ſcrotum*, and conſequently with *veſiculæ ſeminales*. The female organs differ from thoſe of a bitch, moſtly as to the form of the cornua uteri, which are here contorted in form of a ſnail. In this, and all uniparous animals, they contain only part of the ſecundines; but in bitches and other multiparous animals, they run ſtraight up in the abdomen, and contain the fœtus themſelves.

The ſituation of the *heart* is pretty much the ſame with that of a dog, only its point is rather ſharper. In us, the heart beating continually againſt the ribs, and both ventricles going equally far down to the conſtitution of the apex, it is very obtuſe: but here the apex is made up only of the left ventricle, ſo is more acute. The *aorta* in this creature is juſtly divided into *aſcending* and *deſcending*, though this diviſion is ill founded either in a dog or man; and it has certainly been from this ſubject that the older anatomiſts took their deſcriptions when they made this diviſion; for here the aorta divides into two, the aſcending and deſcending

PART II. OF FOWLS.

THE next clafs of animals we come to confider are of the feathered kind; which are divided into the *granivorous* and *carnivorous*. But before we go on to confider the peculiarities in the vifcera of each kind, we muft obferve what both fpecies agree in.

SECT. I. *Of Fowls in general.*

FOWLS have a particular covering of feathers different from all other creatures, but exactly well fuited to their manner of life: for this not only protects them from the injuries of the weather, but ferves them in their progreffion through that thin aërial element they are for the moft part employed in; and as fome fowls live much in the water, their feathers are continually befmeared with an oily liquor, which keeps the water from foaking into their fkins, and fo prevents bad effects.

Fowls have the ftrongeft mufcles of their whole body inferted into their wings; whence by the way we may obferve, that it is altogether impoffible for man to buoy himfelf up in the air like birds, even though he had proper machines in place of wings, unlefs he were likewife provided with mufcles ftrong enough for moving them. In the next place, their wings are not placed in the middle of their bodies, but a good deal further forwards; whence it would at firft view appear, that their heads would be erect, and their pofterior parts moft depending when raifed in the air; but by ftretching out their heads which act upon the lever of a long neck, they alter their centre of gravity pretty much. But if their necks are kept from being ftretched out, or if you cut away their tails, they become incapable of flying to any confiderable diftance.

The fize of the wings in different fowls varies according to the occafions of the creature. Thus birds of prey, that fly a confiderable way to provide their food, have large ftrong wings; whereas domeftic birds, who find their nourifhment almoft every where, have very fhort and but fmall wings. Their tail is of ufe in affifting to raife them in the air; though the chief purpofe of it is to ferve as a rudder in guiding their flight, whilft they ufe their wings as we do oars in putting forward a boat. The pofterior extremities are fituated fo far back, as to make us at firft think they would be in continual hazard of falling down forwards when they walk: but this is prevented by their holding up their heads and neck, fo as to make the centre of gravity fall upon the feet; and when they have occafion for climbing up a fteep place, they ftretch out their heads and necks forwards, efpecially if they are fhort-legged, the better to preferve properly the balance of the body. Thus we may obferve a goofe entering a barn-door, where generally there is an afcending ftep, to ftretch out its neck, which before was raifed, and incline its body forwards. This is laughed at by the common people, who afcribe it to a piece of folly in the goofe, as if afraid of knocking its head againft the top of the door-way.

Carnivorous animals are provided with ftrong crooked claws for the catching their prey: water-fowls ufe them for fwimming; and, principally for this purpofe, have a ftrong firm membrane interpofed betwixt the toes. There is a beautiful mechanifm to be obferved in the toes of fowls, which is of confiderable ufe to them. For their toes are naturally drawn together, or bended, when the foot is bended: this is owing to the fhortnefs of the tendons of the toes, which pafs over them, which is analogous to our heel; and that the toes are fet in the circumference of a circle, as our fingers are: hence, when the foot is bended, the tendons muft confequently be much ftretched; and, fince they are inferted into the toes, muft of neceffity bend them when the foot is bended; and when the foot is extended, the flexors of the toes are again relaxed, and they therefore expanded. This is alfo of great ufe to different kinds of fowls: thus the hawk defcending with his legs and feet extended, fpreads his talons over his prey; and the weight of his body bending his feet, the toes are contracted, and the prey is feized by the talons. This is alfo of great ufe to water-fowls: for had there been no fuch contrivance as this, they muft have loft as much time when they pulled their legs in as they had gained by the former ftroke: but, as the parts are now framed, whenever the creature draws in its foot, the toes are at the fame time bended and contracted into lefs fpace, fo that the refiftance made againft the water is not near fo great as before: on the contrary, when they ftretch their foot, their toes are extended, the membrane betwixt them expanded, and confequently a greater refiftance made to the water. Again, fuch fowls as live moftly in the air, or have occafion to fuftain themfelves on branches of trees in windy weather, and even in the night-time when afleep, while all their mufcles are fuppofed to be in a ftate of relaxation; fuch have no more to do but lean down the weight of their bodies, and their toes continue bended without any mufcles being in action; and whenever they would difentangle themfelves, they raife up their bodies, by which their feet, and confequently their toes, are extended.

The roftrum, bill, or beak in fowls, is compofed of two mandibulæ; and, as in quadrupeds, the upper one has no motion but what it poffeffes in common with the head. But parrots are an exception to this rule; for they can move the upper mandible at pleafure: this is exceedingly convenient, as it enables them to lay hold of whatever comes in their way. Carnivorous fowls have their beaks long, fharp, and crooked; the domeftic fowls, fuch as the hen-kind, &c. have ftrong fhort beaks, commodioufly fitted to dig up and break their food; the water-fowls, again, have long or very broad fcoop-like beaks, which is moft convenient for them. The fternum in fowls is much larger proportionally than the human, and has a ridge rifing in its middle for the more commodious origin of the mufcles that move the wings. It is alfo lefs moveable than ours; for had it been very moveable, a great deal of the force employed for moving the wings would at every contraction of the mufcles have been loft, or elfe fome other mufcles muft have come in play to keep firm the fternum; but this additional weight would have been inconvenient for their progreffion. What other things are moft remarkable in the ftructure of the feveral vifcera, we fhall confider in that common domeftic animal the cock or hen, and afterwards obferve the difference of their vifcera chylopoietica from thofe of a carnivorous fowl.

SECT. II. *Anatomy of the Domeftic Cock.*

THOUGH birds of this kind live upon food fomewhat fimilar to that of man, yet as they have no teeth to feparate or break down this food, we fhould expect to find fomething to compenfate for the want of teeth, fomething remarkable in the organs of digeftion: we fhall therefore begin with thefe parts.

The *œfophagus* of this creature runs down its neck, fomewhat inclined to the right fide: and terminates in a pretty large membranous fac, which is the ingluvies or crop, where the food is macerated and diffolved by a liquor feparated by the glands, which are eafily obferved every where on the internal furface of this bag. The effect of this maceration may be very well obferved in pigeons, who are fometimes in danger of being fuffocated by the peafe, &c. they feed upon, fwelling to fuch an

immenſe bulk in their ingluvies, that they can neither get them upwards nor downwards. But the fowl may be preſerved by opening the ſac, taking out the peaſe, and ſewing up the wound.

The food getting out of this ſac goes down by the remaining part of the œſophagus into the *ventriculus ſuccenturiatus*, or *infundibulum Peyeri*, which is a continuation of the gullet with more numerous glands, which ſeparate a liquor to dilute the food ſtill more, which at length gets into the true ſtomach or gizzard, *ventriculus calloſus*, which conſiſts of two very ſtrong muſcles covered externally with a tendinous aponeuroſis, and lined on the inſide by a very thick firm membrane, which we evidently diſcover to be a production of the cuticula. This might have been proved in ſome meaſure *à priori*, from taking notice, that this membrane, which in chicks is only a thin ſlight pellicle, by degrees turns thicker and ſtronger the more attrition it ſuffers: but there is no other animal ſubſtance, ſo far as we know, which grows more hard and thick by being ſubjected to attrition, excepting the cuticula.—Hence may be drawn ſome kind of proof of what has been affirmed concerning the tunica villoſa of the ſtomach and inteſtines in the human body, viz. that it was in part a continuation of the epidermis; nay, all the hollow parts of the body, even arteries, veins, &c. ſeem to be lined with a production of this membrane, or one analogous to it. The uſe of the internal coat of the ſtomach of fowls is to defend the more tender parts of that viſcus from the hard grains and little ſtones thoſe creatures take down. The uſe of the gizzard is to compenſate for the want of teeth; and it is well fitted for this purpoſe from the great ſtrength it poſſeſſes.

The digeſtion of theſe animals is performed merely by attrition, as is evinced by many experiments; and it is further aſſiſted by the hard bodies they ſwallow. We ſee them daily take down conſiderable numbers of the moſt ſolid rugged little flints they find; and theſe can ſerve for no other purpoſe than to help the trituration of their aliments. After theſe pebbles, by becoming ſmooth, are unfit for this office, they are thrown up by the mouth. Hence fowls that are long confined, though ever ſo well fed, turn lean for want of theſe ſtones to help their digeſtion. Spallanzani, however, has lately found, that pebbles are not at all neceſſary to the trituration of the food of theſe animals. At the ſame time, he does not deny, that when put in motion by the gaſtric muſcles, they are capable of producing ſome effect on the contents of the ſtomach; but is inclined to believe, that they are not ſought for and ſelected by deſign, as many ſuppoſe, but becauſe they frequently happen to be mixed with the food.

The *duodenum* begins pretty near the ſame place at which the œſophagus enters; yet notwithſtanding the vicinity of theſe two tubes, the aliments are in no danger of getting out before they are perfectly digeſted, by reaſon of a protuberance, or *ſeptum medium*, betwixt the orifices; and in thoſe creatures who have ſuch a ſtrong muſcular ſtomach, it is a matter of great indifference whether the entry of the œſophagus or pylorus be higheſt, provided that the entry from the œſophagus does not allow the food to regurgitate, ſince the force of the ſtomach can eaſily protrude it towards the duodenum. This gut is moſtly in the right ſide, and hangs pendulous in their abdomen, having its two extremities fixed to the liver. The *ductus choledochus* enters near its termination, where it mounts up again to be fixed to the liver; and leſt, by the contraction of the inteſtines, the bile ſhould paſs over without being intimately blended with the chyle, that duct enters downwards, contrary to the courſe of the food, and contrary to what is obſerved in any of the animals we have yet mentioned. But ſtill the general intention is kept in view, in allowing theſe juices the faireſt chance of being intimately blended with the food.

The *ſmall inteſtines* are proportionally longer than thoſe of carnivorous birds, for the general cauſe already aſſigned. At the end of the ilium they have two large *inteſtina cœca*, one on each ſide, four or five inches long, coming off from the ſide of the rectum, and aſcending; and we find them containing part of the food: theſe ſerve as reſervoirs to the feces; which, after ſome remora, there regurgitate into what ſoon becomes the rectum; which, together with the excretories of urine and organs of generation, empties itſelf into the common cloaca. The ſmall inteſtines are connected by a long looſe meſentery, which has little or no fat accompanying the blood veſſels, there being no hazard of the blood's being ſtopped.

The *pancreas* in this creature lies betwixt the two folds of the duodenum, and ſends two or three ducts into this gut pretty near the biliary.

The *ſpleen* is here of a round globular figure, ſituated between the liver and ſtomach; and betwixt theſe and the back bone it enjoys the ſame properties as in other animals, viz. large blood-veſſels, &c. All its blood is ſent into the *vena portarum*, and has a perpetual conquaſſation. It has no excretory, as far as we know. The *liver* is divided into two equal lobes by a pellucid membrane, running according to the length of their body: and hence we may obſerve, that it is not proper to that bowel to lie on the right ſide; which is ſtill more confirmed by what we obſerve in fiſhes, where the greateſt part of it lies in the left ſide.

The ſhape of their *gall-bladder* is not much different from that of quadrupeds; but it is thought to be longer in proportion to the ſize of the animal, and is farther removed from the liver.

The principal difference to be remarked in the *heart*, is the want of the *valvulæ tricuſpides*, and their place being ſupplied by one fleſhy flap.

The *lungs* are not looſe within the cavity of the thorax, but fixed to the bone all the way; neither are they divided into lobes, as in thoſe animals that have a large motion in their ſpine. They are two red ſpongy bodies, covered with a membrane that is pervious, and which communicates with the large veſicles or air-bags that are diſperſed over their whole abdomen: which veſicles, according to Dr. Monro, ſerve two very conſiderable uſes. The one is to render their bodies ſpecifically light, when they have a mind to aſcend and buoy themſelves up when flying, by diſtending their lungs with air, and alſo ſtraiten their *trachea arteria*, and ſo return the air. Secondly, they ſupply the place of a muſcular *diaphragm* and ſtrong abdominal muſcles; producing the ſame effects on the ſeveral contained viſcera, as theſe muſcles would have done, without the inconvenience of their additional weight: and conducing as much to the excluſion of the egg and feces.

The late Mr. Hunter made ſome curious diſcoveries relative to theſe internal receptacles of air in the bodies of birds. Some of them are lodged in the fleſhy parts, and ſome in the hollow bones; but all of them communicate with the lungs. He informs us, that the air-cells which are found in the ſoft parts have no communication with the cellular membrane which is common to birds as well as other animals. Some of them communicate immediately with each other; but all of them by the intervention of the lungs as a common centre. Some of them are placed in cavities, as the abdomen; others in the interſtices of parts, as about the breaſt. The bones which receive air are of two kinds; ſome of them divided into innumerable cells; others hollowed out into one large canal. They may be diſtinguiſhed from ſuch as do not receive air, by having leſs ſpecific gravity; by being leſs vaſcular; by containing little oil; by having no marrow nor blood in their cells; by having leſs hardneſs and firmneſs than others; and by the paſſage for the air being perceivable.

The mechanifm by which the lungs are fitted for conveying air to thefe cavities is, their being attached to the diaphragm, and connected alfo to the ribs and fides of the vertebræ. The diaphragm is perforated in feveral places by pretty large holes, allowing a free paffage of air into the abdomen. To each of thefe holes is attached a diftinct membranous bag, thin and tranfparent. The lungs open at their anterior part into membranous cells, which lie upon the fides of the pericardium, and communicate with the cells of the fternum. The fuperior parts of the lungs open into cells of a loofe net-work, through which the trachea and œfophagus pafs. When thefe cells are diftended with air, it indicates paffion, as in the cafe of the turkey-cock, pouting pigeon, &c.

Thefe cells communicate with others in the axilla, and under the large pectoral mufcle; and thofe with the cavity of the os humeri, by means of fmall openings in the hollow furface near the head of that bone. Laftly, the pofterior edges of the lungs have openings into the cells of the vertebræ, ribs, os facrum, and other bones of the pelvis, from which the air finds a paffage to the cavity of the thigh-bone.

Concerning the ufe of thefe cavities the author conjectures, that they are a kind of appendage to the lungs; and that, like the bags, continued through the bellies of amphibious animals, they ferve as a kind of refervoirs of air. They affift birds during their flight, which muft be apt to render frequent refpiration difficult. He farther infinuates that this conftruction of the organs of refpiration may affift birds in finging; which, he thinks, may be inferred from the long continuance of fong between the breathings of a canary-bird. On tying the trachea of a cock, the animal breathed through a canula introduced into his belly; another through the os humeri, when cut acrofs; and a hawk through the os femoris. In all thefe cafes the animals foon died. In the firft, Mr. Hunter afcribes the death to an inflammation of the bowels; but in the laft he owns it was owing to difficult breathing. What took place, however, was fufficient to fhow that the animals really did breathe through the bone.

When we examine the upper end of the *trachea,* we obferve a *rima glottidis* with mufcular fides, which may act in preventing the food or drink from paffing into the lungs: for there is no *epiglottis* as in man and quadrupeds.

The *trachea arteria,* near where it divides, is very much contracted; and the voice is principally owing to this coarctation. If you liften attentively to a cock crowing, you will be fenfible that the noife does not proceed from the throat, but deeper; nay, this very pipe, when taken out of the body, and cut off a little after its divifion, and blown into, will make a fqueaking noife, fomething like the voice of thefe creatures. On each fide, a little higher than this contraction, there is a mufcle arifing from their fternum, which dilates the trachea. The cartilages, of which the pipe is compofed in this animal, go quite round it: whereas in man and quadrupeds they are difcontinued for about one-fourth on the back part, and the intermediate fpace is filled up by a membrane. Neither is the trachea fo firmly attached to their vertebræ as in the other creatures we have examined. This ftructure we fhall find of great fervice to them, if we confider, that had the fame ftructure obtained in them as in us, their breath would have been in hazard of being ftopped at every flexion or twifting of their neck, which they are frequently obliged to.

In place of a *mufcular diaphragm,* this creature has nothing but a thin membrane connected to the pericardium, which feparates the thorax and abdomen. But befides this, the whole abdomen and thorax are divided by a longitudinal membrane or *mediaftinum* connected to the lungs, pericardium, liver, ftomach, and to the fat lying over their ftomach and guts, which is analogous to an *omentum,* and fupplies its place.

The *lymphatic fyftem* in birds confifts, as in man, of lacteal and lymphatic veffels, with the thoracic duct. The lacteals indeed, in the ftricteft fenfe, are the lymphatics of the inteftines; and, like the other lymphatics, carry only a tranfparent lymph; and inftead of one thoracic duct, there are two, which go to the jugular veins. In thefe circumftances, it would feem that birds differ from the human fubject, fo far at leaft as we may judge from the diffection of a *goofe,* the common fubject of this inquiry, and from which the following defcription is taken.

The lacteals run from the inteftines upon the mefenteric veffels: thofe of the duodenum pafs by the fide of the pancreas; afterward they get upon the cæliac artery, of which the fuperior mefenteric is a branch. Here they are joined by the lymphatics of the liver, and then they form a plexus which furrounds the cæliac artery. Here alfo they receive a lymphatic from the gizzard, and foon after another from the lower part of the œfophagus. At the root of the cœliac artery they are joined by the lymphatics from the glandulæ renales, and near the fame part by the lacteals from the other fmall inteftines, which veffels accompany the lower mefenteric artery; but, before they join thofe from the duodenum, receive from the rectum a lymphatic, which runs from the blood-veffels of that gut. Into this lymphatic fome fmall veffels from the kidneys feem to enter at the root of the cœliac artery. The lymphatics of the lower extremities probably join thofe from the inteftines. At the root of the cœliac artery and contiguous part of the aorta, a net-work is formed by the veffels above defcribed. From this net-work arife two thoracic ducts, of which one lies on each fide of the fpine, and runs obliquely over the lungs to the jugular vein, into the infide of which it terminates, nearly oppofite to the angle formed by the vein and this fubclavian one. The thoracic duct of the left fide is joined by a large lymphatic, which runs upon the œfophagus. The thoracic ducts are joined by the lymphatics of the neck, and probably by thofe of the wings, where they open into the jugular veins. The lymphatics of the neck generally confift of two large branches, on each fide of the neck, accompanying the blood-veffels; and thefe two branches join near the lower part of the neck, and form a trunk which runs clofe to the jugular vein, and opens into a lymphatic gland; from the oppofite fide of this gland a lymphatic comes out, which ends in the jugular vein.

On the left fide, the whole of this lymphatic joins the thoracic duct of the fame fide: but, on the right one, part of it goes into the infide of the jugular vein a little above the angle; whilft another joins the thoracic duct, and with that duct forms a common trunk, which opens into the infide of the jugular vein, a little below the angle which that vein makes with the fubclavian. This fyftem in birds differs moft from that of quadrupeds, in the chyle being tranfparent and colourlefs, and in there being no vifible lymphatic glands, neither in the courfe of the lacteals, nor in that of the lymphatics of the abdomen, nor near the thoracic ducts.

The *kidneys* lie in the hollow excavated in the fide of the back-bone, from which there is fent out a blueifh-coloured canal running along by the fide of the *vas deferens,* and terminating directly in the common cloaca. This is the *ureter,* which opens by a peculiar aperture of its own, and not at the penis. Fowls having no *vefica urinaria,* it was thought by fome they never paffed any urine, but that it went to the nourifhment of the feathers: but this is falfe; for that whitifh fubftance that you fee their greenifh feces covered with, and which turns afterwards chalky, is their urine. Let us next confider the organs of generation of both fexes, and firft thofe of the male.

The *tefticles* are fituated one on each fide of the back-bone; and are proportionally very large to the creature's bulk. From

these run out the *vasa seminifera*; at first straight; but after they recede farther from the body of the testicle, they acquire an undulated or convoluted form, as the epididymis in man. These convolutions partly supply the want of *vesiculæ seminales*, their coition being at the same time very short: these terminate in the penis, of which the cock has two, one on each side of the common cloaca, pointing directly outwards. They open at a distance from each other, and are very small and short; whence they have escaped the notice of anatomists, who have often denied their existence. In birds there is no prostate gland. This is what is chiefly remarkable in the organs of the male.

The *racemus vitellorum*, being analogous to the ovaria in the human subject, are attached by a proper membrane to the back-bone. This is very fine and thin, and continued down to the uterus. Its orifice is averse with respect to the ovaria; yet notwithstanding, by the force of the *orgasmus venereus*, it turns round and grasps the *vitellus*, which in its passage through this duct, called the *infundibulum*, receives a thick gelatinous liquor, secreted by certain glands. This, with what it receives in the uterus, composes the white of the egg. By this tube then it is carried into the uterus. The shell is lined with a membrane; and in the large end there is a bag full of air, from which there is no outlet.

The *uterus* is a large bag, placed at the end of the *infundibulum*, full of wrinkles on its inside; here the egg is completed, receiving its last involucrum, and is at last pushed out at an opening on the side of the common cloaca. From the testes in the male being so very large in proportion to the body of the creature, there must necessarily be a great quantity of semen secreted; hence the animal is salacious, and becomes capable of impregnating many females. The want of the *vesiculæ seminales* is in some measure supplied by the convolutions of the *vasa deferentia*, and by the small distance betwixt the secerning and excretory organs. The two *penes* contribute also very much to their short coition; at which time the opening of the uterus into the cloaca is very much dilated, that the effect of the semen on the vitelli may be greater. A hen will of herself indeed lay eggs; but these are not impregnated, and yet appear entirely complete, except that the small black spot, which comes afterwards to be the rudiments of the chick, is not here to be observed.

After having observed the contents of the abdomen and thorax, we next proceed to examine the parts about the *neck* and *head*. These creatures, as was observed of fowls in general, have no teeth. Some, indeed, have an appearance of teeth; but these are only small serræ rising out from the mandible, without any socket, &c. which would have been needless, as they swallow their food entire. But their *tongue* is made pretty firm, lest it should be hurt by the sharp points of the grain they feed on. It is of a triangular figure, and pointed before; and as by their depending posture their meat is in hazard of falling out of their mouths, to prevent this there are several small pointed papillæ standing out upon their tongue and palate, with their points inclined backwards, allowing an easy passage to the food, but hindering its return.

We have here no *velum palatinum*, *uvula*, or *epiglottis*; and in place of two large holes opening into the nose, there is only a long narrow rima supplied with pretty strong muscles, and such another supplies the place of a glottis. The creature has a power of shutting both at pleasure; and the nature of their food seems not only to exempt them from the hazard of its getting into the nose or trachea, but its sharp points would hurt an uvula, or epiglottis, if they had any. Hence we see with what difficulty they swallow dough, or other sort of food that can be easily moulded into any form. When we examine the upper end of the trachea, we observe a rima glottidis with muscular sides, which may act in preventing the food or drink from passing into their lungs, for there is no epiglottis as in man and quadrupeds.

Their *cranium* is more cellular and cavernous than ours. By this means their heads are light, yet strong enough to resist external injuries; for the enlarging the diameter of bones contributes to their strength. By this cavernous cranium the organ of smelling is supposed to be considerably enlarged; and further, singing birds, as is observed by Mr. Ray and Mr. Derham, have this cavernous structure of the brain still more observable; and we are told that the cavity of the tympanum communicates with the cells: but this seems rather founded on theory than matter of fact. Their brain is covered with the common membranes, but its external surface is not formed into so many gyræ or convolutions as ours. Its anterior part is quite solid, of a cineritious colour, and so far has a resemblance of the *corpora striata* as to give rise to the olfactory nerves. The whole of it appears to us as imperfect, and we can scarce determine whether there be any thing analogous to a third or fourth ventricle. Neither the *corpus callosum*, *fornix*, *nates*, or *testes*, &c. can be observed here; which parts therefore cannot be imagined as absolutely necessary for the functions of life, since we find these creatures perform them sufficiently well.

Their organ of *smelling* is very large, and well provided with nerves; hence they have this sensation very acute. Ravens and other birds of prey give a sure proof of this, by their being able to find out their prey, though concealed from their sight, and at a considerable distance. Those birds that grope for their food in the waters, mud, &c. have large nerves, which run quite to the end of their bills, by which they find out and distinguish their food.

The anterior part of their *eyes* (instead of having the scleroic coat continued, so as to make near a sphere as in us) turns all of a sudden flat; so that here the sclerotic makes but half a sphere; and the cornea rises up afterwards, being a portion of a very small and distinct sphere: so that in these creatures there is a much greater difference betwixt the sclerotic and cornea than in us. Hence their eyes do not jut out of their heads, as in man and quadrupeds. As most of these creatures are continually employed in hedges and thickets, therefore, that their eyes might be secured from these injuries, as well as from too much light when flying in the face of the sun, there is a very elegant mechanism in their eyes. A membrane rises from the internal canthus, which at pleasure, like a curtain, can be made to cover the whole eye; and this by means of a proper muscle that rises from the sclerotic coat, and passing round the optic nerve, runs through the *musculus oculi attollens* (by which, however, the optic nerves are not compressed) and palpebra, to be inserted into the edge of this membrane. Whenever this muscle ceases to act, the membrane by its own elasticity again discovers the eye. This covering is neither pellucid nor opaque, both which would have been equally inconvenient; but, being somewhat transparent, allows as many rays to enter as to make any object just visible, and is sufficient to direct them in their progression. By means of this membrane it is that the eagle is said to look at the sun. Quadrupeds also, as we mentioned before, have a small *membrana nictitans*.

Besides, all fowls have another particularity, the use of which is not so well understood; and that is, a pretty long black triangular purse, rising from the bottom of the eye just at the entrance of the optic nerve, and stretched out into the vitreous humour; and one would imagine it gave some threads to the crystalline. To this the French gave the name of *bourse noire*. This may possibly serve to absorb some of the rays of light, that they may see objects more distinctly without

hurting their eyes. It has a connection with the vitreous, and feems to be joined alfo to the cryftalline humours. If we fuppofe it to have a power of contraction (which may be as well allowed as that of the iris), it may fo alter the pofition of the vitreous and cryftalline humours, that the rays from any body may not fall perpendicularly upon the cryftalline; and this feems to be neceffary in them, fince they cannot change the figure of the anterior part of their eye fo much as we can do: and as this animal is expofed often to too great a number of rays of light, fo they have no tapetum, but have the bottom of the eye wholly black on the retina; and in confequence of this, fowls fee very ill in the dark.

They have no external ear; but in place thereof a tuft of very fine feathers covering the *meatus auditorius*, which eafily allows the different founds to pafs them, and likewife prevents duft or infects from getting in. A liquor is feparated in the *meatus auditorius*, to lubricate the paffage. The *membrana tympani* is convex externally; and no mufcles are fixed to the bones of the ear, which are rather of a cartilaginous confiftence. Any tremulous motions impreffed on the air are communicated in thefe creatures merely by the fpring and elafticity of thefe bones; fo probably, the membrane is not fo ftretched as in the human ear by mufcles. The femicircular canals are very diftinct, and eafily prepared.

Sect. III. *Anatomy of a Carnivorous Bird.*

We come next to the birds of prey, and for an example fhall take a flannel or fmall hawk. The principal difference to be obferved in them, is in their chylopoietic vifcera, which may be accounted for from their different way of life.

Immediately under their clavicles, you will obferve the œfophagus expanded into their *ingluvies*, which is proportionally lefs than in the granivorous kind, fince their food does not fwell fo much by maceration; and for the fame reafon there is a lefs quantity of a menftruum to be found here.

They have alfo a *ventriculus fuccenturiatus*, plentifully ftored with glands, fituated immediately above the ftomach, which we fee here is thin and mufculo-membranous, otherwife than in the granivorous kind: and this difference, which is almoft the only one we fhall find betwixt the two different fpecies of fowls, is eafily accounted for from the nature of their food, which requires lefs attrition, being eafier of digeftion than that of the other kind; neverthelefs, it feems requifite it fhould be ftronger than the human, to compenfate the want of abdominal mufcles, which are here very thin.

The fame mechanifm obtains in this creature's *duodenum* that we have hitherto obferved. As being a carnivorous animal, its guts are proportionally fhorter than thofe of the granivorous kind: for the reafon firft given, viz. its food being more liable to corrupt, therefore not proper to be long detained in the body: and for that reafon it has no *inteftina cœca*, of which the other fpecies of fowls have a pair. The difference in their wings, backs, and claws, is obvious; and has been already in fome meafure obferved.

PART III. THE ANATOMY OF AQUEOUS ANIMALS.

Sect. I. *Of the Amphibious Tribe.*

AQUEOUS animals are generally divided into fuch as have lungs, and fuch as want them. The firft fpecies differ fo inconfiderably from an ox or any other quadruped, that a few obfervations may be fufficient to give an idea of their internal ftructure; for this purpofe, we fhall firft examine that fpecies of them which moft refembles man in the internal ftructure, the tortoife.

1. *Tortoife.* The covering of this animal is compofed of a fhell fo remarkably hard and firm in its texture, that a loaded waggon may go over it without hurting the fhell or the animal within it. In the young animal, this fhell grows harder in proportion as its contents expand; and this creature never changes its fhell as fome others do: hence it was neceffary for it to be made up of different pieces; and thefe are more or lefs diftinct in different animals. Their feet are fmall and weak; and they are exceedingly flow in motion. It has neither *tongue* nor *teeth*; to make up for which, their lips are fo hard as to be able to break almoft the hardeft bodies. The *alimentary canal* very much refembles that of the former clafs. The principal difference is in the *circulation of the blood*. The *heart* has two diftinct auricles, without any communication; and under thefe, there is the appearance of two ventricles fimilar in fhape to thofe of the former clafs: but they may be confidered as one cavity; for the ventricle fends out not only the pulmonary artery, but likewife the aorta; for there is a paffage in the feptum, by which the ventricles communicate freely, and the blood paffes from the left into the right one. From the aorta the blood returns into the right auricle, while that from the pulmonary artery returns to the left auricle, from which it is fent to the left ventricle, &c. fo that only a part of the blood is fent to the lungs, the reft going immediately into the aorta; hence the animal is not under the neceffity of breathing fo often as it otherwife would be.

From the bafe of the right ventricle goes out the pulmonary artery and aorta. The pulmonary artery is fpent upon the lungs. The aortæ may be faid to be three in number: for the aorta finiftra afcends through the pericardium in company with the pulmonary artery; and afterwards turns down, and fends off a confiderable branch, which parts into two; one of which joins the right aorta, while the other is diftributed upon the liver, ftomach, inteftines, &c. What remains of this aorta runs to the kidneys or pofterior extremities of that fide. An aorta defcendens, &c. after piercing the pericardium, runs down and communicates with the branch already mentioned, is diftributed upon the right kidney and inferior extremity, and alfo upon the bladder and parts of generation. An aorta afcendens, after getting out of the pericardium, fupplies the fore-legs, neck, and head. The blood in the fuperior part of the body returns to the right auricle by two jugular veins, which unite after perforating the pericardium. From the inferior part, it returns to the fame auricle by two large veins; one on the right fide receives the blood in the right lobe of the liver; the other on the left fide receives the blood in the left lobe, and alfo a trunk which correfponds with the inferior vena cava in other animals. The pulmonary veffels run in the left auricle in the common way.

The abforbent fyftem in the turtle, like that in the former clafs, confifts of lacteals and lymphatics, with their common trunks the thoracic ducts; but differs from it in having no obvious lymphatic glands on any part of its body, nor plexus formed at the termination in the red veins.

The *lacteals* accompany the blood-veffels upon the mefentery, and form frequent net-works acrofs thefe veffels: near the root of the mefentery a plexus is formed, which communicates with the lymphatics coming from the kidneys and parts near the anus. At the root of the mefentery on the left fide of the fpine, the lymphatics of the fpleen join the lacteals; and immediately above this a plexus is formed, which lies upon the right aorta. From this plexus a large branch arifes, which paffes behind the right aorta to the left fide, and gets before the left aorta, where it affifts in forming a very large receptaculum, which lies upon that artery.

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From this receptaculum arife the thoracic ducts. From its right fide goes one trunk, which is joined by that large branch that came from the plexus to the left fide of the right aorta, and then paffes over the fpine. This trunk is the thoracic duct of the right fide; for having got to the right fide of the fpine, it runs upwards, on the infide of the right aorta, towards the right fubclavian vein; and when it has advanced a little above the lungs, it divides into two branches, which near the fame place are joined by a large branch, that comes up on the outfide of the aorta. From this part upwards, thofe veffels divide and fubdivide, and are afterwards joined by the lymphatics of the neck, which likewife form branches before they join thofe from below. So that between the thoracic duct and the lymphatics of the fame fide of the neck, a very intricate net-work is formed; from which a branch goes into the angle between the jugular vein and the lower part or trunk of the fubclavian. This branch lies therefore on the infide of the jugular vein, whilft another gets to the outfide of it, and feems to terminate in it, a little above the angle, between that vein and the fubclavian.

Into the above mentioned receptaculum the lymphatics of the ftomach and duodenum likewife enter. Thofe of the duodenum run by the fide of the pancreas, and probably receive its lymphatics and a part of thofe of the liver. The lymphatics of the ftomach and duodenum have very numerous anaftomofes, and form a beautiful net-work on the artery which they accompany. From this receptaculum likewife (befides the trunk already mentioned, which goes to the right fide) arife two other trunks pretty equal in fize; one of which runs upon the left fide, and the other upon the right fide of the left aorta, till they come within two or three inches of the left fubclavian vein; where they join behind the aorta, and form a number of branches which are afterwards joined by the lymphatics of the left fide of the neck; fo that here a plexus is formed as upon the right fide. From this plexus a branch iffues, which opens into the angle between the jugular and fubclavian veins.

2. *Serpent and Crocodile.* The circulation in thefe is fimilar to that of the turtle; but we find only one ventricle. The blood goes right from the auricle to the ventricle which fends out the pulmonary artery and aorta; the blood from the pulmonary artery returns to the left auricle, that from the aorta going to the right auricle, and both the auricles opening into the ventricle.

3. *Frog and Lizard.* Thefe differ from the former animals, in having only one auricle and a ventricle: and befides, the ventricle fends out a fingle artery, which afterwards fplits into two parts; one to fupply the lungs, the other runs to all the reft of the body: from the lungs and from the other parts, the blood returns into the auricle.

SECT. II. *Anatomy of Fifhes.*

Of thefe we may firft obferve, that they have a very ftrong thick *cuticle*, covered with a great number of fcales, laid one on another like the tiles of a houfe. This, among other arguments, is fuppofed to prove the human epidermis to be of a fquamous ftructure: but the fcales refemble the hairs, wool, feathers, &c. of the creatures that live in air; and below thefe we obferve their proper *cuticula* and *cutis*. The generality of fifhes, particularly thofe fhaped like the cod, haddock, &c. have a line running on each fide. Thefe lines open externally by a number of ducts, which throw out a mucous or flimy fubftance that keeps them foft and clammy, and feems to ferve the fame purpofe with the mucous glands or ducts which are placed within many of our internal organs.

Thefe creatures have neither anterior nor pofterior extremities, as quadrupeds and fowls; for their progreffion is performed in a different way from either of thofe fpecies of animals: for this purpofe they are provided with machines, properly confifting of a great number of elaftic beams, connected to one another by firm membranes, and with a tail of the fame texture; their fpine is very moveable towards the pofterior part, and the ftrongeft mufcles of their bodies are inferted there. Their tails are fo framed as to contract to a narrow fpace when drawn together to either fide, and to expand again when drawn up to a ftraight line with their bodies; fo, by the affiftance of this broad tail, and the fins on their fides, they make their progreffion much in the fame way as a boat with oars on its fides and rudder at its ftern. The perpendicular fins fituated on the fuperior part of their body keep them *in equilibrio*, hindering the belly from turning uppermoft; which it would readily do, becaufe of the air-bag in the abdomen rendering their belly fpecifically lighter than their back; but by the refiftance thefe fins meet with when inclined to either fide, they are kept with their backs always uppermoft. The beft account of this matter, we have in *Borellius de Motu Animalium, cap.* 23.

It may next be obferved, that thefe creatures have nothing that can be called a *neck*, feeing they feek their food in an horizontal way, and can move their bodies either upwards or downwards, as they have occafion, by the contraction or dilatation of the air-bag; a long neck, as it would hinder their progreffion, would be very difadvantageous in the element they live in.

The *abdomen* is covered on the inferior part with a black-coloured thin membrane refembling our peritoneum. It is divided from the thorax by a thin membranous partition, which has no mufcular appearance; fo that we have now feen two different forts of animals that have no mufcular diaphragm.

Thefe creatures are not provided with *teeth* proper for breaking their aliment into fmall morfels, as the food they ufe is generally fmall fifhes, or other animals that need no trituration in the mouth, but fpontaneoufly and gradually diffolve. Their teeth ferve to grafp their prey, and hinder what they once catched from efcaping. For the fame purpofe, the internal cartilaginous bafis of the bronchi, and the two round bodies fituated in the pofterior part of the jaws, have a great number of tenter-hooks fixed in them, in fuch a manner as that any thing can eafily get down, but is hindered from getting back. The water that is neceffarily taken in along with their food in too great quantities to be received into their jaws in deglutition, paffes betwixt the interftices of the bronchi and the flap that covers them. The compreffion of the water on the bronchi is of confiderable ufe to the creature, as we fhall explain by and by.

The *œfophagus* in fifhes is very fhort, and fcarcely diftinguifhed from the ftomach, feeing their food lies almoft equally in both. The ftomach is of an oblong figure. There are commonly found fmall fifhes in the ftomachs of large ones ftill retaining their natural form; but when touched, they break down into a jelly. From this, and the great quantity of fluids poured into their ftomachs, we may conclude, that digeftion is folely brought about in them by the diffolving power of a menftruum, and that no trituration happens here.

The *guts* are very fhort, making only three turns; the laft of which ends in the common cloaca for the fæces, urine, and femen, fituated about the middle of the inferior part of their bodies.

To what we call *pancreas*, fome give the name of *inteftinula cæca*: it confifts of a very great number of fmall threads, like fo many little worms, which all terminate at laft in two larger canals that open into the firft gut, and pour into it a vifcous liquor much about the place where the biliary ducts enter. That kind of pancreas formed of inteftinula cæca is peculiar to a certain kind of fifhes; for the cartilaginous, broad, and flat kind, as the fkate, fole, flounder, &c. have a pancreas refembling that

of the former clafs of animals. Their inteftines are connected to the back-bone by a membrane analogous to a mefentery.

Their *liver* is very large, of a whitifh colour, and lies almoft wholly in the left fide, and contains a great deal of fat or oil.

The *gall-bladder* is fituated a confiderable way from the liver; and fends out a canal, the cyftic duct, which joins with the hepatic duct juft at the entry into the gut. Some fibres being obferved ftretched from the liver to the gall-bladder, but without any apparent cavity, the bile was fuppofed not to be carried into the gall-bladder in the ufual way, but that it muft either be fecreted on the fides of the fac, or regurgitate into it from the ductus choledochus. It is certain, however, that hepato-cyftic ducts exift in fifh as well as in fowls. This, for example, is very obvious in the falmon, where large and diftinct ducts run from the biliary ducts of the liver, and open into the gall-bladder.

The *fpleen* is placed near the back-bone, and at a place where it is fubjected to an alternate preffure from the conftriction and dilatation of the air-bag, which is fituated in the neighbourhood. Since, in all the different animals we have diffected, we find the fpleen attached to fomewhat that may give it a concuaffation; as in the human fubject and quadrupeds, it is contiguous to the diaphragm; in fowls, it is placed betwixt the back-bone, the liver, and ftomach; in fifhes, it lies on the faccus aërius: and fince we find it fo well ferved with blood veffels, and all its blood returning into the liver, we muft not conclude the fpleen to be an *inutile pondus*, only to ferve as a balance to the animal *pro equilibrio*, but particularly defigned for preparing the blood which paffes to the liver.

The only *organs of generation* in this animal are two bags fituated in the abdomen uniting near the podex. Thefe in the male are filled with a whitifh firm fubftance called the *milt*; and in the female with an infinite number of little ova cluftered together, of a redifh yellow colour, called the *roe*. Both thefe at fpawning-time we find very much diftended; whereas at another time the male organs can fcarce be diftinguifhed from the female; nor is there any proper inftrument in the male for throwing the feed into the organs of the female, as in other creatures. We fhall not take upon us to determine the way whereby the female ovum is impregnated: but we find that the fpawn of frogs confifts in the fmall fpecks wrapped up in a whitifh glutinous liquor; thefe fpecks are the rudiments of the young frogs, which are nourifhed in that liquor till they are able to go in fearch of their food. In the fame way, the ova of fifhes are thrown out and depofited in the fand, the male being for the moft part ready to impregnate them, and they are incubated by the heat of the fun. It is curious enough to remark with what care they feek for a proper place to depofit their ova, by fwimming to the fhallows, where they can better enjoy the fun's rays, and fhun the large jaws of other fifhes. The river-fifhes, again, fpawn in fome creek free from the hazard of the impetuous ftream. But whether this mixture be brought about in fifhes by a fimple application of the genitals to each other, or if both of them throw out their liquors at the fame time in one place, and thus bring about the defired mixture, it is not eafy to determine. Spallanzani has found, that the eggs of frogs, toads, and water-newts, are not fecundated in the body of the female; that the male emits his femen upon the fpawn while it is flowing from the female; and that the fœtus pre-exifts in the body of the female: but whether impregnation takes place in the fame manner in fifhes, he has not yet been able to determine, though he feems to think it probable. Thefe creatures are fo fhy, that we cannot eafily get to obferve their way of copulation, and are confequently but little acquainted with their natural hiftory. Frogs, it is very evident, do not copulate: at leaft no farther than to allow both fexes an opportunity of throwing their fperm. Early in the fpring the male is found for feveral days in clofe contact upon the back of the female, with his fore-legs round her body in fuch a manner that makes it very difficult to feparate them, but there is no communication. At this time the female lays her fpawn in fome place that is moft fecure, while the male emits his fperm upon the female fpawn.

After raifing up the black peritoneum in fifhes, there comes in view an oblong white membranous bag, in which there is nothing contained but a quantity of elaftic air. This is the *fwimming bladder*: it lies clofe to the back-bone; and has a pretty ftrong mufcular coat, whereby it can contract itfelf. By contracting this bag, and condenfing the air within it, they can make their bodies fpecifically heavier than water, and fo readily fall to the bottom; whereas the mufcular fibres ceafing to act, the air is again dilated, and they become fpecifically lighter than water, and fo fwim above. According to the different degrees of contraction and dilatation of this bladder, they can keep higher or lower in the water at pleafure. Hence flounders, foles, raia or fkate, and fuch other fifhes as want this fac, are found always grovelling at the bottom of the water: it is owing to this that dead fifhes (unlefs this membrane has been previoufly broke) are found fwimming a-top, the mufcular fibres then ceafing to act, and with their bellies uppermoft; for the back-bone cannot yield, and the diftended fac is protruded into the abdomen, and the back is confequently heavieft at its upper part, according to their pofture. There is here placed a glandular fubftance, containing a good quantity of red blood; and it is very probable that the air contained in the fwimming bladder is derived from this fubftance. From the anterior part of the bag go out two *proceffes* or *appendices*, which, according to the gentlemen of the French academy, terminate in their fauces. In a variety of other fifhes we find communications with fome parts of the alimentary canal, particularly the œfophagus and ftomach. The falmon has an opening from the fore end of the air-bag into the œfophagus, which is furrounded by a kind of mufcular fibres. The herring has a funnel-like paffage leading from the bottom of the ftomach into the air-bag; but it is not determined whether the air enters the air-bag by this opening, or comes out by it: the latter, however, feems to be the more probable opinion, as the glandular body is found in all fifhes, whereas there are feveral without this paffage of communication.

At the fuperior part of this bag there are other red-coloured bodies of a glandular nature, which are connected with the kidneys. From them the *ureters* go down to their infertion in the *vefica urinaria*, which lies in the lower part of the abdomen; and the urethra is there produced, which terminates in the podex. Thefe laft-mentioned parts have not hitherto been obferved in fome fpecies of fifhes; whence authors too haftily denied them in all. Thefe creatures have a *membranous diaphragm*, which forms a fac in which the heart is contained. It is very tenfe, and almoft perpendicular to the vertebræ.

The *heart* is of a triangular form, with its bafe downwards, and its apex uppermoft; which fituation it has becaufe of the *branchiæ*. It has but one *auricle* and one *ventricle*, becaufe they want lungs; and one great artery. The fize of the auricle and that of the ventricle is much the fame; the artery fends out numberlefs branches to the branchiæ or gills. And what is rather curious, this artery, inftead of fupporting all parts as in the frog, is diftributed entirely upon the gills; every branch terminating there, and becoming fo extremely fmall as at laft to efcape the naked eye.

The *branchiæ* lie in two large flits on each fide of their heads, and feem to be all they have that bears any analogy to lungs. Their form is femicircular: they have a vaft number of red fibrillæ ftanding out on each fide of them like a fringe, and very much refemble the vane of a feather. Thefe branchiæ are

perpetually ſubjected to an alternate motion and preſſure from the water; and we may here remark, that we have not found any red blood but in places ſubjected to this alternate preſſure. This obſervation will help us in explaining the action of the lungs upon the blood. Over theſe gills there is a large flap, allowing a communication externally; by which the water they are obliged to take into their mouths with their food finds an exit without paſſing into their ſtomachs: it is owing to theſe flaps coming ſo far down that the heart is ſaid commonly to be ſituated in the head. The blood is collected again from the gills by a vaſt number of ſmall veins, ſomewhat in the ſame manner as in our pulmonary vein; but inſtead of going back to the heart a ſecond time, they immediately unite, and form an aorta deſcendens, without the intervention of an auricle and ventricle. Hence a young anatomiſt may be puzzled to find out the power by which the blood is propelled from the gills to the different parts of the body; but the difficulty will be conſiderably leſſened when we conſider the manner in which the blood is carried through the liver from the inteſtines in man and quadrupeds. The aorta in fiſhes ſends off branches which ſupply all the parts of the body excepting the gills. From the extremity of thoſe branches the blood returns to the heart ſomewhat in the ſame manner as in the former claſs of animals; only there are two inferior venæ cavæ, whereas the former has but one.

The *brain* in fiſhes is formed pretty much in the ſame way as that of fowls; only we may obſerve, that the poſterior lobes bear a greater proportion to the anterior.

Their organ of *ſmelling* is large; and they have a power of contracting and dilating the entry into their noſe as they have occaſion. It ſeems to be moſtly by this acute ſmell that they diſcover their food: for their tongue ſeems not to have been deſigned for a very nice ſenſation, being of a pretty firm cartilaginous ſubſtance; and common experience evinces, that their ſight is not of ſo much uſe to them as their ſmell in ſearching for their nouriſhment. If you throw a freſh worm into the water, a fiſh ſhall diſtinguiſh it at a conſiderable diſtance; and that this is not done by the eye, is plain from obſerving, that after the ſame worm has been a conſiderable time in the water and loſt its ſmell, no fiſhes will come near it: but if you take out the bait, and make ſeveral little inciſions into it, ſo as to let out more of the odoriferous effluvia, it ſhall have the ſame effect as formerly. Now it is certain, had the creatures diſcovered this bait with their eyes, they would have come equally to it in both caſes. In conſequence of their ſmell being the principal means they have of diſcovering their food, we may frequently obſerve their allowing themſelves to be carried down with the ſtream, that they may aſcend again leiſurely againſt the current of the water; thus the odoriferous particles ſwimming in that medium, being applied more forcibly to their ſmelling organs, produce a ſtronger ſenſation.

The *optic nerves* in theſe animals are not confounded with one another in their middle progreſs betwixt their origin and the orbit, but the one paſſes over the other without any communication; ſo that the nerve that comes from the left ſide of the brain goes diſtinctly to the right eye, and *vice verſa*. Indeed it would ſeem not to be neceſſary for the optic nerves of fiſhes to have the ſame kind of connection with each other as thoſe of man have: for their eyes are not placed in the fore-part, but in the ſides of their head; and of conſequence, they cannot conveniently look at any object with both eyes at the ſame time.

The *lens cryſtallina* is here a complete ſphere, and more denſe than in terreſtrial animals, that the rays of light coming from water might be ſufficiently refracted. As fiſhes are continually expoſed to injuries in the uncertain element they live in, and as they are in perpetual danger of becoming a prey to the larger ones, it was neceſſary that their eyes ſhould never be ſhut; and as the cornea is ſufficiently waſhed by the element they live in, they are not provided with palpebræ: but then, as in the current itſelf the eye muſt be expoſed to ſeveral injuries, there was a neceſſity it ſhould be ſufficiently defended; which in effect it is by a firm pellucid membrane, that ſeems to be a continuation of the cuticula, being ſtretched over here. The epidermis is very proper for this purpoſe, as being inſenſible and deſtitute of veſſels, and conſequently not liable to obſtructions, or, by that means, of becoming opaque. In the eye of the ſkate tribe, there is a digited curtain which hangs over the pupil, and may ſhut out the light when the animal reſts, and it is ſimilar to the tunica adnata of other animals.

Although it was formerly much doubted whether fiſhes poſſeſſed a ſenſe of hearing, yet there can be little doubt of it now; ſince it is found that they have a complete organ of hearing as well as other animals, and likewiſe as the water in which they live is proved to be a good medium. Fiſhes, particularly thoſe of the ſkate kind, have a bag at ſome diſtance behind the eyes, which contains a fluid and a ſoft cretaceous ſubſtance, and ſupplies the place of veſtibule and cochlea. There is a nerve diſtributed upon it, ſimilar to the portio mollis in man. They have three ſemicircular canals, which are filled with a fluid, and communicate with the bag: they have likewiſe, as the preſent profeſſor of anatomy at Edinburgh has lately diſcovered, a meatus externus, which leads to the internal ear. The cod fiſh, and others of the ſame ſhape, have an organ of hearing ſomewhat ſimilar to the former; but inſtead of a ſoft ſubſtance contained in the bag, there is a hard cretaceous ſtone. In this kind of fiſh no meatus externus has been yet obſerved: and Dr. Monro is inclined to think that they really have not one, from the conſideration that the common canal or veſtibule, where the three ſemicircular canals communicate, is ſeparated from the cavity of the cranium by a thin membrane only; that this cavity, in the greater number of fiſhes, contains a watery liquor in conſiderable quantity; and that, by the thinneſs of the cranium, the tremor excited by a ſonorous body may readily and eaſily be tranſmitted through the cranium to the water within it, and ſo to the ear.

PART IV. THE ANATOMY OF INSECTS.

AS inſects and worms are ſo exceedingly numerous, it would be endleſs to examine all the different kinds, nor would it ſerve any uſeful purpoſe to the anatomiſt. We ſhall therefore be content with making a few general obſervations, and theſe chiefly on the ſtructure of their body; leaving the variety of their colour, ſhape, &c. to the naturaliſts. Inſects differ from the former claſſes, by their bodies being covered with a hard cruſt or ſcale, by their having feelers or antennæ ariſing from their heads, and many of them breathing the air through lateral pores. As to the ſhape of their bodies, though it ſomewhat differs from that of birds, being in general not ſo ſharp before to cut and make way through the air, yet it is well adapted to their manner of life. The baſe of their bodies is not formed of bone, as in many other animals, but the hard external covering ſerves them for ſkin and bone at the ſame time. Their feelers, beſide the uſe of cleaning their eyes, are a guard to them in their walk or flight. Their legs and wings are well fitted for their intended ſervice; but the latter vary ſo much in different inſects, that from them naturaliſts have given names to the ſeveral orders of the claſs. As, 1. *Coleoptera*, or beetle tribe, which have a cruſtaceous elytra or ſhell, that ſhuts together, and forms a longitudinal ſuture down their back. 2. *Hemiptera*—as in cimex, cockroach, bug, &c. which have the upper wings half cruſtaceous and half membranaceous; not

divided by a longitudinal future, but incumbent on each other. 3. *Lepidoptera*—as the butterfly, have four wings, covered with fine fcales in the form of powder. 4. *Neuroptera*—as the dragon-fly, fpring-fly, &c. have four membranaceous tranfparent naked wings, generally reticulated. 5. *Hymenoptera*—as wafps, bees, &c. have four membranaceous wings, and a tail furnifhed with a fting. 6. *Diptera*—as the common houfe-fly, have only two wings. 7. *Aptera*—as the lobfter, crab, fcorpion, fpider, &c. have no wings.

The ftructure of the eye in many infects is a moft curious piece of mechanifm. The outer part is remarkably hard, to guard againft injuries; and has commonly a reticular appearance, or the whole may be looked upon as an affemblage of fmaller eyes; but whether they fee objects multiplied before them, has not yet been determined. Linnæus, and feveral others following him, deny the exiftence of a brain in thefe creatures. But it is certain, that at leaft a number of the larger kinds, as the lobfter, crab, &c. have a foft fubftance fimilar to the brain, from which the optic and other nerves take their rife; befides, when this fubftance is irritated, the animal is thrown into convulfions: hence we would conclude, that infects have a brain as well as the former claffes, although this is fmaller in proportion to their bodies.

The ear has been lately difcovered to be placed at the root of their antennæ or feelers, and can be diftinctly feen in fome of the larger kinds, as the lobfter.

They have a ftomach, and other organs of digeftion; and it is curious, that in fome, as the lobfter, the teeth are found in the ftomach.

They have a heart and blood-veffels, and circulation is carried on in them fomewhat as in the former clafs; but the blood is without red globules; or, as naturalifts fpeak, is colourlefs. In the lobfter, and others of the larger kind, when a piece of fhell is broken, the pulfation of the heart is feen diftinctly, and that fometimes for feveral hours after it has been laid bare.

Lungs.—The exiftence of thefe by fome has been denied. But late experiments and obfervations fhow, that no fpecies want them, or at leaft fomething fimilar to them; and in many infects, they are larger in proportion than in other animals: in moft of them they lie on or near the furface of the body; and fend out lateral pores or tracheæ, by which, if the animal is befmeared with oil, it is inftantly fuffocated.

Generation.—The fame difference in fex exifts in infects as in other animals, and they even appear more difpofed to increafe their fpecies; many of them, when become perfect, feeming to be created for no other purpofe but to propagate their like. Thus the filk-worm, when it arrives at its perfect moth-ftate, is incapable of eating, and can hardly fly; it endeavours only to propagate its fpecies; after which the male immediately dies, and fo does the female as foon as fhe has depofited her eggs.

Befides thofe of the male and female, a third fex exifts in fome infects, which we call *neuter*. As thefe have not the diftinguifhing parts of either fex, they may be confidered as eunuchs or infertile. We know of no inftance of this kind in any other clafs of animals; and it is only found among thofe infects which form themfelves into focieties, as bees, wafps, and ants: and here thefe eunuchs are real flaves, as on them lies the whole bufinefs of the economy. No hermaphrodites have as yet been difcovered among infects.

Many have imagined that the generality of infects were merely the production of putrefaction, becaufe they have been obferved to arife from putrefied fubftances: but a contrary opinion is now more generally adopted; and it is pretty certain, that if putrid bodies be fhut up in a clofe veffel, no infects are ever generated unlefs their ova have been originally depofited there. They are oviparous animals, and lay their eggs in places moft convenient for the nourifhment of their young; fome in water, others in flefh; fome in fruit and leaves: while others make nefts in the earth or in wood, and fometimes even in the hardeft ftone. The egg in all infects firft becomes *(larva)* a caterpillar, or maggot; from which they are changed into *(pupa)* a chryfalis or aurelia, fo named from their being inclofed in a cafe; and thefe dying, or feeming to die, the *(imago)* fly, or butterfly, or perfect ftate, fucceeds; and during each of thefe changes their appearance differs wonderfully.

PART V. THE ANATOMY OF WORMS.

WITH refpect to this clafs of animals, they have characters correfponding with thofe of the former tribe, but are diftinguifhed from them by having no antennæ, and in being furnifhed with tentacula. Many of them, particularly thofe without fhells, are remarkably tenacious of life, fometimes capable of being new formed from a part which may have been feparated. By much the greater number of them are deftitute of head, ears, nofe, eyes, and feet. Some of thofe in the firft order, as the common round worms, have a vafcular and nervous fyftem, with the parts of generation, which can be diftinctly feen. Some, as the cuttle fifh, form a kind of connection between fifhes and worms in poffeffing gills but wanting fins, &c. while others, as thofe of the loweft order, or zoophyta, join the properties of the animal and vegetable kingdom together.

The clafs is divided by Linnæus, &c. into the following orders, viz. 1. *Inteftina*—as the earth worm, leech, &c. which are the moft fimple animals, being perfectly naked, and without limbs of any kind. 2. *Mollufca*—as the naked fnail, fea-ftar, cuttle fifh; which are likewife fimple animals without any fhell, but are branchiated or furnifhed with a kind of limbs. 3. *Teftacea*—as the fnail, oyfter, &c. which have the fame characters as the former order, but are covered with a fhell, and include the greater part of what we commonly call *fhell-fifh*. 4. *Lithophyta*—as corals, madreports, &c. which are compound animals fixed upon a calcareous bafe, as conftructed by the creatures themfelves. 5. *Zoophyta*—as the fponge, polypus, &c. Thefe are likewife compound animals, furnifhed with a kind of flowers, and having a vegetating root and ftem.

Some of thefe creatures inhabit the earth, others live on the reft of the animal or on the vegetable kingdom, and many are found in the hardeft ftones; while an innumerable tribe of them live in the waters. In general, they are faid to be of the hermaphrodite and oviparous kind; while the loweft clafs, as the polypi, in a great meafure refemble the vegetable kingdom in their manner of growth.

COMPARATIVE *Degree*, among grammarians, that between the pofitive and fuperlative degrees, expreffing any particular quality above or beneath the level of another.

COMPARISON, in a general fenfe, the confideration of the relation between two perfons and things, when oppofed and fet againft each other, by which we judge of their agreement or difference.

COMPARISON *of Ideas*, an act of the mind, whereby it com-

pares its ideas one with another, in reſpect of extent, degree, time, place, or any other circumſtances. See IDEA.

Brutes ſeem not to have this faculty in any great degree: they have, probably, ſeveral ideas diſtinct enough; but cannot compare them farther than as to ſome ſenſible circumſtanees annexed to the objects themſelves; the power of comparing general ideas, which we obſerve in men, we may probably conjecture they have not at all.

COMPARISON, in grammar, the inflection of the comparative degree. See GRAMMAR.

COMPARISON, in *Rhetoric*, is a figure, whereby two things are conſidered with regard to ſome third, which is common to them both. Thus, Cicer. Topic. *Catoni licuit ſequi bellum civile, igitur & Ciceroni licebit.* *It was allowed Cato to engage in the civil wars, therefore it may be allowed Cicero:* where, to engage in the civil wars, is common to both.

There are three kinds of *compariſon*; the firſt, *à majori*, i. e. from the major to the minor, as that of Cicero againſt Anthony, *Quid feceris domi tuæ, cum alienæ tam ſis inſolens?* Or that of Terence, *Quem feret, ſi parentem non fert ſuum?* From the ſame place, Ovid endeavours to appeaſe Cæſar.

Cur ego poſſe negem leniri Cæſaris iram
Cum videam mites hoſtibus eſſe Deos?

The ſecond, *à minori*, i. e. from the minor to the major: thus Cicero, *Majoris noſtri ſæpe mercatoribus, ac naviculatoribus injurioſius tractatis, bella geſſerunt! vos tot civium Romanorum millibus uno nuntio atque uno tempore necatis, quo tandem animo eſſe debetis?*

The third, *à pari*; as when we contend, that what obtains in one thing, ought to obtain in another of the ſame kind: *It was a law, that he who killed his father ſhould be ſewed up in a ſack, and thrown into a river; therefore he who killed his mother deſerves the ſame puniſhment.*

Capto tuam, pudet heu, ſed capto, Maxime, cœnam:
Tu capis alterius; jam ſumus ergo pares.
Mane ſalutatum venio, tu diceris iſſe,
Ante ſalutatum: jam ſumus ergo pares, &c.
Mart. lib. ii.

COMPARISON, in architecture, denotes the uſeful and graceful diſpoſition of the whole ground plot of an edifice, into rooms of office, and of reception or entertainment.

COMPARTMENT, in general, is a deſign compoſed of ſeveral different figures, diſpoſed with ſymmetry, to adorn a parterre, a ceiling, &c. A compartment of tiles or bricks, is an arrangement of them, of different colours, and varniſhed, for the decoration of a building. Compartments in gardening, are an aſſemblage of beds, plots, borders, walks, &c. diſpoſed in the moſt advantageous manner that the ground will admit of. Compartments in heraldry, are othewiſe called *partitions*.

COMPASS, or *Mariner's Steering* COMPASS, is an inſtrument uſed at ſea by pilots to direct and aſcertain the courſe of their ſhips. It conſiſts of a circular braſs box, which contains a paper card with the 32 points of the compaſs, fixed on a magnetic needle that always turns to the north, excepting a ſmall declination variable at different places. See VARIATION. The needle with the card turns on an upright pin fixed in the centre of the box. In the centre of the needle is fixed a braſs conical ſocket or cap, whereby the card hanging on the pin turns freely round the centre. The top of the box is covered with a glaſs, that the card's motion may not be diſturbed by the wind. The whole is encloſed in another box of wood, where it is ſuſpended by braſs hoops or gimbals, to preſerve the card horizontal. The compaſs-box is to be ſo placed in the ſhip, that the middle ſection of the box, parallel to its ſides, may be parallel to the middle ſection of the ſhip along its keel.

The compaſs being of the utmoſt conſequence to navigation, it is reaſonable to expect that the greateſt attention ſhould be uſed in its conſtruction, and every attempt to improve it carefully examined, and, if proper, adopted.

The very great objections to which the common compaſs is obnoxious, induced the ingenious Dr. Knight to contrive a new one which is now in uſe on board all our ſhips of war. The needle in this inſtrument is quite ſtraight, and ſquare at the ends; and conſequently has only two poles, though about the hole in the middle the curves are a little confuſed. Needles of this conſtruction, after vibrating a long time, will always point exactly in the ſame direction; and if drawn ever ſo little on one ſide, will return to it again, without any ſenſible difference. We may therefore conclude, that a regular parallelopiped is the beſt form for a needle, as well as the ſimpleſt, the holes for the caps being as ſmall as poſſible. And as the weight ſhould be removed to the greateſt diſtance from the centre of motion, a circle of braſs, of the ſame diameter of the card, may be added, which will ſerve alſo to ſupport the card, which may then be made of thin paper, without any thing to ſtiffen it. This ring being fixed below the card, and the needle above it, the centre of gravity is placed low enough to admit of the cap being put under the needle, whereby the hole in the needle becomes unneceſſary.

The above obſervations will be eaſily underſtood from viewing the ſeveral parts of the inſtrument as repreſented in Plate 84. where fig. 3. is the card, with the needle K L, and its cap M, fixed upon it, being one-third of the diameter of the real card. Fig. 5. is a perſpective view of the back ſide of the card, where AB repreſents the turning down of the braſs edge, C the under part of the cap, D and E two ſliding weights to balance the card, and F, G, two ſcrews that fix the braſs edge, &c. to the needle. Fig. 4. is the pedeſtal that ſupports the card, containing a ſcrewing needle, fixed in two ſmall grooves to receive it, by means of the collet C, in the manner of a port-crayon. D, the ſtem, is filed into an octagon, that it may be the more eaſily unſcrewed. For its further illuſtration and application to uſe, ſee NAVIGATION. The invention of the compaſs is uſually aſcribed to Flavio da Melfi, or Flavio Gioia, a Neapolitan, about the year 1302; but many other nations lay claim to it.

The compaſs hath ſometimes been obſerved to be diſturbed by the electricity of its glaſs cover; the remedy for this inconvenience is to moiſten the ſurface of the glaſs with a wet finger, which removes it immediately and effectually. The mariner's compaſs with a chart is much leſs dangerouſly moved than the common compaſs with a bare needle: and the deeper, or farther diſtant the needle hangs below the glaſs, the leſs diſturbance it is likely to receive. Notwithſtanding the various contrivances that have been made to prevent the card from being much affected by the motions of the ſhip, they have always been found too delicate to encounter the ſhocks of a tempeſtuous ſea. Improved ſea-compaſſes have lately been conſtructed by Mr. M'Culloch of London that are reported to be the beſt of any yet uſed. We have given a repreſentation in the Plate, where Fig. 8. is a ſection of this ſteering compaſs. *Aaaaa*, The common wooden-box, with its lid. *bb*, The braſs compaſs-box. *cc*, The glaſs cover to ditto. *dd*, The hollow conical bottom. *e*, The prop upon which the compaſs is ſupported inſtead of gimbals; the ſpherical top of which is finely poliſhed, and the apex of the hollow cone fitted in a peculiar manner to receive it. *ff*, A quantity of lead run round the bottom and cone of the compaſs box, to balance and keep it ſteadily horizontal. *gg*, The card and the magnetical needle, bent in ſuch a manner that the point of the conical pivot on which it moves and is ſupported, may be brought very near to the centre of gravity, as well as to the centre of motion. *hh*, Two guards, which by means of two pins *ii*, affixed to the compaſs box, prevent it from turning round and deceiving the

fteerfman. Fig. 9. a perfpective view of the fteering compafs, with the lid off and the front laid open. *bb*, The guards. *b*, The compafs-box. *c*, The prop, &c. as in figure 8. Fig. 10. a view of the azimuth compafs. *b*, The compafs-box. *b*, One of the guards. *c*, The prop, as in fig. 8. and 9. with this difference, that in the azimuth compafs, inftead of being fcrewed to the bottom of the wood-box, it ftands in a brafs focket, and may be turned round at pleafure. 1. A brafs bar, upon which the fight vanes are fixed. 2. A dark glafs, which moves up or down on 3. the fight vane. 4. A magnifying glafs, which is alfo moveable on the other vane. 5. The nonius or vernier. 6. A flide for moving the vernier fo as to ftop the card in taking the azimuth. 7. A double convex glafs, by which the divifions on the vernier may be read with accuracy. Fig. 11. is a fection reprefenting another application of the magnetic needle and card, conftructed by Mr. M'Culloch. *Aaaa*, The common wood box. *bb*, The brafs compafs-box. *cc*, The brafs fupport for the circle and pendulum. *d*, The pendulum. *e*, The agate. *ff*, The magnetic needle and card. *gg*, The brafs circle. *hh*, The glafs cover and brafs ring. *i*, The lead weight. *N. B.* All the centres of motion are in the fame plane. Befides poffeffing many advantages over the common compafs, this invention is preferable to the former, in as far as the needle is both longer and broader; hence its magnetifm muft be ftronger, and of courfe the line of its magnetic direction correfpondent with the card.

Azimuth Compass. This differs from the common fea *compafs* in this; that there is faftened, on the round box wherein the card is, a broad circle A B, Plate 84. *fig.* 12. one half whereof is divided into 90 degrees, and thofe fubdivided diagonally into minutes: *b c*, is an index moveable on *b*, having a fight, *b a*, erected thereon, and moving on a hinge. From the upper part of the fight to the middle of the index, is faftened a fine hypothenufal luteftring *a c*, to give a fhadow on the line in the middle of the index. The circle AB is croffed at right angles with two threads, from the extremities whereof are drawn four lines on the infide of the round box: there are alfo four lines drawn at right angles to each other on the card. The round box fitted with its card, graduated circle, and index, is hung in the brafs hoops BB, and thefe hoops faftened to the fquare box CC. Capt. Middleton mentions an *azimuth compafs* of his own contrivance, by which the variation may be determined with greater eafe and exactnefs than by any others in ufe before the year 1738. He has given no particular defcription of it, but only fhews the manner of ufing it. It carries a telefcope with a vertical hair in it, and may be conveniently ufed for taking the fun's altitude by reflection. See M'Culloch's improvement above.

Compass is alfo an inftrument of confiderable ufe in furveying land, dialing, &c. Its ftructure, in the main, is the fame with that of the mariner's compafs; confifting, like that, of a box and needle: the principal difference confifts in this, that inftead of the needle's being fitted into the card, and playing with it on a pivot, it here plays alone; the card being drawn on the bottom of the box, and a circle divided in 360 degrees on the limb. See Plate 84. fig. 2. This inftrument is of obvious ufe to travellers, to direct them in their road; and to miners, to fhow them what way to dig, with other confiderable ufes.

1. *To take the declination of a wall by the Compafs.* Apply that fide of the compafs whereon the north is marked along the fide of the wall; the number of degrees over which the north end of the needle fixes will be the declination of the wall, and on that fide; *v. g.* if the north point of the needle tends towards the north, that wall may be fhone on by the fun at noon; if it fix over fifty degrees, counting from the north towards the eaft, the declination is fo many degrees from north towards eaft. But fince the needle itfelf declines from the north towards the weft, with us 13°; it muft be noted, that to retrieve the irregularity, 13° are always to be added to the degrees fhown by the needle, when the declination of the wall is towards the eaft; on the contrary, when the declination is towards the weft, the declination of the needle is to be fubtracted.

2. *To take an angle with the Compafs.* Suppofe the angle required be DAE, fig. 1. apply that fide of the compafs whereon the north is marked to one of the lines AD; when the needle refts, obferve the degrees at which its north point ftands, which fuppofe 80: fo many degrees does the line decline from the meridian. In the fame manner take the declination of the line AE, which fuppofe 215°; fubtract 80° from 215, the remainder is 135; which fubtracted from 180, there will remain 45°; the quantity of the angle required. But if the difference between the declination of the two lines exceed 180°; in that cafe, 180° muft be fubtracted from that difference; the remainder then is the angle required. In meafuring angles by the compafs, there needs not any regard be had to the variation; that being fuppofed the fame in all the lines of the angles.

3. *To take a plot of a field by the Compafs.* Suppofe the field A, B, C, D, E, fig. 7. For the greater accuracy let there be two fights fitted to the meridian line of the compafs, place it horizontally, and through the fights look along the fide AB, or a line parallel to it; applying the eye to the fight at the fouth point of the compafs. Draw a rough fketch of the field by the eye, and on the correfponding line enter down the degree to which the needle points, which fuppofe 90; meafure the length of the fide, and enter that too, which fuppofe 10 chains. In this manner proceed with all the reft of the fides and angles of the field; the fides, which fuppofe 70, 65, 70, 50, 94 fathom; and the angles, which fuppofe 30, 100, 130, 240, 300 degrees. To protract the field, fet down the feveral angles obferved, one after another, and fubtract the leffer from the next greater: thus will you have the quantity of the feveral angles, and the length of the lines that include them. *Note,* All the angles of the figure taken together, muft make twice as many right angles; abating two if no miftake has been committed.

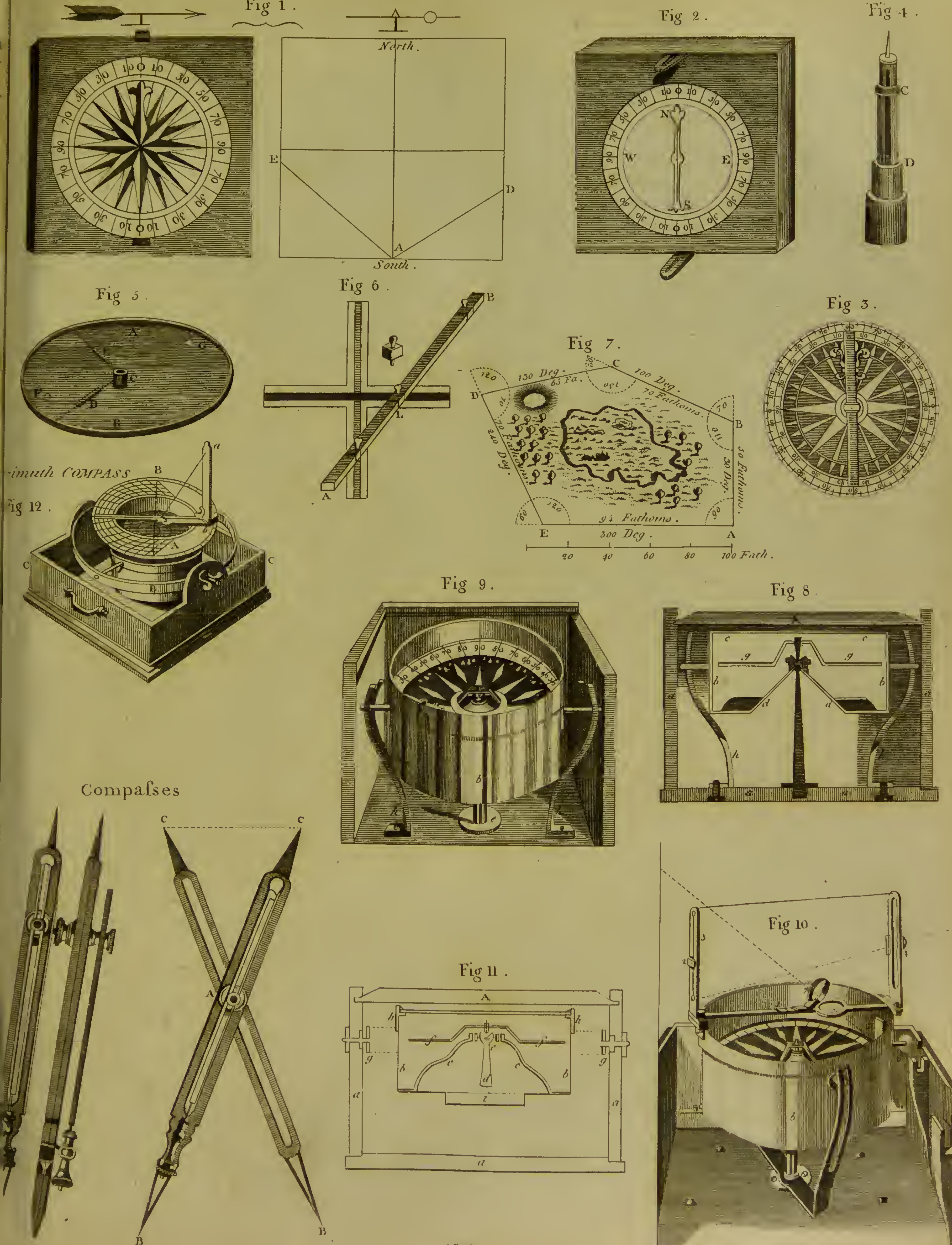
Compass-*Dials*, are fmall horizontal dials, fitted in brafs or filver boxes, for the pocket, to fhow the hour of the day, by the direction of a needle that indicates how to place them right, by turning the dial about till the cock or ftyle ftand directly over the needle; but thefe can never be very exact, becaufe of the variation of the needle itfelf. See Compass and Dialing.

COMPASSES, or *Pair of* Compasses, a mathematical inftrument for defcribing circles, meafuring figures, &c. The common compaffes confift of two fharp-pointed branches or legs of iron, fteel, brafs, or other metal, joined together at the top by a rivet, whereon they move as on a centre. Thofe compaffes are of the beft fort in which the pin or axle on which the joint turns, and alfo half the joint itfelf, is made of fteel, as the oppofite metals wear more equably. The perfection of them may be known by the eafy and uniform opening and fhutting of their legs; one of which is fometimes made to take in and out, in order to make room for two other points to defcribe with ink, black-lead, or other materials. There are now ufed compaffes of various kinds and contrivances, accommodated to the various ufes they are intended for; as,

Compasses *of three legs*, or *Triangular Compaffes*, are, fetting afide the excefs of a leg, of the fame ftructure with the common ones: their ufe being to take three points at once, and fo to form triangles; to lay down three pofitions of a map, to be copied at once, &c.

Beam Compasses confift of a long branch, or beam, made of brafs or wood, carrying two brafs curfors, the one fixed at one end, the other fliding along the beam, with a fcrew to faften it occafionally. To the curfors may be fcrewed points of any kind, whether fteel for pencils, or the like. It is ufed to draw large circles, to take great extents, &c. To the fixed curfor is fometimes applied an adjufting or micrometer fcrew, by which

COMPASS.



J Barlow sculp.

an extent is obtained to extreme nicety. Mr. Jones of Holborn has made beam compaſſes to adjuſt to the $\frac{1}{1000}$dth of an inch.

Caliber COMPASSES. See CALIBER.

Clockmaker's COMPASSES are joined like the common compaſſes, with a quadrant, or bow, like the ſpring-compaſſes; only of different uſe, ſerving here to keep the inſtrument firm at any opening. They are made very ſtrong, with the points of their legs of well tempered ſteel, as being uſed to draw lines on paſteboard or copper.

Cylindrical and Spherical COMPASSES, conſiſt of four branches, joined in a centre, two of which are circular, and two flat, a little bent at the ends: their uſe is to take the diameter, thickneſs, or caliber of round or cylindric bodies; ſuch as guns, pipes, &c.

Elliptic COMPASSES. Their uſe is to draw ellipſes, or ovals of any kind: they conſiſt of a beam AB, Plate 84. fig. 14. about a foot long, bearing three curſors; to one of which may be ſcrewed points of any kind: to the bottom of the other two are riveted two ſliding dove-tails, adjuſted in grooves made in the croſs branches of the beam. The dove-tails having a motion every way, by turning about the long branch, go backwards and forwards along the croſs; ſo that when the beam has gone half-way about, one of theſe will have moved the whole length of one of the branches, and when the beam has got quite round, the ſame dove-tail has got back the whole length of the branch. The ſame may be ſaid of the other dove-tail. *Note*, the diſtance between the two ſliding dove-tails is the diſtance between the two foci of the ellipſis; ſo that by changing that diſtance, the ellipſis will be rounded or ſlenderer. Under the ends of the branches of the croſs are placed four ſteel points to keep it faſt. The uſe of this compaſs is eaſy; by turning round the long branch, the ink pencil, or other point, will draw the ellipſis required. Its figure ſhows both its uſe and conſtruction.

German COMPASSES have their legs a little bent outwards, towards the top; ſo that, when ſhut, the points only meet.

Hair COMPASSES are ſo contrived within ſide by a ſmall adjuſting ſcrew to one of the legs, as to take an extent to a hair's breadth.

Lapidary's COMPASSES are a piece of wood, in form of the ſhaft of a plane, cleft at top, as far as half its length; with this they meaſure the angles, &c. of jewels and precious ſtones, as they cut them. There is in the cleft a little braſs rule, faſtened there at one end by a pin; but ſo that it may be moved in the manner of a braſs level: with this kind of ſquare they take the angles of the ſtones, laying them on the ſhaft as they cut them.

Proportional COMPASSES are thoſe whoſe joint lies between the points terminating each leg: they are either ſimple or compound. In the former ſort the centre is fixed, ſo that one pair of theſe ſerves only for one proportion.

Compound proportional COMPASSES, conſiſt of two branches, (Plate 84. fig. 15.) each pointed at either end with ſteel: the length of the branches is cut through, for a curſor to ſlide up and down; in the middle of which curſor is a ſcrew, ſerving to join the branches, and to fix them at any point required. On the one leg are diviſions, ſerving to divide lines into any number of equal parts, for reducing of figures, &c. On the other are numbers, for inſcribing any regular polygon in a circle propoſed. The uſe of the firſt is eaſy. Suppoſe, *e. g.* a right line required to be divided into three equal parts; puſh the curſor till the ſcrew be juſt on the figure 3; where fixing it, take the length of the given line between the longeſt parts of the legs: the diſtance between the two ſhorteſt will be one third of the given line. In the ſame manner may the line be divided into any other number of parts.

For the uſe of the line of polygons: Suppoſe, *e. g.* a pentagon required to be inſcribed in a circle: puſh the curſor till the middle of the ſcrew be againſt 5, the number of ſides in a pentagon; between the ſhorteſt parts of the legs take the ſemidiameter of the circle: the legs thus opened, the diſtance between the points of the longeſt parts will be the ſide of the pentagon to be inſcribed in the circle. And thus for a figure of any other number of ſides.

Proportional COMPASSES *with the ſector lines.* The ſtructure of theſe is ſo like that of the common proportional compaſſes, only a little nicer, that it needs no particular deſcription. The lines on the firſt face are the line of lines, marked *lines*; it is divided into 100 equal parts, every tenth numbered: and the line of chords, which goes to 60°, is marked *chords*. On the other face are a line of ſines to 90°, and a line of tangents to 45°. On one ſide are the tangents from 45° to 71° 34′; on the other, ſecants from 0° to 70° 30′.

For the uſe of theſe compaſſes: 1. To divide a line into any number of equal parts leſs than 100: divide 100 by the number of parts required; ſlip the curſor till the line on the ſliding dove-tail be againſt the quotient on the line of lines: then, the whole line being taken between the points of the compaſſes moſt remote from the centre, the aperture of the other will ſhow the diviſion required. 2. A right line given, ſuppoſed to be divided into 100 parts, to take any number of thoſe parts; ſlip the line on the ſliding dove-tail to the number of parts required: the whole line being taken between the points fartheſt from the centre, the aperture of the other two will include the number of diviſions required. 3. The radius being given, to find the chord of any arch under 60°; ſlip the line on the ſliding dove-tail to the degrees required on the line of chords: the radius being taken between the points fartheſt from the centre of the curſor; the aperture of the other line will be the chord required, provided the number of degrees be greater than 29: if it be leſs, the aperture taken from the radius will leave the chord required. 4. If the chord of an arch under 60° be given, and the radius required; ſlip the line on the dove-tail to the degrees given on the line of chords; the given chord being taken between the two points next the curſor, the aperture of the other will be the radius required. 5. The radius being given, to find the ſine of any number of degrees; ſlip the line on the dove-tail to the degrees on the line of ſines whoſe ſine is required: the radius taken between the points furtheſt from the curſor, the aperture of the other will give the ſine of the angle required. But if the ſine ſought be leſs than 30°, the difference of the apertures of the oppoſite points will be the ſine required. 6. The radius being given, to find the tangent of any number of degrees under 71: if the tangent required be under 26° 30′, then ſlip the line on the dove-tail to the degree propoſed on the tangent line; the radius taken between the points fartheſt from the curſor, the aperture of the others will be the tangent of the degrees required: if the tangent required be above 26° 30′, but under 45°, the line on the curſor muſt be ſlipped to the degrees given on the tangent line: then the radius being taken between the points furtheſt from the curſor, the aperture of the others will be the tangent. If the tangent required be greater than 45°, but leſs than 56° 20′, ſlip the notch on the tangent ſide of the turned check to the degree 0 in the tangent line on the ſide of the compaſs; the radius being taken between the points fartheſt from the curſor; the difference between the aperture of the other and theſe, added together, will be the tangent required. Thus, for the tangents of the degrees under 71. After the like manner may the ſecant of any number of degrees under 71 be found.

Mr. Heath, a mathematical inſtrument-maker in London, conſtructed a pair of proportional compaſſes, in 1746, with a curious and uſeful contrivance for preventing the ſhorter legs from changing their poſition, when theſe compaſſes were uſed. It conſiſted of a beam ſoldered to a ſcrew, and running parallel to the leg of the compaſſes, nearly of the length of the groove; in this beam a ſlit was made, which admitted of a ſliding-nut, the other end of which fell into a hole in the bottom of the ſcrew, belonging to the great nut of the compaſſes. The ſcrew-pin of

the beam paffed through an adjufter, by means of which the mark on the flider might be brought exactly to any divifion. But the proportional compaffes have been much out of ufe fince the invention of the fector.

Spring COMPASSES, or dividers; thofe with an arched head, which by its fpring opens the legs; the opening being directed by a circular fcrew faftened to one of the legs, and let through the other, worked with a nut. Thefe compaffes are made of hardened fteel.

Trifecting COMPASSES confift of two central rules, and an arch of circles of 120 degrees, immoveable, with its radius; which is faftened with one of the central rules like the two legs of a fector, that the central rule may be carried through all the points of the circumference of the arch. The radius and rule fhould be as thin as poffible; and the rule faftened to the radius fhould be hammered cold, to attain the greater elafticity; and the breadth of the central rule fhould be triple that of the radius; there muft alfo be a groove in this rule, with a dove-tail faftened on it for its motion, and a hole in the centre of each rule. The ufe of this inftrument is to facilitate the trifection of angles geometrically; and it is faid to have been invented by M. Taragen for that purpofe.

Turn-up COMPASSES. The body of this inftrument is like the common compaffes: but towards the bottom of the legs, without-fide, are added two other points befides the ufual ones: the one whereof carries a drawing pen point, and the other a port-crayon, both adjufted fo as to turn round, and be in the way of ufe, or out of it, as occafion requires. Thefe compaffes have been contrived to fave the trouble of changing the points.

COMPASSION, or COMMISERATION, in ethics, a mixed paffion, compounded of love and forrow, and excited by the fight or recital of diftrefs. Hobbs makes this a merely felfifh paffion, and defines it, as being fear for ourfelves; Hutchefon refolves it into inftinct; but Dr. Butler much more properly confiders compaffion as an original, diftinct, particular affection in human nature.

COMPATIBLE, fomething that may fuit or confift with another. See INCOMPATIBLE.

COMPEIGNE, a handfome town of France, in the department of Oife and late province of the Ifle of France. It is feated near an extenfive foreft, at the confluence of the Aifne and Oife. Here is a palace, in which the kings of France often refided. The Maid of Orleans was taken prifoner here in 1430. It is 45 miles N. E. of Paris. E. lon. 2. 55. N. lat. 49. 25.

COMPENDIUM, in matters of literature, denotes much the fame as epitome or abridgement. See ABRIDGEMENT.

COMPENSATION, in law. When the fame perfon is debtor and creditor to another, the mutual obligations, if they are for equal fums, are extinguifhed by compenfation; if for unequal, the leffer obligation is extinguifhed, and the greater diminifhed, as far as the concourfe of debt and credit goes.

COMPETENCE, in law, the right or authority of a judge, whereby he takes cognizance of any thing.

COMPETENTES, an order of catechumens, in the primitive Chriftian church, being the immediate candidates for baptifm. See CATECHUMEN.

COMPITALIA, or COMPITALITA, feafts held among the ancients in honour of the *lares*. The word comes from the Latin *compitum*, a crofs-way; by reafon the feaft was held in the meeting of feveral roads. The *compitalia* are more ancient than the building of Rome. Dionyfius of Halicarnaffus, and Pliny, indeed, fay, they were inftituted by Servius Tullius; but this only fignifies that they were then introduced into Rome. The feaft being moveable, the day whereon it was to be obferved was proclaimed every year. It was ordinarily held on the 4th of the nones of February, *i. e.* on the 2d of that month. Macrobius obferves, that they were held not only in honour of the *lares*, but alfo of *mania*, madnefs. The priefts who officiated at them were flaves and liberti, and the facrifice a fow. They were re-eftablifhed, after a long neglect, by Tarquin the Proud, on occafion of an anfwer of the oracle, *that they fhould facrifice heads for heads*; i. e. that for the health and profperity of each family, children were to be facrificed: but Brutus, after expelling the kings, in lieu of thofe barbarous victims fubftituted the heads of garlic and poppy; thus fatisfying the oracle which had enjoined *capita*, heads. During the celebration of this feaft, each family placed at the door of their houfe the ftatue of the goddefs *Mania*: they alfo hung up at their doors figures of wool, reprefenting men and women; accompanying them with fupplications that the lares and mania would be contented with thofe figures, and fpare the people of the houfe.

COMPLEMENT, in geometry, is what remains of the quadrant of a circle, or 90°, after any certain arch had been taken away from it. Thus, if the arch taken away be 40°, its complement is 50; becaufe $50 + 40 = 90$. The fine of the complement of an arch is called the *co-fine*, and that of the tangent the *co-tangent*, &c.

COMPLETUS FLOS, in botany. A flower is faid to be *complete*, which is provided with both the covers, viz. the calyx or flower-cup, and the petals. The term was invented by Vaillant, and is fynonymous to *calyculatus flos* in Linnæus. Berkenhout erroneoufly confounds it with the *auctus* and *calyculatus calyx* of the fame author.

COMPLEX, in a more general fenfe, a term fynonymous with compound; though in ftrictnefs of fpeech there is fome difference. The term *Complex* is properly applied where one thing contains many others, or confifts of various parts not really diftinct from each other, but only imaginarily, or in our conceptions. In this fenfe the foul may be faid to be complex, in refpect of the underftanding and will, which are two things that our reafon alone diftinguifhes in it.

COMPLEX *Term* or *Idea*, is a term compounded of feveral fimple or incomplex ones. Thus in the propofition, *A juft God cannot leave crimes unpunifhed*; the fubject of this propofition, viz. *a juft God*, is a complex term, or ftands for a complex idea compofed of two fimple or incomplex ones, viz. *God and juft*.

COMPLEXION, among phyficians, the temperament, habitude, and natural difpofition, of the body; but, popularly fpeaking, the colour of the face and fkin.

Few queftions in philofophy have engaged the attention of naturalifts more than the diverfities among the human fpecies, among which that of colour is the moft remarkable. The great differences in this refpect have given occafion to feveral authors to affert, that the whole human race have not fprung from one original; but that as many different fpecies of men were at firft created as there are now different colours to be found among them. It remains, in reality, a matter of no fmall difficulty to account for the remarkable variations of colour that are to be found among different nations. On this fubject Dr. Hunter hath publifhed a thefis, in which he confiders the matter more accurately than hath commonly been done, and determines abfolutely againft any fpecific difference among mankind. He introduces his fubject by obferving, that when the queftion has been agitated, whether all the human race conftituted only one fpecies or not, much confufion has arifen from the fenfe in which the term *fpecies* has been adopted. He therefore thinks it neceffary to fet out with a definition of the term. He includes under the fame fpecies all thofe animals which produce iffue capable of propagating others refembling the original ftock from whence they fprung. This definition he illuftrates by having recourfe to the human fpecies as an example. And in this fenfe of the term he concludes, that all of them are to be confidered as belonging to the fame fpecies. And as, in the cafe of plants, one fpecies comprehends feveral varieties depending upon climate,

ſoil, culture, and ſimilar accidents; ſo he conſiders the diverſities of the human race to be merely varieties of the ſame ſpecies, produced by natural cauſes. For the reaſons aſſigned by phyſiologiſts for the variations of *colour* in the human ſkin, see ANATOMY, p. 185.

Upon the whole, colour and figure may be ſtyled habits of the body. Like other habits, they are created, not by great and ſudden impreſſions, but by continual and almoſt imperceptible touches. Of habits both of mind and body, nations are ſuſceptible as well as individuals. They are tranſmitted to the offspring, and augmented by inheritance. Long in growing to maturity, national features, like national manners, become fixed only after a ſucceſſion of ages. They become, however, fixed at laſt; and if we can aſcertain any effect produced by a given ſtate of weather or of climate, it requires only repetition during a ſufficient length of time to augment and impreſs it with a permanent character. The ſanguine countenance will, for this reaſon, be perpetual in the higheſt latitudes of the temperate zone; and we ſhall for ever find the ſwarthy, the olive, the tawny, and the black, as we deſcend to the ſouth. Theſe obſervations have been well recapitulated and enforced by the Rev. Dr. Smith, profeſſor of moral philoſophy in the college of New Jerſey, in his *Eſſay on the Cauſes of the Variety of Complexion and Figure in the Human Species*; to which the reader who wiſhes for further ſatisfaction on the ſubject is referred.

COMPLEXUS; and COMPLEXUS *Minor*, or *Trachelo-maſtoidæus*: two muſcles in the poſterior part of the trunk. See ANATOMY, *Table of the Muſcles*.

COMPLICATION, in general, denotes the blending, or rather interweaving, of ſeveral different things together: thus, a perſon afflicted with ſeveral diſorders at the ſame time, is ſaid to labour under a complication of diſorders.

COMPLINE, the laſt diviſion of the Romiſh breviary. It was inſtituted to implore God's protection during the night, as the *prime* is for the day. It is recited after ſun-ſet; and is ſo called, becauſe it completes the office for the 24 hours.

COMPLUTENSIAN BIBLE. See BIBLE *(Greek)*.

COMPONE, or COMPONED, or *Gobony*, in heraldry. A bordure compone is that formed or compoſed of a row of angular parts, or chequers of two colours.

COMPONED, or COMPOSED, is alſo uſed in general for a bordure, a pale, or a feſs, compoſed of two different colours or metals diſpoſed alternately, ſeparated and divided by fillets, excepting at the corners; where the junctures are made in form of a goat's foot.

COMPOSITE, in general, denotes ſomething compounded, or made up of ſeveral others united together: thus, COMPOSITE *Numbers*, are ſuch as can be meaſured exactly by a number exceeding unity: as 6 by 2 or 3, or 10 by 5, &c. ſo that 4 is the loweſt compoſite number. Compoſite numbers, between themſelves, are thoſe which have ſome common meaſure beſides unity; as 12 and 15, as being both meaſured by 3.

COMPOSITE *Order*, in architecture, the laſt of the five orders of columns; ſo called becauſe its capital is compoſed out of thoſe of the other columns, borrowing a quarter round from the Tuſcan and Doric, a row of leaves from the Corinthian, and volutes from the Ionic. Its corniche has ſimple modillions or dentils. It is alſo called the *Roman* or *Italic* order, as having been invented by the Romans. By moſt authors it is ranked after the Corinthian, either as being the next richeſt, or the laſt invented. See ARCHITECTURE.

COMPOSITION, in a general ſenſe, the uniting or putting together ſeveral things, ſo as to form one whole, called a *compound*. Thus, COMPOSITION *of Ideas* is an act of the mind whereby it unites ſeveral ſimple ideas into one conception or complex idea. When we are provided with a ſufficient ſtock of ſimple ideas, and have by habit and uſe rendered them familiar to our minds, they become the component parts of other ideas ſtill more complicated, and form what we may call a ſecond order of compound notions. This proceſs may be continued to any degree of compoſition we pleaſe, mounting from one ſtage to another, and enlarging the number of combinations.

COMPOSITION, in grammar, the joining of two words together; or prefixing a particle to another word, to augment, diminiſh, or change its ſignification.

COMPOSITION, in logic, a method of reaſoning, whereby we proceed from ſome ſelf-evident truth to other particular and ſingular ones. In diſpoſing and putting together our thoughts, there are two ways of proceeding equally within our choice: for we may ſo ſuppoſe the truths, relating to any part of knowledge, as they preſented themſelves to the mind in the manner of inveſtigation; carrying on the ſeries of proofs in a reverſe order, till they at laſt terminate in firſt principles: or beginning with theſe principles, we may take the contrary way; and from them deduce, by a ſtrict train of reaſoning, all the ſeveral propoſitions we want to eſtabliſh. This diverſity in the manner of arranging our thoughts gives riſe to the twofold diviſion of method eſtabliſhed among logicians; the one called *analytic* method, or the method of *reſolution*, inaſmuch as it traces back things to their ſource, and reſolves knowledge into its firſt original principles. This method ſtands in contradiſtinction to the method of compoſition; or, as it is otherwiſe called, the *ſynthetic* method: for here we proceed by gathering together the ſeveral ſcattered parts of knowledge, and combining them into one ſyſtem, in ſuch a manner as that the underſtanding is enabled diſtinctly to follow truth through all the different ſtages of gradation.

COMPOSITION, in muſic, is the art of inventing and writing airs; of accompanying them with a ſuitable harmony; in ſhort, of forming a complete piece of muſic in all its parts. The knowledge of melody, harmony, and its rules, is the foundation of compoſition. Without doubt, it is neceſſary to know in what manner chords ſhould be filled, how to prepare and reſolve diſſonances, how to find the fundamental baſs, and how to put in practice all the other minutiæ of elementary knowledge; but with the mechanical rules of harmony alone, one is by no means better qualified to underſtand the art, and operate in the practice of compoſition, than to form himſelf for eloquence upon all the rhetorical precepts exhibited in grammar. We need not ſay, that beſides this, it is neceſſary to underſtand the genius and compaſs of voices and inſtruments; to judge what airs may be of eaſy, and what of difficult, execution; to obſerve what will, and what will not, be productive of any effect; to feel the character of different movements, as well as that of different modulations, that both may be always ſuitably applied; to know the different rules eſtabliſhed by convention, by taſte, by caprice, or by pedantry, as fugues, imitations, or pieces where the ſubject is confined to uniform laws in its harmony, melody, rithmus, &c. All theſe acquiſitions are ſtill no more than preparatives for compoſition: but the compoſer muſt find in his own genius the ſources of beautiful melody, of ſublime harmony, the pictureſque, and the expreſſive in muſic; he muſt, in ſhort, be capable of perceiving, and of forming, the order of the whole piece; to follow the relations and aptitudes of which it is ſuſceptible in every kind; to inflame his ſoul with the ſpirit and enthuſiaſm of the poet, rather than childiſhly amuſe himſelf with punning in harmony, or adapting the muſic in each particular word. It is with reaſon that our muſicians have given the name of *words* to the poems which they ſet to muſic. It appears evident from their manner of expreſſing them, that, in their apprehenſion, they ſeemed words, and words alone. One would be tempted to imagine, particularly during ſome of theſe laſt years, that the

rules for the formation and succeffion of chords have caufed all the reft to be neglected or forgot; and that harmony has made no acquifitions but at the expence of what is general and effential in the mufical art. All our artifts know how to fill a chord with its conftituent founds, or a piece of harmony with its conftituent parts; but not a foul amongft them feels a ray of compofition. As to what remains, though the fundamental rules of counterpoint, or mufic in parts, continue ftill the fame, they are more or lefs rigorous and inflexible in proportion as the parts increafe in number; for according as the parts are multiplied, the difficulty of compofition is heightened, and the rules are lefs fevere.—Compofitions in two parts are called *duettos* when the two performers fing equally; that is to fay, when the fubject is no further extended, but divided between them: but if the fubject is in one part alone, and the fubordinate harmony no more than an accompanyment, the firft part is then either called a *recitative* or a *folo*; and the other an *accompanyment*, or *continued bafs*, if it is a bafs. It is the fame cafe with the *trio*, with compofitions in three, in four, or in five parts.

The name of compofition is likewife given to fuch pieces of mufic themfelves as are formed according to the rules of the art. For this reafon the *duetts*, *trios*, *quartettos*, which have juft been mentioned, are called *compofitions*. Compofitions are either formed for the voice alone, or for inftruments, or for voices and inftruments joined. Full chorufes and fongs are the only compofitions principally intended for the voice, though fometimes inftruments are joined with it to fupport it. Compofitions for inftruments are intended to be executed by a band in the orcheftra, and then they are called *fymphonies*, *concertos*; or for fome particular fpecies of inftruments, and then they are called *pieces* or *fonatas*. Such compofitions as are deftined both for voices and inftruments, have been generally divided into two capital fpecies, viz. the *facred* and the *fecular*. The compofitions deftined for the church, whether pfalms, hymns, anthems, or refponfives, are in general diftinguifhed by the name of *church-mufic*, and characterifed by their intention to be fung with words. Secular mufic in general may likewife be divided into two kinds; *theatrical* and *chamber* mufic. Of the firft kind is that ufed in the operas; the fubdivifions of the fecond are endlefs. Solos, concertos, cantatas, fongs, and airs, almoft of every kind, which are not adapted to the church or the ftage, may be included in the idea of *chamber mufic*. In general, it is thought, that facred mufic requires deeper fcience, and a more accurate obfervation of rules; the fecular fpecies gives more indulgence to genius, and fubfifts in greater variety. This, however, will admit of a difpute, notwithftanding the weighty authority of Rouffeau on the fubject.

In compofition, the author either confines himfelf, as a fubject, to the mere mechanical modulations and arrangements of found; and, as his end, to the pleafure of the ear alone; or otherwife he foars a nobler height; he afpires to imitative mufic; he endeavours to render the hearts and fouls of his auditors ductile by his art, and thus to produce the nobleft emotions. In the firft view, it is only neceffary that he fhould look for beautiful founds and agreeable chords; but in the fecond he ought to confider mufic in its conformity with the accents of the human voice, and in the expreffive powers of notes harmonically combined to fignify or paint fuch objects as are fufceptible of imitation. In Rouffeau's article *Opera*, fome ideas may be found by which the art may be ennobled and elevated, by forming mufic into a language more powerful and pathetic than eloquence itfelf.

Composition, in literature, the art of forming and arranging fentiments, and clothing them with language fuitable to the nature of the fubject or difcourfe. See the articles Language, Oratory, Poetry, Dialogue, Epistle, and History.

Composition, in chemiftry, is the union and combination of feveral fubftances of different natures, from which a compound body refults. From this union of bodies of different natures, a body is formed of a mixed nature, which Becker and Stahl have called a *mixture*, and which may be called a *combination* or *chemical compofition*, to avoid the equivocal fenfe of the word *mixture*. By this laft, we underftand only a mere appofition of parts; and which would therefore give a very falfe idea of chemical compofition, in which a mutual adhefion takes place between the combined fubftances.

Composition, in painting, includes the invention as well as difpofition of the figures, the choice of attitudes, &c. Compofition, therefore, confifts of two parts; one of which finds out, by means of hiftory, proper objects for a picture; and the other difpofes them to advantage. See Painting.

Composition, in pharmacy, the art or act of mixing divers ingredients together into a medicine fo as they may affift each other's virtues, fupply each other's defects, or correct any ill qualities thereof. See Pharmacy.

Composition, in commerce, a contract between an infolvent debtor and his creditors, whereby the latter accept of a part of the debt in compofition for the whole, and give a general acquittance accordingly.

Composition, in printing, commonly termed *compofing*, the arranging of feveral types or letters in the compofing-ftick, in order to form a line; and of feveral lines ranged in order, in the galley, to make a page; and of feveral pages to make a form. See Printing.

COMPOSITÆ, in botany, the name of a clafs in Hermannus and Royen; as likewife of an order in Linnæus's fragments of a natural method, confifting in general of the plants which have the characters enumerated in the following article. A particular defcription of this order is given under the article Syngenesia, which includes all the compound flowers.

COMPOSITUS flos, in botany, an aggregate flower compofed of many *flofculi feffiles*, on a common entire receptaculum, with a common perianthium, and whofe antheræ being five in number unite in the form of a cylinder; the flofculi are monopetalous, and under each of them is a monofpermous germen. Compound flowers are either *ligulati*, *tubulofi*, or *radiati*.

COMPOST, in agriculture, denotes a certain kind of mixture defigned to affift the foil in the way of vegetation, inftead of dung. The requifites for compoft are, 1. That it ought to be cheaper than the quantity of dung required for an equal extent of foil. 2. It ought to be lefs bulky; and, 3. It ought to produce equal effects. An oil-compoft is recommended in the Georgical Effays, upon a fuppofition that the food of vegetables is of an oily nature. It is made as follows: "Take of North American pot-afh 12lb. Break the falt into fmall pieces, and put it into a convenient veffel with four gallons of water. Let the mixture ftand 48 hours: then add coarfe train oil 14 gallons. In a few days the falt will be diffolved, and the mixture, upon ftirring, will become nearly uniform. Take 14 bufhels of fand, or 20 of dry mould; upon thefe pour the above liquid ingredients. Turn this compofition frequently over, and in fix months it will be fit for ufe. When the liquid ingredients are put to one or two hogfheads of water, a liquid compoft will be formed, which muft be ufed with a water cart." This compoft, however, the inventor himfelf owns to be inferior to rotten dung, as indeed may very naturally be fuppofed; yet in fome cafes it feems capable of doing fervice.

Thofe who propofe to affift vegetation by means of a compoft will do well to confult Kirwan's Treatife on Manures. See alfo the articles Husbandry and Manure.

COMPOSTELLA, a celebrated town in Spain, and capital of Galicia, with an archbifhop's fee, and an univerfity. The public fquares, and the churches, particularly in the Metropo-

litan church, are very magnificent. It has a great number of monafteries, for both fexes, and about 2000 houfes. It is pretended, that the body of St. James was buried here, which draws a great number of pilgrims from moft parts of Chriftendom. The archbifhop is one of the richeft prelates in Spain, having 70,000 crowns a-year. From this town the military order of St. Jago, or St. James, had its original. It is feated in a peninfula, formed by the rivers Tambra and Ulla, in a pleafant plain. W. long. 7. 17. N. lat. 42. 54.

New Compostella, a town in North America, in New Spain, and province of Xalifco, built in 1531. It is feated near the South Sea. W. long. 110. 12. N. lat. 21. 0.

COMPOUND, in a general fenfe, an appellation given to whatever is compofed or made up of different things; thus we fay, a compound word, compound found, compound tafte, &c. —*Compound* differs from *complex,* and ftands oppofed to *fimple.* See Complex and Simple.

Compound *Flower*. See Compositus *Flos*.

Compound *Intereft,* called alfo *intereft upon intereft,* is that which is reckoned not only upon the principal, but upon the intereft itfelf forborne; which hereby becomes a fecondary principal. See Interest.

Compound *Motion,* that motion which is effected by feveral confpiring powers. Powers are faid to confpire if the direction of the one be not quite oppofite to that of the other; as when the radius of a circle is conceived to revolve about a centre, and at the fame time a point to move ftraight along it.

Compound *Numbers,* thofe which may be divided by fome other number befide unity, without leaving any remainder; fuch are 18, 20, &c. the firft being meafured by the numbers 2, 6, or 9; and the fecond by the numbers 2, 4, 5, 10.

Compound *Quantities*. See Algebra.

Compound *Ratio,* is that which the product of the antecedents of two or more ratios has to the product of their confequents. Thus, 6 to 72 is in a ratio compounded of 2 to 6, and of 3 to 12.

COMPREHENSION, in Englifh church-hiftory, denotes a fcheme propofed by Sir Orlando Bridgman in 1667-8, for relaxing the terms of conformity in behalf of Proteftant diffenters, and admitting them into the communion of the church. A bill for this purpofe was drawn up by Lord Chief-Baron Hale, but difallowed. The attempt was renewed by Tillotfon and Stillingfleet in 1674, and the terms were fettled to the fatisfaction of the nonconformifts; but the bifhops refufed their affent. This fcheme was likewife revived again immediately after the Revolution; the king and queen expreffed their defire of an union: however, the defign failed after two attempts; and the act of toleration was obtained.

Comprehension, in metaphyfics, is that act of the mind whereby it apprehends or knows any object that is prefented to it, on all the fides whereon it is capable of being apprehended or known. To comprehend a thing is defined by the fchoolmen, *rem aliquam totam et totaliter cognofcere.*

Comprehension, in rhetoric, a trope or figure whereby the name of a whole is put for a part; or that of a part for a whole; or a definite number of any thing for an indefinite.

COMPRESS, in furgery, a bolfter of foft linen cloth, folded in feveral doubles, frequently applied to wounds to promote their healing.

COMPRESSION, the act of preffing or fqueezing fome matter together, fo as to fet its parts nearer to each other, and make it poffefs lefs fpace. *Compreffion* properly differs from *condenfation,* in that the latter is performed by the action of cold, the former by fome external violence.

COMPROMISE, a treaty or contract, whereby two contending parties eftablifh one or more arbitrators to judge of and terminate their differences in an amicable manner.

COMPTON (Henry), bifhop of London, was the youngeft fon of Spencer Earl of Northampton, and born in 1632. After the reftoration of Charles II. he became a cornet of a regiment of horfe: but foon after quitting the army for the church, he was made bifhop of Oxford in 1674; and about a year after tranflated to the fee of London. He was entrufted with the education of the two princeffes Mary and Anne, whom he alfo afterwards married to the princes of Orange and Denmark: and their firmnefs in the Proteftant religion was in a great meafure owing to their tutor, to whom, when popery began to prevail at court, it was imputed as an unpardonable crime. He was fufpended from his ecclefiaftical function by James II. but was reftored by him again on the prince of Orange's invafion. He and the bifhop of Briftol made the majority for filling the vacant throne with a king: he performed the ceremony of the coronation; was appointed one of the commiffioners for revifing the liturgy; and laboured with much zeal to reconcile diffenters to the church. His fpirit of moderation made him unpopular with the clergy, and in all probability checked his further promotion. He died in 1713; but, living in bufy times, did not leave many writings behind him.

Comptroller. See Controller.

COMPULSOR, an officer under the Roman emperors, difpatched from court into the provinces, to compel the payment of taxes, &c. not paid within the time prefcribed. The word is formed of the verb *compellere,* "to oblige, conftrain." Thefe were charged with fo many exactions, under the colour of their office, that Honorius cafhiered them by a law in 412. The laws of the Vifigoths mention military compulfors; that were officers among the Goths, whofe bufinefs was to oblige the tardy foldiers to go into the fight, or to run back to an attack, &c. Caffian mentions a kind of monaftic compulfors, whofe bufinefs was to declare the hours of canonical office, and to take care the monks went to church at thofe hours.

COMPUNCTION, in theology, an inward grief of the mind for having offended God. The word comes from *compungere,* of *pungere,* "to prick."—The Romanifts own their confeffion infignificant unlefs attended with compunction or pricking of the heart.

COMPURGATOR, one that, by oath, juftifies another perfon's innocence. Compurgators were introduced as evidences in the jurifprudence of the middle ages. Their number varied according to the importance of the fubject in difpute, or the nature of the crime with which a perfon was charged.

COMPUTATION, in a general fenfe, the manner of eftimating time, weights, meafures, money, or quantities of any kind.—The word is fometimes alfo ufed among mathematicians in the like fenfe as calculation.

COMUS, in mythology, the god of jollity or feftivity. There is great reafon to believe he was the Chamos of the Moabites; Bel-Phegor, Baal Peor, Priapus, and Bacchus. He is reprefented under the appearance of a young man, with an inflamed red countenance, his head inclined, and crowned with flowers; his air drowfy; leaning on an huntfman's fpear in his left hand, and holding an inverted torch in his right. His ftatue was placed at the chamber doors of new married perfons; his pedeftal crowned with flowers.

CON, or Cond. See Cond.

CONARION, or Conoides, a name for the pineal gland. See Anatomy, page 203.

CONATUS, a term frequently ufed in philofophy and mathematics, defined by fome to be a quantity of motion, not capable of being expreffed by any time or length; as the *conatus recedendi ab axe motus,* is the endeavour which a body, moved circularly, makes to recede, or fly off from the centre or axis of its motion.

CONCA (Sebaftian), called *Cavalier,* a celebrated hiftory

and portrait painter, was born at Gaeta in 1679, and placed as a diſciple with Franceſco Solimena, an incomparable maſter. Under his direction Conca exerted his utmoſt induſtry to obtain a proper knowledge of the true principles of the art of painting; and afterwards through life was eſteemed an artiſt of the firſt eminence. He was inceſſantly employed, and his works were ſolicited by moſt of the princes of Europe. The churches and chapels of every part of Italy are enriched with ſome of his compoſitions; of which he painted an incredible number. He was earneſtly invited by Philip V. of Spain to viſit his court, but he could not be prevailed on to leave Rome. He was at laſt, however, ſo ſtrongly preſſed to go to Naples, that he undertook the journey; and was received in that kingdom with all the reſpect and honour due to his merit; and there he finiſhed ſeveral noble deſigns, as alſo at Gaeta his native city. While he continued at Naples, he received in the royal preſence a ſnuff-box of very great value, preſented to him in the king's name by the marquis of Tanucci, at that time prime miniſter; and in the year 1757 the king was pleaſed to ennoble him and all his deſcendants. At that time he was 78, and it is confidently ſaid that he died in 1761 aged 82, which is very probable, though not poſitively certain. He underſtood perſpective and architecture thoroughly, and added to it a fine underſtanding of the chiaro-ſcuro. His ſtyle of compoſition is grand and elegant; his deſign very correct; his diſpoſition ingenious; his attitudes and expreſſion full of truth, nature, and variety; and his colouring is excellent. The hiſtory of Diana and Actæon, by Conca, is in the poſſeſſion of the earl of Pembroke at Wilton.

CONCALE BAY, is on the coaſt of France in the former province of Brittany, where the Engliſh forces landed in June 1758, in order to go to St. Maloes; which they did, and burnt all the ſhips in that harbour, which were above 100, of all ſorts. Concale is the town which gives name to the bay, and is famous for oyſters. It is 18 miles eaſt of St. Maloes, and 197 weſt of Paris. W. long. 1. 47. N. lat. 48. 41.

CONCARNEAU, a town of France in the department of Finiſtere, and late province of Brittany, with a harbour and a caſtle. It is 12 miles from Quimper. E. lon. 4. 2. N. lat. 47. 46.

CONCAVE, an appellation uſed in ſpeaking of the inner ſurface of hollow bodies, but more eſpecially of ſpherical ones.

CONCAVE *Glaſſes*, are ſuch as are ground hollow, and are uſually of a ſpherical figure, though they may be of any other, as parabolical, &c. All objects ſeen through concave glaſſes appear erect and diminiſhed.

CONCENTRATION, in general, ſignifies the bringing things nearer a centre. In a chemical view, the particles of ſalt in ſea-water are ſaid to be concentrated; that is, brought nearer each other, by evaporating the watery part.

CONCENTRIC, in mathematics, ſomething that has the ſame common centre with another: it ſtands in oppoſition to *excentric*.

CONCEPTION, in logic, the ſimple apprehenſion or perception which we have of any thing, without proceeding to affirm or deny any thing about it. Some writers, as Lord Kames, diſtinguiſh between conception and perception; making the latter to denote the conſciouſneſs of an object when preſent, or to include the reality of its object; whereas conception expreſſes the forming of an idea of an object whether preſent or abſent, or without any conviction of its reality.

CONCEPTION, in phyſiology, the firſt formation of the embryo, or fœtus, in the womb. See ANATOMY, page 209, and the article GENERATION.

CONCEPTION *Immaculate of the Holy Virgin*, is a feaſt eſtabliſhed in honour of the holy virgin, particularly with regard to her having been conceived and born *immaculate*, i. e. without original ſin, held in the Romiſh church on the 8th of December. The immaculate conception is the great head of controverſy between the Scotiſts and Thomiſts; the former maintaining, and the latter impugning it. In the three Spaniſh military orders, of St. James of the ſword, Calatrava, and Alcantara, the knights take a vow at their admiſſion to defend the immaculate conception. This reſolution was firſt taken in 1652. Peter d'Alva has publiſhed 48 huge volumes in folio on the myſteries of the conception.

CONCEPTION, an epiſcopal town of Chili in South America. It is ſituated in W. long. 79. 12. S. lat. 36. 43; and is the oldeſt European ſettlement in Chili, and the ſecond in point of dignity.

CONCEPTION, a town in North America, in New Spain, and in the Audience of Guatimali. It is ſeated near the ſea-coaſt, 100 miles weſt of Porto-bello, and a ſmall river that runs into the ſea. W. long. 83. 5. N. lat. 10. 0.

CONCERT, or CONCERTO, in muſic, a number or company of muſicians, playing or ſinging on the ſame piece of muſic or ſong at the ſame time.

CONCERTATO intimates the piece of muſic to be compoſed in ſuch a manner, as that all the parts may have their recitativos, be it for two, three, four, or more voices or inſtruments.

CONCERTO GROSSI, the grand chorus of a concert, or thoſe places where all the ſeveral parts perform or play together.

CONCESSION, in general, ſignifies either the act of granting or yielding any thing, or the thing itſelf which is ſo granted or yielded.

CONCESSION, in rhetoric, a figure whereby ſomething is freely allowed, that yet might bear diſpute, to obtain ſomething that one would have granted to him, and which he thinks cannot fairly be denied, as in the following conceſſion of Dido, in Virgil:

> " The nuptials he diſclaims, I urge no more;
> " Let him purſue the promis'd Latian ſhore.
> " A ſhort delay is all I aſk him now;
> " A pauſe of grief, an interval from woe."

CONCHA, in zoology, a ſynonime of the MYTILUS, SOLEN, and other ſhell-fiſh.

CONCHITES MARMOR, a name given by the ancients to a ſpecies of marble dug near Megara, and remarkable for containing a great number of ſea-ſhells, and other marine bodies immerſed in it.

CONCHOID, in geometry, the name of a curve, given to it by its inventor Nicomedes. See FLUXIONS.

CONCHYLIA, a general name for all petrified ſhells, as limpets, cochleæ, nautili, conchæ, lepades, &c.

CONCIATOR, in the glaſs art, is, for the cryſtal-glaſs, what the founder is at the green-glaſs houſes. He is the perſon that weighs and proportions the ſalt to aſhes and ſand, and works them with a ſtrong fire till they run into lumps and become white; and if the metal be too hard, and conſequently brittle, he adds ſalt or aſhes, and if too ſoft, ſand; ſtill mixing them to a fit temper, which is only known by the working.

CONCINNOUS INTERVALS, in muſic, are ſuch as are fit for muſic, next to, and in combination with, concords; being neither very agreeable nor diſagreeable in themſelves; but having a good effect, as by their oppoſition they heighten the more eſſential principles of pleaſure; or as, by their mixture and combination with them, they produce a variety neceſſary to our being better pleaſed.

CONCINNOUS *Syſtem*, in muſic. A ſyſtem is ſaid to be concinnous, or divided concinnouſly, when its parts, conſidered as ſimple intervals, are concinnous; and are beſides placed in ſuch

an order between the extremes, as that the fucceffion of founds, from one extreme to the other, may have an agreeable effect.

CONCLAMATIO, in antiquity, a fhout raifed by thofe prefent at burning the dead, before they fet fire to the funeral pile. See SHOUT. The word was alfo applied to the fignal given to the Roman foldiers to decamp, whence the expreffion *conclamare vafa*; and *conclamari arma*, was a fignal for battle. It was likewife ufed for a practice of calling to a perfon deceafed three times by his name; and when no reply was returned, they thus expreffed his deceafe, *conclamatum eft*. Whence the fame term was afterwards applied to the ceffation of the Roman empire.

CONCLAVE, the place in which the cardinals of the Romifh church meet, and are fhut up, in order to the election of a pope. The term alfo denotes the affembly or meeting itfelf. The conclave is a range of fmall cells, 10 feet fquare, made of wainfcot: thefe are numbered, and drawn for by lot. They ftand in a line along the galleries and hall of the Vatican, with a fmall fpace between each. Every cell has the arms of the cardinal over it. The conclave is not fixed to any one determined place, for the conftitutions of the church allow the cardinals to make choice of fuch a place for the conclave as they think moft convenient; yet it is generally held in the Vatican. The conclave is very ftrictly guarded by troops: neither the cardinals, nor any perfon fhut up in the conclave, are fpoken to, but at the hours allowed of, and then in Italian or Latin: even the provifions for the conclave are examined, that no letters be conveyed by that means from the minifters of foreign powers, or other perfons who may have an intereft in the election of the pontiff.

CONCLUSION, in logic, the confequences or judgement drawn from what was afferted in the premifes; or the previous judgements in reafoning, gained from combining the extreme ideas between themfelves.

CONCOCTION, an obfolete term in medicine, fignifying the change which the food undergoes in the ftomach. It was alfo ufed to denote a falutary and fpontaneous operation in the fyftem during the exiftence of a fever, in which the febrile matter was faid to be *concocted* previous to its expulfion.

CONCORD, in grammar, that part of conftruction called *fyntax*, in which the words of a fentence agree; that is, in which nouns are put in the fame gender, number, and cafe; and verbs in the fame number and perfon with nouns and pronouns. See GRAMMAR.

CONCORD, in mufic, the relation of two founds that are always agreeable to the ear, whether applied in fucceffion or confonance.

Form of CONCORD, in ecclefiaftic hiftory, a ftandard book among the Lutherans, compofed at Torgaw, in 1576, and thence called the book of Torgaw, and reviewed at Berg by fix Lutheran doctors of Germany, the principal of whom was James Andreæ. This book contains, in two parts, a fyftem of doctrine, the fubfcription of which was a condition of communion, and a formal and very fevere condemnation of all who differed from the compilers of it, particularly with refpect to the majefty and omniprefence of Chrift's body, and the real manducation of his flefh and blood in the eucharift. It was firft impofed on the Saxons by Auguftus, and occafioned great oppofition and difturbance. The difpute about it was revived in Switzerland in 1718, when the magiftrates of Bern publifhed an order for adopting it as the rule of faith; the confequence of which was a conteft, that reduced its credit and authority.

CONCORDANCE, a dictionary or index to the Bible, wherein all the leading words, ufed in the courfe of the infpired writings, are ranged alphabetically; and the various places where they occur referred to; to affift in finding out paffages, and comparing the feveral fignifications of the fame word. We have feveral very copious concordances in Englifh, as Newmann's, &c. but the laft and beft efteemed is that in 4to. by Alex. Cruden.

CONCORDANT VERSES, fuch as have feveral words in common; but which, by the addition of other words, convey an oppofite, or at leaft a different meaning. Such are thofe,

$$\textit{Et}\begin{Bmatrix}\textit{canis}\\\textit{lupus}\end{Bmatrix}\textit{in filva}\begin{Bmatrix}\textit{venatur}\\\textit{nutritur}\end{Bmatrix}\textit{\& omnia}\begin{Bmatrix}\textit{fervat.}\\\textit{vaftat.}\end{Bmatrix}$$

CONCORDAT, in the Canon law, denotes a covenant or agreement concerning fome beneficiary matter, as a refignation, permutation, promotion, or the like. The council of Trent, fpeaking of concordats made without the authority and approbation of the pope, calls them *concordias quæ tantum fuos obligant auctores, non fucceffores*. And the congregation of cardinals, who have explained this decree, declares alfo that a concordat cannot be valid fo as to bind fucceffors, unlefs confirmed by the pope.

CONCORDAT is alfo ufed, abfolutely, among the French writers, for an agreement concluded at Bologna in 1516, between pope Leo X. and Francis I. of France, for regulating the manner of nominating to benefices. The concordat ferves in lieu of the Pragmatic fanction, which has been abrogated; or, rather, it is the pragmatic fanction foftened and reformed. The concordat between the pope and the republic of Venice refembles the former. There is alfo a German concordat, made between the emperor Frederic III. and the princes of Germany, in 1448, relating to beneficiary matters, confirmed by pope Nicholas V.

CONCORDIA, a town of Italy, in the duchy of Mirandola; feated on the river Sechia, 5 miles weft of Mirandola, and 15 miles fouth-eaft of Mantua; fubject to the houfe of Auftria. E. long. 11. 22. N. lat. 44. 52.

CONCORDIA, a Pagan divinity of the Romans, pictured with a cup in her right hand; having in her left fometimes a fceptre, and fometimes a *cornucopia*. Her fymbols were two hands joined, as is feen in a coin of Aurelius Venus, and another of Nero: alfo two ferpents twifting about a caduceus. She was addreffed to promote the peace and union of families and citizens.

CONCOU, in botany, a name given by the people of Guinea to an herb, which is in great efteem among them for killing that troublefome fort of worm called the *Guinea-worm*, that breeds in their flefh. They bruife the leaves, and mixing them with oil, apply them in form of a cataplafm.

CONCRETE, in the fchool-philofophy, an affemblage or compound. In natural philofophy and chemiftry, it fignifies a body made up of different principles, or any mixed body: thus, foap is a factitious concrete, mixed together by art; and antimony is a natural concrete, or a mixed body compounded in the bowels of the earth.

CONCRETION, the uniting feveral fmall particles of a natural body into fenfible maffes or concretes, whereby it becomes fo and fo figured and determined, and is endued with fuch and fuch properties. This term denotes alfo the act whereby foft bodies are rendered hard; or an infenfible motion of the particles of a fluid or foft body, whereby they come to a confiftence. It is indifferently ufed for induration, condenfation, congelation, and coagulation.

CONCUBINAGE fometimes expreffes a criminal or prohibited commerce between the two fexes; in which fenfe it comprehends adultery, inceft, and fimple fornication. In its more reftrained fenfe, concubinage is ufed for a man's and a woman's cohabiting together in the way of marriage, without having paffed through the ceremony.

Concubinage was anciently tolerated: the Roman law calls it an allowed cuftom, *licita confuetudo*. When this expreffion occurs in the conftitutions of the Christian emperors, it figni-

fies what we now call a *marriage in conſcience.* The concubinage tolerated among the Romans in the time of the republic, and of the heathen emperors, was that between perſons not capable of contracting marriage together: nor did they even refuſe to let inheritances deſcend to children which ſprung from ſuch a tolerated cohabitance. Concubinage between ſuch perſons they looked on as a kind of marriage, and even allowed it ſeveral privileges; but then this concubinage was confined to a ſingle perſon, and was of perpetual obligation as much as marriage itſelf. Hottoman obſerves, that the Roman laws had allowed of concubinage long before Julius Cæſar made that law whereby every one was allowed to marry as many wives as he pleaſed. The emperor Valentinian, Socrates tells us, allowed every man two.

Concubinage is alſo uſed for a marriage performed with leſs ſolemnity than the formal marriage: or a marriage with a woman of inferior condition, and to whom the huſband does not convey his rank or quality. Cujas obſerves, that the ancient laws allowed a man to eſpouſe, under the title of *concubine*, certain perſons, ſuch as were eſteemed unequal to him, on account of the want of ſome qualities requiſite to ſuſtain the full honour of marriage. He adds, that though concubinage was beneath marriage, both as to dignity and civil effects; yet was concubine a reputable title, very different from that of miſtreſs among us. The commerce was eſteemed ſo lawful, that the concubine might be accuſed of adultery in the ſame manner as a wife. This kind of concubinage is ſtill in uſe in ſome countries, particularly in Germany, under the title of a *half-marriage, morgengabic marriage* or *marriage with the left hand*; alluding to the manner of its being contracted, viz. by the man's giving the woman his left hand inſtead of the right. This is a real marriage, though without ſolemnity: the parties are both bound for ever; though the woman be thus excluded from the common rights of a wife for want of quality or fortune. The children of concubines were not reputed either legitimate or baſtards, but natural children, and were capable only of donations. They were deemed to retain the low rank of the mother; and were on this ground unqualified for inheriting the effects of the father.

Concubinage, in a legal ſenſe, is uſed as an exception againſt her that ſueth for dower, alleging thereby, that ſhe was not a wife lawfully married to the party, in whoſe lands ſhe ſeeks to be endowed, but his concubine.

CONCUBINE, a woman whom a perſon takes to cohabit with him, in the manner, and under the character, of a wife, without being authorized thereto by a legal marriage. Concubine is alſo uſed for a real, legitimate, and only wife, diſtinguiſhed by no other circumſtance but a diſparity of birth or condition between her and the huſband. Du Cange obſerves, that one may gather from ſeveral paſſages in the epiſtles of the popes, that they anciently allowed of ſuch concubines. In effect, the Roman laws did not allow a man to eſpouſe whom he pleaſed; there was required a kind of parity, or proportion, between the conditions of the contracting parties: but a woman of inferior condition, who could not be eſpouſed as a wife, might be kept as a concubine; and the laws allowed of it, provided the man had no other wife.

It is certain the patriarchs had a great number of wives, and that theſe did not all hold the ſame rank; ſome being ſubaltern to the principal wife; which were what we call *concubines*, or half-wives. The Romans prohibited a plurality of concubines, and only had regard to the children iſſuing from a ſingle concubine, becauſe ſhe might become a legitimate wife. Solomon had 700 wives and 300 concubines; and Q. Curtius obſerves, that Darius was followed in his army by 365 concubines, all in the equipage of queens.

COND, Con, or Conn, in ſea language, ſignifies to guide or conduct a ſhip in her right courſe. He that cons her, ſtands aloft with a compaſs before him, and gives the word of direction to the man at the helm how he is to ſteer. If the ſhip go before the wind, or, as they call it, betwixt the ſheets, the word is either ſtarboard, or port the helm, according as the conder would have the helm put to the right or left ſide of the ſhip, upon which the ſhip always goes the contrary way. If he ſays, helm a mid-ſhip, he would have the ſhip to go right before the wind, or directly between her two ſheets. If the ſhip ſail by the wind, or on a quarter wind, the word is, aloof, keep your luff, fall not off, veer no more, keep her to, touch the wind, have a care of the lee-latch; all which expreſſions are of the ſame import, and imply that the ſteerſman ſhould keep the ſhip near the wind. On the contrary, if he would have her ſail more large, or more before the wind, the word is, eaſe the helm, no near, bear up. If he cries ſteady, it means, keep her from going in and out, or making yaws (as they call it), howſoever ſhe ſails, whether large or before a wind: and when he would have her go juſt as ſhe does, he cries, keep her thus, thus, &c.

CONDE, a ſtrong town of France, in the department of the North and French part of Hainault. It has a caſtle, and gave the title of prince to a branch of the late royal family. It was taken by the Allies, July 10, 1793, and is ſeated on the Scheld, ſeven miles N. E. of Valenciennes, and 117 N. by E. of Paris. E. long. 3. 39. N. lat. 50. 27.

Conde, a town of France, in the department of Calvados, and late province of Normandy. It carries on a conſiderable trade; and is ſeated on the Nereau, 15 miles W. of Paris. W. long. 0. 37. N. lat. 48. 50.

CONDENSATION, the act whereby a body is rendered more denſe, compact, and heavy. The word is commonly applied to the converſion of vapour into water, by diſtillation, or naturally in the clouds. The way in which vapour commonly condenſes, is by the application of ſome cold ſubſtance. On touching it, the vapour parts with its heat which it had before abſorbed; and on doing ſo, it immediately loſes the proper characteriſtics of vapour, and becomes water. But though this is the moſt common and uſual way in which we obſerve vapour to be condenſed, nature certainly proceeds after another method: ſince we often obſerve the vapours moſt plentifully condenſed when the weather is really warmer than at other times. See the articles Cloud, Evaporation, &c.

CONDENSER, a pneumatic engine, or ſyringe, whereby an uncommon quantity of air may be forced into a given ſpace; ſo that ſometimes ten atmoſpheres, or ten times as much air as there is at the ſame time in the ſame ſpace, without the engine, may be thrown in by means of it, and its egreſs prevented by valves properly diſpoſed. See plate 89. It conſiſts of a braſs cylinder, wherein is a moveable piſton; which being drawn out, the air ruſhes into the cylinder through a hole provided on purpoſe; and when the piſton is again forced into the cylinder, the air is driven into the receiver through an orifice, furniſhed with a valve to hinder its getting out. The receiver or veſſel containing the condenſed air, ſhould be made very ſtrong, to bear the force of the air's ſpring thus increaſed; for which reaſon they are generally made of braſs: its orifice is fitted with a female ſcrew to receive the male ſcrew at the end of the condenſer.

CONDITION, in the civil law, a clauſe of obligation ſtipulated as an article of a treaty or a contract; or in a donation of a teſtament, legacy, &c. in which laſt caſe a donee does not loſe his donative if it be charged with any diſhoneſt or impoſſible conditions.

CONDITIONAL, ſomething not abſolute, but ſubject to conditions. Thus, Conditional *Conjunctions*, in grammar, are thoſe which ſerve to make propoſitions conditional; as *if, unleſs, provided*, &c.

CONDITIONAL *Propositions*, in logic, such as consist of two parts connected together by a conditional particle.

CONDITIONAL *Syllogism*, a syllogism where the major is a conditional proposition. Thus, If there is a God, he ought to be worshipped—But there is a God;—Therefore he ought to be worshipped.

CONDOM, a large town of France, in the department of Gers, and late province of Gascony. As it has no trade, it is poor, and thinly peopled. It was lately an episcopal town, and is seated on the Baise, 22 miles W. of Auch. E. long. 0. 36. N. lat. 44. 1.

CONDOR, or CONTOR, in ornithology. See VULTURE.

CONDORMIENTES, in church history, religious sectaries, who take their name from lying all together, men and women, young and old. They arose in the 13th century, near Cologne; where they are said to have worshipped an image of Lucifer, and to have received answers and oracles from him.

CONDRIEU, a town of France, in the department of Rhone and Loire, and late province of Lyonois, remarkable for its excellent wines. It is seated near the Rhone, 17 miles S. of Lyons. E. long. 4. 53. N. lat. 45. 23.

CONDUCTOR, in surgery, an instrument which serves to conduct the knife in the operation of cutting for the stone, and in laying open sinuses and fistulas.

CONDUCTORS, in electrical experiments, are those bodies that receive and communicate electricity; and those that repel it are called *non-conductors*. See ELECTRICITY.

CONDUIT, a canal or pipe for the conveyance of water, or other fluid. There are several subterraneous conduits through which the waters pass that issue from springs. Artificial conduits for water are made of lead, stone, cast-iron, potter's earth, timber, &c. There is too much reason to fear, that water which passes through *leaden* pipes, dissolves some of the metal, and thence becomes unwholesome.

CONDYLOID and CORONOID processes. See ANATOMY.

CONDYLOMA, in medicine, a tubercle, or callous eminence, which arises in the folds of the anus, or rather a swelling or hardening of the wrinkles of that part.

CONDYLUS, a name given by anatomists to a projecting knot in any of the joints, formed by the epiphysis of a bone.

CONE, in geometry, a solid figure, having a circle for its base, and its top terminated in a point or vertex. See CONIC SECTIONS.

Melting CONE, in chemistry, is a hollow cone formed of copper or brass, with a handle, and with a flat bottom adjoining to the apex of the cone, upon which it is intended to rest. Its use is to receive a mass of one or more metals melted together, and cast into it. This mass, when cold, may be easily shook out of the vessel, from its figure. Also, if a melted mass, consisting of two or more metals, or other substances not combined together, be poured into this vessel, the conical figure facilitates the separation of these substances according to their respective densities. The cone ought to be well heated before the melted mass is thrown into it; that it may not contain any moisture, which would occasion a dangerous explosion. It ought also to be greased internally with tallow, to prevent the adhesion of the fluid matter.

CONE *of Rays*, in optics, includes all the several rays which fall from any radiant point upon the surface of a glass.

CONE, in botany. See CONUS.

CONESSI, a sort of bark of a tree, which grows on the Coromandel coast in the East Indies. It is recommended in a letter to Dr. Monro, in the Medical Essays, as a specific in diarrhoeas. It is to be finely pulverized, and made into an electuary with syrup of oranges. The bark should be fresh, and the electuary new made every day, or second day, otherwise it loses its austere but grateful bitterness on the palate, and its proper effects on the intestines.

CONFARREATION, a ceremony among the ancient Romans, used in the marriage of persons whose children were destined for the honour of the priesthood. Confarreation was the most sacred of the three modes of contracting marriage among that people; and consisted, according to Servius, in this, that the *pontifex maximus* and *flamen dialis* joined and contracted the man and woman, by making them eat of the same cake of salted bread: whence the term, *far* signifying *meal* or *flour*. Ulpian says, it consisted in the offering up of some pure wheaten bread; rehearsing, withal, a certain formula, in presence of ten witnesses. Dionysius Halicarnasseus adds, that the husband and wife did eat of the same wheaten bread, and threw part on the victims.

CONFECTION, in pharmacy, signifies, in general, any thing prepared with sugar: in particular it imports something preserved, especially dry substances. It also signifies a liquid or soft electuary, of which there are various sorts directed in dispensatories. See PHARMACY.

CONFECTOR, among the ancient Romans, a sort of gladiator, hired to fight in the amphitheatre against beasts; thence also denominated *bestiarius*. The *confectores* were thus called *à conficiendis bestiis*, from their dispatching and killing beasts. The Greeks called them παραβολοι, q. d. *daring*, *rash*, *desperate*; whence the Latins borrowed the appellations *parabolani* and *parabolarii*. The Christians were sometimes condemned to this sort of combat.

CONFECTS, a denomination given to fruits, flowers, herbs, roots, &c. when boiled or prepared with sugar of honey, to dispose them to keep, and render them more agreeable to the taste.

CONFEDERACY, in law, is when two or more persons combine to do any damage to another, or to commit any unlawful act. Confederacy is punishable, though nothing be put in execution; but then it must have these four incidents: 1. That it be declared by some matter of prosecution, as by making of bonds or promises to one another; 2. That it be malicious, as for unjust revenge; 3. That it be false, *i. e.* against the innocent; and, lastly, That it be out of court, voluntary.

CONFERVA, in botany; a genus belonging to the cryptogamia class of plants; and in the natural method ranking under the 57th order, *Algæ*. The tubercles are of different sizes, on capillary, very long fibres. There are 21 species, most of them growing on stones in slow streams, on the sides of cisterns, or in ponds.

CONFESSION, in a civil sense, a declaration or acknowledgment of some truth, though against the interest of the party who makes it; whether it be in a court of justice or out of it. It is a maxim, that in civil matters, the confession is never to be divided, but always taken entire. A criminal is never condemned on his simple confession, without any other collateral proofs; nor is a voluntary extrajudicial confession admitted as any proof. A person is not admitted to accuse himself, according to that rule in law, *Non auditur perire volens*. See ARRAIGNMENT.

CONFESSION, among divines, the verbal acknowledgment which a Christian makes of his sins. Among the Jews it was the custom, on the annual feast of expiation, for the high-priest to make confession of sins to God in the name of the whole people: besides this general confession, the Jews were enjoined, if their sins were a breach of the first table of the law, to make confession of them to God; but violations of the second table were to be acknowledged to their brethren. The confessions of the primitive Christians were all voluntary, and not imposed on them by any laws of the church; yet private confession was

not only allowed, but encouraged. The Romifh church requires confeffion not only as a duty, but has advanced it to the dignity of a facrament: this confeffion is made to the prieft, and is private and auricular; and the prieft is not to reveal them under pain of the higheft punifhment.

CONFESSION *of Faith*, a lift of the feveral articles of belief in any church.

CONFESSIONAL, or CONFESSIONARY, a place in churches under the great altar, where the bodies of deceafed faints, martyrs, and confeffors, were depofited. This word is alfo ufed by the Romanifts for a defk in the church where the confeffor takes the confeffion of the penitents.

CONFESSOR, a Chriftian who has made a folemn and refolute profeffion of the faith, and has endured torments in its defence. A mere faint is called a confeffor, to diftinguifh him from the roll of dignified faints; fuch as apoftles, martyrs, &c. In ecclefiaftical hiftory, we frequently find the word confeffors ufed for martyrs: in after times, it was confined to thofe who, after having been tormented by the tyrants, were permitted to live and die in peace. And at laft it was alfo ufed for thofe who, after having lived a good life, died under an opinion of fanctity.

CONFESSOR is alfo a prieft, in the Romifh church, who has a power to hear finners in the facrament of penance, and to give them abfolution. The church calls him in Latin *confeffarius*, to diftinguifh him from confeffor, which is a name confecrated to faints. The confeffors of the kings of France, from the time of Henry IV. have been conftantly Jefuits: before him the Dominicans and Cordeliers fhared the office between them. The confeffors of the houfe of Auftria have alfo, ordinarily, been Dominicans and Cordeliers; but the latter emperors have all taken Jefuits.

CONFIRMATION, in law, a conveyance of an eftate, or right in *effe*, from one man to another, whereby a voidable eftate is made fure and unavoidable, or a particular eftate is increafed, or a poffeffion made perfect.

CONFIRMATION, in theology, the ceremony of laying on of hands, for the conveyance of the Holy Ghoft. The antiquity of this ceremony is, by all ancient writers, carried as high as the apoftles, and founded upon their example and practice. In the primitive church, it ufed to be given to Chriftians immediately after baptifm, if the bifhop happened to be prefent at the folemnity. Among the Greeks, and throughout the Eaft, it ftill accompanies baptifm: but the Romanifts make it a diftinct independent facrament. Seven years is the ftated time for confirmation: however, they are fometimes confirmed before, and fometimes after, that age. The perfon to be confirmed has a god-father and god-mother appointed him, as in baptifm. The order of confirmation in the church of England, does not determine the precife age of the perfons to be confirmed.

CONFISCATION, in law, the adjudication of goods or effects to the public treafury; as the bodies and effects of criminals, traitors, &c.

CONFLAGRATION, the general burning of a city or other confiderable place. This word is commonly applied to that grand period or cataftrophe of our world, when the face of nature is to be changed by fire, as formerly it was by water. The ancient Pythagoreans, Platonifts, Epicureans, and Stoics, appear to have had a notion of the conflagration: though whence they fhould derive it, unlefs from the facred books, is difficult to conceive; except, perhaps, from the Phœnicians, who themfelves had it from the Jews. Seneca fays exprefsly, *Tempus advenerit quo fidera fideribus incurrent, & omni flagrante materia uno igne, quicquid nunc ex depofito lucet, ardebit.* This general diffolution the Stoics call ἐκπύρωσις, *ecpyrefis*. Mention of the conflagration is alfo made in the books of the Sybils, Sophocles, Hyftafpes, Ovid, Lucan, &c.

CONFLUENT, among phyficians, &c. an appellation given to that kind of SMALL-POX wherein the puftules run into each other.

CONFORMATION, in medicine, that make and conftruction of the human body which is peculiar to every individual. Hence, *mala conformatio* fignifies fome fault in the firft rudiments; whereby a perfon comes into the world crooked, or with fome of the vifcera or cavities unduly framed or proportioned. Many are fubject to incurable afthmas, from a too fmall capacity of the thorax, and the like vitious conformations.

CONFORMITY, in the fchools, is the congruency, or relation of agreement between one thing and another; as between the meafure and the thing meafured, the object and the underftanding, the thing and the divifion thereof, &c.

CONFRONTATION, the act of bringing two perfons in prefence of each other, to difcover the truth of fome fact which they relate differently. The word is chiefly ufed in criminal matters; where the witneffes are confronted with the accufed, the accufed with one another, or the witneffes with one another.

CONFUCIUS, a Chinefe philofopher, who lived about 500 years before our Saviour's birth, in the kingdom of Lu, now called the province of *Xantung*. His wit and judgment got him a reputation from his very youth; and being a mandarin, and employed in the government of the kingdom of Lu, his profound knowledge of morals and politics made him be greatly admired. Notwithftanding his care, his prince's court was much difordered; and Confucius finding the king would not liften to his advice, quitted the court, and taught moral philofophy with fuch applaufe that he foon had above 3000 fcholars, whereof 72 furpaffed the reft in learning and virtue, for whom the Chinefe have ftill a particular veneration. He divided his doctrine into four parts, and his fcholars into four claffes: the firft order was of thofe who ftudied to acquire virtue; the 2d, thofe who learned the art of reafoning well; the 3d ftudied the government of the ftate and the duty of magiftrates; the 4th were wholly taken up in noble difcourfes of all that concerned morals. In fpite of all his pains to eftablifh pure morality and religion, he was neverthelefs the innocent caufe of their corruption. It is faid, that when he was complimented upon the excellency of his philofophy, he replied, that he fell greatly fhort of the perfect degree of virtue: but that in the weft the moft holy was to be found. This made a ftrong impreffion on the learned; and in the 66th year after Chrift's birth, the emperor Mon-ti fent ambaffadors toward the weft to feek this holy man. They ftopped at an ifland near the Red Sea, and found a famous idol named Fohi, reprefenting a philofopher that lived 500 years before Confucius. They carried this idol back with them, with inftructions concerning the worfhip rendered to it; and fo introduced a fuperftition that abolifhed in feveral places the maxims of Confucius. His tomb is in the academy where he taught, near the town Xio fu, upon the banks of the river Xu. This philofopher has been in great veneration in China above 2000 years; and is ftill fo efteemed, that each town has a palace confecrated to his memory. There was one of his defcendants who was very confiderable in the kingdom in 1646, whom Xanchi king of Tartary, who then conquered China, received with a great deal of honour. All thofe of his family are mandarins by birth; and have a privilege common with the princes of the blood, not to pay any tribute.

CONFUSION, in a general fenfe, is oppofed to *order*. In a logical fenfe, confufion is oppofed to diftinctnefs and perfpicuity; and may happen either in words, as when mifcontrived or mifapplied; or in ideas, as when the idea of any thing prefents fomething along with it, which does not properly belong

to that thing. See IDEA and NOTION. In a phyfical fenfe, confufion is a fort of union or mixture by mere contiguity. Such is that between fluids of a contrary nature, as oil and vinegar, &c.

CONFUTATION, in rhetoric, &c. a part of an oration, wherein the orator feconds his own arguments and ftrengthens his caufe, by repelling and deftroying the oppofite arguments of the antagonift. This is done by denying what is apparently falfe, by detecting fome flaw in the reafoning of the adverfe party, by granting their argument, and fhowing his invalidity, or retorting it upon the adverfary.

CONGE, in the former French law, a licence, or permiffion, granted by a fuperior to an inferior, which gave him a difpenfation from fome duty to which he was before obliged. A woman cannot obligate herfelf without the *congé* or licence of her hufband; a monk cannot go out of his convent, without the *congé* of his fuperiors.

CONGE *d'élire*, in ecclefiaftical policy, the king's permiffion royal to a dean and chapter in the time of a vacancy, to choofe a bifhop; or to an abbey, or priory, of his own foundation, to choofe their abbot or prior. The king of England, as fovereign patron of all archbifhoprics, bifhoprics, and other ecclefiaftical benefices, had of antient time free appointment of all ecclefiaftical dignities, whenfoever they chanced to be void; invefting them firft *per baculum & annulum*, and afterwards by his letters-patent; and in courfe of time he made the election over to others, under certain forms and limitations, as that they fhould at every vacation, before they choofe, demand the king's congé d'élire, and after the election crave his royal affent, &c.

CONGE, in architecture, a mould in form of a quarter round, or a cavetto, which ferves to feparate two members from one another; fuch as that which joins the fhaft of the column to the cincture, called alfo *apophyge*. CONGES are alfo rings or ferrels formerly ufed in the extremities of wooden pillars, to keep them from fplitting, afterwards imitated in ftone-work.

CONGELATION. See FREEZING.

CONGER, in zoology. See MURÆNA.

CONGERIES, a Latin word, fometimes ufed in our language for a collection or heap of feveral particles of bodies united into one mafs or aggregate.

CONGESTION, in medicine, a mafs or collection of humours, crowded together and hardened in any part of the body, and there forming a preternatural tumour. Congeftion is effected by little and little: in which it differs from *defluxion*, which is more fudden.

CONGIARIUM, CONGIARY, among medalifts, a gift or donative reprefented on a medal. The word comes from the Latin *congius*; becaufe the firft prefents made to the people of Rome confifted in wine and oil, which were meafured out to them in *congii*. The congiary was properly a prefent made by the emperors to the people of Rome. Thofe made to the foldiers were not called *congiaries* but *donatives*. The legend on medals reprefenting *congiaries*, is, *Congiarium* or *Liberalitas*. Tiberius gave a congiary of three hundred pieces of money to each citizen: Caligula twice gave three hundred fefterces a head: Nero, whofe congiaries are the firft that we find reprefented on medals, gave four hundred.

CONGIUS, a liquid meafure of the ancient Romans, containing the eighth part of the amphora, or the fourth of the urna, or fix fextarii. The congius in Englifh meafure contains 2,070,676 folid inches; that is, feven pints, 4,942 folid inches.

CONGLOBATE GLAND. See GLAND.

CONGLOMERATE GLAND. *Ibid.*

CONGLOMERATE *Flowers*, are thofe growing on a branching foot-ftalk, to which they are irregularly but clofely connected. This mode of inflorefcence, as Linnæus terms it, is oppofed to that in which the flowers are irregularly and loofely fupported on their foot-ftalks, hence termed a *diffufe panicle*. (See PANICLE.) The term is exemplified in feveral of the graffes, particularly in fome fpecies of the *poa*, fefcue grafs, and agroftis.

CONGLUTINATION, the glueing or faftening any two bodies together by the intermiffion of a third, whofe parts are unctuous and tenacious, in the nature of glue. See GLUE.

CONGO, a country of Africa, between the equinoctial line and 18 degrees of S. latitude, containing the countries of Loango, Angola, and Benguela. It is bounded on the N. by Benin, by the inland part of Africa on the E. by Matamon on the S. and by the Atlantic Ocean on the W. It is fometimes called Lower Guinea; and the Portuguefe have a great many fettlements on the coaft, as well as in the inland country. The heat is almoft infupportable, efpecially in the fummer months. They have many defert places within land, in which are elephants, tigers, leopards, monkies, and monftrous ferpents; but, near the coaft, the foil is more fertile; and there are fruits of many kinds, befide palm-trees, from which they get wine and oil. The greateft part of the inhabitants go almoft naked, worfhipping the fun, moon, and ftars, befide animals of different kinds; but the Portuguefe have made a great number of converts, fuch as they are. Congo, properly fo called, is about 150 miles in length along the coaft, and 372 in breadth. From March to September is called the winter feafon, when it rains almoft every day; and the fummer is from October to March, when the weather is always ferene. The inhabitants are fkilful in weaving cotton cloth; and they trade in flaves, ivory, caffia, and tamarinds. The river Zaire is full of crocodiles and river-horfes. The principal town is St. Salvador. The trade is open to all European nations.

CONGO, a term applied to tea of the fecond quality.

CONGREGATION, an affembly of feveral ecclefiaftics, united fo as to conftitute a body.

The term is principally ufed for affemblies of cardinals appointed by the pope, and diftributed into feveral chambers, for the difcharge of certain functions and jurifdictions, after the manner of our offices and courts. The firft is the congregation of the holy office, or the inquifition: the fecond, that of jurifdiction over bifhops and regulars: the third, that of councils; this has power to interpret the council of Trent: the fourth that of cuftoms, ceremonies, precedences, canonizations, called the *congregation of rites*: the fifth, that of St. Peter's fabric, which takes cognizance of all caufes relating to piety and charity, part whereof is due to the church of St. Peter: the fixth, that of waters, rivers, roads: the feventh, of fountains and ftreets: the eighth, that of the index, which examines the books to be printed or corrected: the ninth, that of the council of ftate, for the management of the territories belonging to the pope and church: the tenth, *de bono regimine*; of which two laft the cardinal-nephew is chief: the eleventh, that of money: the twelfth, that of bifhops, wherein thofe who are to be promoted to bifhoprics in Italy are examined; this is held before the pope: the thirteenth, that of confiftorial matters; the chief whereof is the cardinal-dean: the fourteenth, a congregation for promoting the faith (See COLLEGE): and the fifteenth, that of ecclefiaftical immunity, for fettling fuits againft churchmen. There is alfo a congregation of alms, which takes care of every thing that relates to the fubfiftence of Rome and the ftate of the church.

CONGREGATION is alfo ufed for a company or fociety of religious cantoned out of this or that order; and making, as it were, an inferior order, or a fubdivifion of the order itfelf. Such are the congregations of the oratory, and thofe of Cluny, &c. among the Benedictines. The word is alfo ufed for affemblies of pious perfons in manner of fraternities, frequent among

the Jesuits in honour of the Virgin, &c. It is likewise applied to the audience in a church, particularly as consisting of the inhabitants of the same parish.

CONGREGATIONALISTS, in church-history, a sect of Protestants who reject all church government, except that of a single congregation under the direction of one pastor.

CONGRESS, in political affairs, an assembly of commissioners, envoys, deputies, &c. from several courts meeting to concert matters for their common good.

CONGRESS, in America, is the assembly of delegates from the United States. See AMERICA.

CONGRESS, in a judicial sense, the trial made by appointment of a judge before surgeons and matrons, in order to prove whether or no a man be impotent, before sentence is passed for the dissolution of a marriage solicited upon such a complaint. Neither the civil nor canon law makes any mention of the trial of virility by congress; yet it existed in the French jurisprudence, was authorised by decrees and arrets, and obtained for about 120 years; when it was at length annulled, by an arret of parliament in 1677, as being precarious.

CONGREVE (William), a younger brother of an ancient family in Staffordshire. His father was employed in the stewardship of the great estate of the earl of Burlington in Ireland, where he resided many years; and our author was born there in 1672. Mr. Congreve entered into the Middle-Temple when he came to England, and began to study the law; but his bias was toward polite literature and poetry. His first performance was a novel, entitled, *Incognita*, or *Love and Duty reconciled*. He soon after began his comedy of the *Old Bachelor*; which was the amusement of some leisure hours during a slow recovery from a fit of illness soon after his return to England; yet was in itself so perfect, that Mr. Dryden, on its being shown to him, declared he had never in his life seen such a first play. When brought on the stage in 1693, it met with such universal approbation, that Mr. Congreve, though he was but 19 years old at the time of his writing it, became now considered as a prop to the declining stage, and a rising genius in dramatic poetry. The next year he produced the *Double Dealer*; which, for what reason is not obvious, did not meet with so much success as the former. The merit of his first play, however, had obtained him the favour and patronage of Lord Halifax, and some peculiar mark of distinction from Queen Mary; on whose death, which happened in the close of this year, he wrote a very elegant elegiac pastoral. In 1695, when Betterton opened the new house in Lincoln's-Inn Fields, Mr. Congreve joining with him, gave him his comedy of *Love for Love*, with which the company opened their campaign; and which met with such success, that they immediately offered the author a share in the management of the house, on condition of his furnishing them with one play yearly. This offer he accepted; but whether through indolence, or that correctness which he looked upon as necessary to his works, his *Mourning Bride* did not come out till 1697, nor his *Way of the World* till two years after that. The indifferent success this last mentioned play, though an exceeding good one, met with from the public, completed that disgust to the theatre, which a long contest with Jeremy Collier, who had attacked the immoralities of the English stage, and more especially some of his pieces, had begun, and he determined never more to write for the stage. However, though he quitted dramatic writing, he did not lay down the pen entirely; but occasionally wrote many little pieces both in prose and verse, all of which stand on the records of literary fame. It is very possible, however, that he might not so soon have given way to this disgust, had not the easiness of his circumstances rendered any subservience to the opinions and caprice of the town absolutely unnecessary to him. For his abilities having very early in life raised him to the acquaintance of the Earl of Halifax, who was then the Mæcenas of the age; that nobleman, desirous of raising so promising a genius above the necessity of too hasty productions, made him one of the commissioners for licensing hackney-coaches; or, according to Coxeter, a commissioner of the wine-licence. He soon after bestowed on him a place in the pipe-office; and not long after gave him a post in the customs worth 600l. per annum. In the year 1718 he was appointed secretary of Jamaica; so that, with all together, his income towards the latter part of his life was upwards of 1200l. a-year. The greatest part of the last 20 years of his life was spent in ease and retirement; and he either did not, or affected not to give himself any trouble about reputation. Towards the close of his life he was much afflicted with the gout; and continued gradually declining till the 19th of January 1729, when he died, aged 57; and, on the 26th following, was buried in Westminster Abbey.

CONGRUITY, a suitableness or relation of agreement between things. The terms *congruity* and *propriety* are not applicable to any single object: they imply a plurality, and obviously signify a particular relation between different objects. Thus we currently say, that a decent garb is suitable or proper for a judge; modest behaviour for a young woman; and a lofty style for an epic poem: and, on the other hand, that it is unsuitable or incongruous to see a little woman sunk in an overgrown farthingale, a coat richly embroidered covering coarse and dirty linen, a mean subject in an elevated style, a first minister darning his wife's stocking, or a reverend prelate in lawn sleeves dancing a hornpipe.

The perception we have of this relation, which seems peculiar to man, cannot proceed from any other cause, but from a *sense* of congruity or propriety; for, supposing us destitute of that sense, the terms would be to us unintelligible.

It is a matter of experience, that congruity or propriety, wherever perceived, is agreeable; and that incongruity or impropriety, wherever perceived, is disagreeable. The only difficulty is, to ascertain what are the particular objects that in conjunction suggest these relations: for there are many objects that do not: the sea, for example, viewed in conjunction with a picture, or man viewed in conjunction with a mountain, suggest not either congruity or incongruity. It seems natural to infer, what will be found true by induction, that we never perceive congruity nor incongruity but among things that are connected together by some relation; such as a man and his actions, a principal and his accessories, a subject and its ornaments. We are indeed so framed by nature, as, among things so connected, to require a certain suitableness or correspondence, termed *congruity* or *propriety*; and to be displeased when we find the opposite relation of *incongruity* or *impropriety*.

Congruity is so nearly allied to beauty, as commonly to be held a species of it; and yet they differ so essentially as never to coincide: beauty, like colour, is placed upon a single subject; congruity upon a plurality: further, a thing beautiful in itself, may, with relation to other things, produce the strongest sense of incongruity. Congruity and propriety are commonly reckoned synonymous terms; but they are distinguishable; and the precise meaning of each must be ascertained. Congruity is the genus of which propriety is a species; for we call nothing *propriety*, but that congruity or suitableness which ought to subsist between sensible beings and their thoughts, words and actions.

CONI, a strong town of Italy in Piedmont, and a capital of a territory of that name, with a good citadel. It is seated at the confluence of the rivers Greffe and Sture. E. long. 7. 29. N. lat. 44. 23.

CONIC SECTIONS

ARE curve lines formed by the interfections of a cone and plane.

If a cone be cut by a plane through the vertex, the fection will be a triangle ABC, 2d. Pl. 84, fig. 1.

If a cone be cut by a plane parallel to its bafe, the fection will be a circle. If it be cut by a plane DEF, fig. 1. in fuch a direction, that the fide AC of a triangle paffing through the vertex, and having its bafe BC perpendicular to EF, may be parallel to DP, the fection is a parabola; if it be cut by a plane DR, fig. 2. meeting AC, the fection is an ellipfe; and if it be cut by a plane DMO, fig. 3. which would meet AC extended beyond A, it is an hyperbola.

If any line HG, fig. 1. be drawn in a parabola perpendicular to DP, the fquare of HG will be to the fquare of EP, as DG to DP; for let LHK be a fection parallel to the bafe, and therefore a circle, the rectangle LGK will be equal to the fquare of HG, and the rectangle BPC equal to the fquare of EP; therefore thefe fquares will be to each other as their rectangles; that is, as BP to LG, that is DP to DG.

There are three modes of inveftigating the properties of thefe curves. 1. By taking the demonftrations from the fections of a cone, which, from the many interfections of planes with planes, and planes with folids, is apt to perplex the learner, and is now feldom adopted. 2. By taking fome general property of the figures on a plane, from which all the reft may be determined geometrically, or by taking the general property of each curve fingly, and from thence deducing geometrically all the other properties of that curve. 3. By taking the equation to all the curves from whence their refpective properties may be difcovered algebraically, or by taking the equation to each fingle curve, from whence its properties may be difcovered algebraically.

By whichever of thefe three methods the properties of conic fections are inveftigated, the general property is difcovered, which makes the bafes of the other methods. If they are confidered as curves on a plane furface, they are fhewn to have the fame properties with thofe formed by the interfections of a plane with a cone: and again, the equation is produced, which makes the bafis of the algebraical procefs. For a beginner, the geometrical method feems clearly to have the preference; and that which deduces from a common property, the relations of each curve to the other, as well as the refpective properties of each curve, feems to be better than that which confiders each curve feparately, and, after an examination of its properties, enters into a comparifon of each curve with the others. Bofcovich in a very elegant manner has deduced the properties of the three curves, from a property common to all; and his method has been made ftill eafier for beginners lately, by Newton of Jefus college, Cambridge; who laying afide the mufical proportion on which Bofcovich founds his demonftrations, has, within a fhort compafs, introduced every thing requifite for the ftudy of the principia and the higher mathematics. The bafis of this method is the relation of two lines to each other, drawn the one from a given point, the other perpendicular to a line given in pofition.

I. If any point S be affumed without the line DX, (fig. 4, 5.) and, whilft the line SP revolves about S as a centre, a point P moves in it in fuch a manner, that its diftance from point S fhall always be to PE, its diftance from the line DX, in a given ratio, the curve defcribed by the point P is called a conic fection, a parabola, an ellipfe, or an hyperbola, according as SP is equal to, lefs, or greater than PE.

II. The indefinite right line DX is called the directrix.

III. The point S is called the focus.

IV. The ratio of SP to PE is called the determining ratio.

V. If a line SD be drawn through the focus perpendicular to the directrix, which is produced indefinitely, it is called the axis of the conic fection.

VI. The point A, where the curve meets the axis, is called the vertex.

VII. A right line LST, drawn through the focus parallel to the directrix, and terminated by the curve in the points L, T, is called the principal parameter, or the latus rectum.

Cor. 1. SP being greater than PE in the hyperbola, two curves will be defcribed, one on each fide of the directrix; which are called oppofite hyperbolas.

Cor. 2. When the revolving line SP comes into the pofition SAD; SP, PE will be equal to SA, AD; therefore SA is to AD in the determining ratio.

Cor. 3. When the line SP comes into the pofition SL, or ST, the diftance of P from the directrix will be equal to SD, and SL, or ST, will be to SD in the determining ratio; and therefore the latus rectum LT is bifected in S.

Cor. 4. The latus rectum in the parabola is equal to twice the diftance of the focus from the directrix, or to four times its diftance from the vertex. For SL is equal to SD, and SA is equal to AD; therefore LT is equal to twice SD, or to four times SA.

VIII. The tangents DLQ, DTq, (fig. 6, 7.) which are drawn through the extremities of the latus rectum, are called focal tangents.

IX. The right line AM, in the ellipfe and hyperbola, is called the tranfverfe axis, or the axis major.

X. If the tranfverfe axis be bifected in C, the point C is called the centre of the ellipfe or hyperbola.

XI. If a line BCb, which is bifected in C, be drawn perpendicular to the tranfverfe axis, and CB, Cb be each of them a mean proportional between SA, SM, the fegments of the axis intercepted between the focus and the vertices, BCb is called the conjugate axis, or the axis minor.

XII. A right line PNp, drawn through any point N in the axis parallel to the tangent KAG, or perpendicular to the axis, and terminated by the curve in the points P and p, is called an ordinate to the axis.

XIII. And the fegment of this axis AN, intercepted between the ordinate and the vertex, in all the fections, as alfo the other fegment NM in the ellipfe and hyperbola, is called an abfciffa.

XIV. Any line paffing through the centre of an ellipfe or hyperbola, which is terminated both ways by the curve in the former, and by the oppofite curves in the latter, is called a diameter.

XV. A line drawn through any point in the parabola parallel to the axis is called a diameter to the parabola.

XVI. Any point where a diameter meets the curve is called a vertex to that diameter.

XVII. If from the centre C, at the diftance CA, (fig. 8.) half the tranfverfe axis, a circle be defcribed, cutting the directrix of the hyperbola in the points H, b, and lines be drawn from the centre through the points of interfection, thefe lines are called the afymptotes.

XVIII. If AM be the tranfverfe axis, and Bb the conjugate axis of any two oppofite hyperbolas, and two other hyperbolas be defcribed, of which the tranfverfe axis is Bb, and the conjugate axis AM, thefe hyperbolas are faid to be conjugate to the former.

XIX. When the two axes are equal, the hyperbolas are faid to be equilateral.

XX. If a right line be drawn through any point in the diameter of a conic fection parallel to the tangent at its vertex, which is terminated both ways by the curve, it is called an ordinate to that diameter.

XXI. The fegments of any diameter of a conic fection, which is intercepted between an ordinate and the vertex, is called an abfciffa.

XXII. A diameter which is parallel to the tangent at the vertex of any diameter of the ellipfe or hyperbola, is called a conjugate diameter.

XXIII. A line which is a third proportional to any diameter of the ellipfe or hyperbola and its conjugates is called a parameter to that diameter.

XXIV. If a line be drawn through the focus of a parabola parallel to the ordinates of any diameter, which is terminated both ways by the curve, it is called a parameter to that diameter.

From thefe fundamental properties all the others are derived, and the curves may be defcribed mechanically. This defcription depends for the parabola, on the property that a line from any point in the curve to the focus, is equal to the line drawn from the fame point perpendicularly on the directrix; for the ellipfe, on the property that the fum of the lines drawn from the foci to any point, is equal to the major axis; for the hyperbola, that the difference of the lines drawn from the foci to any point in the curve, is equal to the major axis. Hence to draw the parabola.

Sect. I. *Defcription of Conic Sections on a Plane.*

1. PARABOLA.

" Let AB, fig. 9. be any right line, and C any point without " it, and DKF a ruler, which let be placed in the fame plane in " which the right line and point are, in fuch a manner that " one fide of it, as DK, be applied to the right line AB, and " the other fide KF coincide with the point C; and at F, the " extremity of the fide KF, let be fixed one end of the thread " FNC, whofe length is equal to KF, and the other extremity " of it at the point C, and let part of the thread, as FG, be " brought clofe to the fide KF by a fmall pin G; then let the " fquare DKF be removed from B towards A, fo that all the " while its fide DK be applied clofe to the line BA, and in the " mean time the thread being extended will always be applied to " the fide KF, being ftopt from going from it by means of the " fmall pin; and by the motion of the fmall pin N there will " be defcribed a certain curve, which is called a *femi-parabola.*

" And if the fquare be brought to its firft given pofition, and " in the fame manner be moved along the line AB, from B to- " wards H, the other femi-parabola will be defcribed."

2. ELLIPSE.

" If any two points, as A and B, fig. 10. be taken in any " plane, and in them are fixed the extremities of a thread, whofe " length is greater than the diftance between the points, and " the thread extended by means of a fmall pin C, and if the " pin be moved round from any point until it return to the " place from whence it began to move, the thread being ex- " tended during the whole time of the revolution, the figure " which the fmall pin by this revolution defcribes is called an " *ellipfe.*"

3. HYPERBOLA.

" If to the point A, fig. 11. in any plane, one end of the rule " AB be placed, in fuch a manner, that about that point, as a " centre, it may freely move; and if to the other end B, of the " rule AB, be fixed the extremity of the thread BDC, whofe " length is fmaller than the rule AB, and the other end of the " thread, being fixed in the point C, coinciding with the fide of " the rule AB, which is in the fame plane with the given point " A; let part of the thread, as BD, be brought clofe to the " fide of the rule AB, by means of a fmall pin D; then let the " rule be moved about the point A, from C towards T, the " thread all the while being extended, and the remaining part " coinciding with the fide of the rule, being ftopt from going " from it by means of the fmall pin, and by the motion of the " fmall pin D, a certain figure is defcribed which is called the " *femi-hyperbola.*"

The ellipfe returns into itfelf. The parabola and hyperbola may be extended without limit.

Every line perpendicular to the directrix of a parabola meets it in one point, and falls afterwards within it; and every line drawn from the focus meets it in one point, and falls afterwards without it. And every line that paffes through a parabola, not perpendicular to the directrix, will meet it again, but only once.

Every line paffing through the centre of an ellipfe is bifected by it; the tranfverfe axis is the greateft of all thefe lines; the leffer axis the leaft; and thofe nearer the tranfverfe axis greater than thofe more remote.

In the hyperbola, every line paffing through the centre is bifected by the oppofite hyperbola, and the tranfverfe axis is the leaft of all thefe lines; alfo the fecond axis is the leaft of all the fecond diameters. Every line drawn from the centre within the angle contained by the afymptotes, meets at once, and falls afterwards within it; and every line drawn through the centre without the angle, never meets it; and a line which cuts one of the afymptotes, and cuts the other extended beyond the centre, will meet both the oppofite hyperbolas in one point.

If a line GM, fig. 9. be drawn from a point in a parabola perpendicular to the axis, it will be an ordinate to the axis, and its fquare will be equal to the rectangle under the abfciffa MI and latus rectum; for becaufe GMC is a right angle, GMq is equal to the difference of GCq and CMq; but GC is equal to GE, which is equal to MB; therefore GMq is equal to BMq—CMq; which, becaufe CI and IB are equal, is (8 *Euc.* 2.) equal to four times the rectangle under MI and IB, or equal to the rectangle under MI and the latus rectum.

Hence it follows, that if different ordinates be drawn to the axis, their fquares being each equal to the rectangle under the abfciffa and latus rectum, will be to each other in the proportion of the abfciffas, which is the fame property as was fhown before to take place in the parabola cut from the cone, and proves thofe curves to be the fame.

This property is extended alfo to the ordinates of other diameters, whofe fquares are equal to the rectangle under the abfciffas and parameters of their refpective diameters.

In the ellipfe, the fquare of the ordinate is to the rectangle under the fegments of the diameter, as the fquare of the diameter parallel to the ordinate to the fquare of the diameter to which it is drawn, or as the firft diameter to its latus rectum; that is, LKq fig. 10. is to EKF as EFq to GHq.

In the hyperbola, the fquare of the ordinate is to the rectangle contained under the fegments of the diameters betwixt its vertices, as the fquare of the diameter parallel to the ordinate to the fquare of the diameter to which it is drawn, or as the firft diameter to its latus rectum; that is, SXq is to EXK as MNq to KEq.

Or if an ordinate be drawn to a fecond diameter, its fquare will be to the fum of the fquares of the fecond diameter, and of the line intercepted betwixt the ordinate and centre, in the fame proportion: that is, RZq fig. 11. is to ZGq added to GMq, as KEq to MNq. Thefe are the moft important properties of the conic fections; and by means of thefe, it is demonftrated, that the figures are the fame defcribed on a plane as cut with a cone; which we have demonftrated in the cafe of the parabola.

Sect. II. *Equations of the Conic Sections*

Are derived from the above properties. The equation of any curve, is an algebraic expreffion, which denotes the relation betwixt the ordinate and abfciffa; the abfciffa being equal to x, and the ordinate equal to y.

If p be the parameter of a parabola, then $y^2 = px$; which is an equation for all parabolas.

If a be the diameter of an ellipſe, p its parameter; then $y^2 = \frac{p}{a} \times \overline{ax - xx}$; an equation for all ellipſes.

If a be a tranſverſe diameter of a hyperbola, p its parameter; then $y^2 = \frac{p}{a} \times \overline{ax + xx}$.

If a be a ſecond diameter of an hyperbola, then $y^2 = \frac{p}{a} \times \overline{aa + xx}$; which are equations for all hyperbolas.

As all theſe equations are expreſſed by the ſecond powers of x and y, all conic ſections are curves of the ſecond order; and converſely, the locus of every quadratic equation is a conic ſection, and is a parabola, ellipſe, or hyperbola, according as the form of the equation correſponds with the above ones, or with ſome other deduced from lines drawn in a different manner with reſpect to the ſection.

Sect. III. *General Properties of Conic Sections.*

A tangent to a parabola biſects the angle contained by the lines drawn to the focus and directrix; in an ellipſe and hyperbola, it biſects the angle contained by the lines drawn to the foci.

In all the ſections, lines parallel to the tangent are ordinates to the diameter paſſing through the point of contact; and in the ellipſe and hyperbola, the diameters parallel to the tangent, and thoſe paſſing through the points of contact, are mutually conjugate to each other. If an ordinate be drawn from a point to a diameter, and a tangent from the ſame point which meets the diameter produced; in the parabola, the part of the diameter betwixt the ordinate and tangent will be biſected in the vertex; and in the ellipſe and hyperbola, the ſemi-diameter will be a mean proportion betwixt the ſegments of the diameter betwixt the centre and ordinate, and betwixt the centre and tangent.

The parallelograms formed by tangents drawn through the vertices of any conjugate diameters, in the ſame ellipſe or hyperbola, will be equal to each other.

Sect. IV. *Properties peculiar to the Hyperbola.*

As the hyperbola has ſome curious properties ariſing from its aſymptotes which appear at firſt view almoſt incredible, we ſhall briefly demonſtrate them.

1. The hyperbola and its aſymptotes never meet: if not, let them meet in S, fig. 7.; then by the property of the curve the rectangle KXE is to SXq as GEq to GMq or EPq; that is, as GXq to SXq; wherefore, KXE will be equal to the ſquare of GX; but the rectangle KXE, together with the ſquare of GE, is alſo equal to the ſquare of GX; which is abſurd.

2. If a line be drawn through a hyperbola parallel to its ſecond axis, the rectangle, by the ſegments of that line, betwixt the point in the hyperbola and the aſymptotes, will be equal to the ſquare of the ſecond axis.

For if SZ, fig. 11. be drawn perpendicular to the ſecond axis, by the property of the curve, the ſquare of MG, that is, the ſquare of PE is to the ſquare of GE, as the ſquares ZG and the ſquare of MG together, to the ſquare of SZ or GX: and the ſquares of RX and GX are in the ſame proportion, becauſe the triangles RXG, PEG are equiangular; therefore the ſquares ZG and MG are equal to the ſquare of RX; from which, taking the equal ſquares of SX and ZG, there remains the rectangle RSV, equal to the ſquare of MG.

3. Hence, if right lines be drawn parallel to the ſecond axis, cutting an hyperbola and its aſymptotes, the rectangles contained betwixt the hyperbola and points where the lines cut the aſymptotes will be equal to each other; for they are ſeverally equal to the ſquare of the ſecond axis.

4. If from any points, d and S, in a hyperbola, there be drawn lines parallel to the aſymptotes $d\,a$ SQ and S b d c, the rectangle under $d\,a$ and $d\,c$ will be equal to the rectangle under QS and S b; alſo the parallelograms d a, G c, and SQG b, which are equiangular, and conſequently proportional to the rectangles, are equal.

For draw YW RV parallel to the ſecond axis, the rectangle Y d W is equal to the rectangle RSV; wherefore, WD is to SV as RS is to d Y. But becauſe the triangles RQS, AYD, and GSV c d W, are equiangular, W d is to SV as c d to S b, and RS is to DY as SQ to d a; wherefore, d c is to S b as SQ to d a: and the rectangle d c, d a, is equal to the rectangle QS, S b.

5. The aſymptotes always approach nearer the hyperbola.

For, becauſe the rectangle under SQ and S b or QG, is equal to the rectangle under d a and d c, or AC and QG is greater than a G; therefore d a is greater than QS.

6. The aſymptotes come nearer the hyperbola than any aſſignable diſtance.

Let X be any ſmall line. Take any point, as d, in the hyperbola, and draw d a, d c, parallel to the aſymptotes: and as X is to d a, ſo let a G be to GQ. Draw QS parallel to a d, meeting the hyperbola in S; then QS will be equal to X. For the rectangle SQG will be equal to the rectangle d a G; and conſequently SQ is to d a as AG to GQ.

If any point be taken in the aſymptote below Q, it can eaſily be ſhown that its diſtance is leſs than the line X.

Sect. V. *Areas contained by Conic Sections.*

The area of a parabola is equal to $\frac{2}{3}$ the area of a circumſcribed parallelogram.

The area of an ellipſe is equal to the area of a circle whoſe diameter is a mean proportional betwixt its greater and leſſer axes.

If two lines, a d and QS, be drawn parallel to one of the aſymptotes of an hyperbola, the ſpace a QS d, bounded by theſe parallel lines, the aſymptotes and the hyperbola will be equal to the logarithm of a Q, whoſe module is a d, ſuppoſing a G equal to unity.

Sect. VI. *Curvature of Conic Sections.*

The curvature of any conic ſection, at the vertices of its axis, is equal to the curvature of a circle whoſe diameter is equal to the parameter of its axis.

If a tangent be drawn from any other point of a conic ſection, the curvature of the ſection in that point will be equal to the curvature of a circle to which the ſame line is a tangent, and which cuts off from the diameter of the ſection, drawn through the point, a part equal to its parameter.

Sect. VII. *Uſes of Conic Sections.*

Any body, projected from the ſurface of the earth, deſcribes a parabola, to which the direction wherein it is projected is a tangent: and the diſtance of the directrix is equal to the height from which a body muſt fall to acquire the velocity wherewith it is projected: hence the properties of the parabola are the foundation of gunnery.

All bodies acted on by a central force, which decreaſes as the ſquare of the diſtances increaſes, and impreſſed with any projectile motion, making any angle with the direction of the central force, muſt deſcribe parabolas, ellipſes, and hyperbolas, according to the proportion betwixt the central and projectile force. This is proved by direct demonſtration.

The great principle of gravitation acts in this manner: and all the heavenly bodies deſcribe conic ſections having the ſun

in one of the foci; the orbits of the planets are ellipfes, whofe tranfverfe and leffer diameters are nearly equal: it is uncertain whether the comets defcribe ellipfes with very unequal axes, and fo return after a great number of years; or whether they defcribe parabolas and hyperbolas; in which cafe they will never return.

They are of great ufe alfo in many other parts of the mathematics; in dialing, for delineating the figns in the projection of the fphere, many of whofe circles are projected into thefe curves; in optics, to reflect or refract rays accurately to a focus; in logarithms, and in the higher algebra, one or other of them is continually applied, and no one can make any great progrefs in the mathematics, without underftanding thoroughly the chief properties of the conic fections.

CONICHTHYODONTES, or Plectronitæ, in natural hiftory, one of the three names the foffile teeth of fifhes are known by.

CONIFERÆ, in botany, an order of plants in the *Fragmenta methodi naturalis* of Linnæus, containing the following genera, viz. cupreffus, ephedra, equifetum, juniperus, pinus, taxus, thuja.

CONIFEROUS trees, fuch as bear hard dry feed-veffels of a conical figure; confifting of feveral woody parts, being moftly fcaly, adhering clofely together, and feparating when ripe.

CONINGSECK, a town of Suabia in Germany, and capital of a county of the fame name. E. long. 9. 23. N. lat. 47. 50.

CONJOINT *Degrees*, in mufic, two notes which follow each other immediately in the order of the fcale, as *ut* and *re*. Conjoint *Tetrachords*, two tetrachords, or fourths, where the fame chord is the higheft of one and the loweft of the other.

CONISSALÆ, in natural hiftory, a clafs of foffils naturally and effentially compounded, not inflammable, or foluble in water, found in detached maffes, and formed of cryftalline matter debafed by earth. Of this clafs there are two orders, and of each of thefe only one genus. Coniffalæ of the firft order are found in form of a naturally regular and uniform powder; all the genuine particles of which are nearly of one determinate fhape, appearing regularly concreted, and not fragments of others once larger. Coniffalæ of the fecond order are found in form of a rude, irregular, and fhapelefs powder, the particles of which are never of any determinate figure, but feem broken fragments of once larger maffes. To the former genus belong the different kinds of fand; and to the latter the fuburræ, or gritts.

CONJUGATE diameter, or *Axis of an ellipfis*, the fhorteft of the two diameters, or that bifecting the axis.

CONJUGATION, in grammar, a regular diftribution of the feveral inflections of verbs in their different voices, moods, tenfes, numbers, and perfons, fo as to diftinguifh them from one another. See Grammar and Language.

CONIUM, hemlock, a genus of the digynia order, belonging to the pentandria clafs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The partial involucra are halved, and moftly tryphyllous; the fruit fubglobofe and quinque-ftriated, the ftriæ crenated on each fide. The fpecies are three: 1. The *maculatum*, or *greater hemlock*, grows naturally on the fides of banks and roads in many parts of great Britain. It is a biennial plant which perifhes after it has ripened its feeds. It hath a long taper root like a parfnip, but fmaller. The ftalk is fmooth, fpotted with purple, and rifes from four to upwards of fix feet high; branching out toward the top into feveral fmaller ftalks, garnifhed with decompounded leaves, whofe lobes are cut at the top into three parts; thefe are of a lucid green, and have a difagreeable fmell. The ftalks are terminated by umbels of white flowers, each being compofed of about ten rays or fmall umbels, and have a great number of flowers, which fpread open, each fitting upon a diftinct footftalk; the feeds are fmall and channelled, and like thofe of anifeed. It flowers in June, and the feeds ripen in autumn. 2. The *tenuifolium*, with ftriated feeds, differs from the firft in having taller ftalks, which are not fo much fpotted. The leaves are much narrower, and of a paler green; and this difference is conftant. It is a biennial plant, and grows naturally in Germany. 3. The *africanum*, with prickly feeds, is a native of the Cape of Good Hope. The plant rarely grows above nine inches high; the lower leaves are divided like thofe of the fmall wild rue, and are of a yellowifh colour; thofe upon the ftalk are narrower, but of the fame colour; thefe are terminated by umbels of white flowers, each of the larger umbels being compofed of three fmall ones; the involucrum hath three narrow leaves fituated under the umbel. This flowers in July, and ripens feed in autumn; foon after which the plants decay.

The medical ufes of this plant are various. The firft fpecies is fometimes applied externally, in the form of fomentation or poultice, as a difcutient. Its medicinal properties have alfo been communicated to the fyftem in the way of a bath or femicupium. See the *Pharm. Chirurgica*. With regard to its virtues when taken internally, it has been juftly reckoned poifonous, when ufed in any confiderable quantity. In fmall dofes however it may be taken with great fafety; and thefe being gradually augmented, it fometimes proves a powerful remedy. In fchirrus, the internal and external ufe of hemlock has been found ufeful. In cancer, it often abates pain, and is free from the conftipating effects of opium. It is likewife ufed in fcrophulous tumours and ulcers, and in other ulcers that are not defined by the term *ill-conditioned*. It is alfo recommended by fome in chin-cough, and various other difeafes. Its beft form, perhaps, is that of the powdered leaves, in the dofe at firft of two or three grains a-day, which in fome cafes has been gradually increafed to upwards of two ounces a-day, without producing giddinefs. Both the London and Edinburgh colleges have given a place to the fuccus fpiffatus cicutæ, but into the pharmacopœia of the latter an extractum *feminum* cicutæ is alfo introduced.

CONJUNCT, in a general fenfe, fignifies conjoined, concurrent, or united.

CONJUNCTION, in aftronomy, the meeting of two or more ftars or planets in the fame degree of the zodiac.

Conjunction, in grammar, an indeclinable word or particle, which ferves to join words and fentences together, and thereby fhows their relation or dependence upon one another. See Grammar.

CONJURATION, magic words, characters, or ceremonies, whereby evil fpirits, tempefts, &c. are fuppofed to be raifed, or driven away. The Romifh priefts pretend to expel devils, by preparing holy water in a particular manner, and fprinkle it over the poffeffed, with a number of conjurations and exorcifms. Some authors make the difference between conjuration and witchcraft to confift in this; that the former effects its end by prayers and invocation of God's name, &c. to compel the devil to do what is defired; fo that the conjurer is fuppofed to be at war with the devil, and that evil fpirit to act merely out of conftraint: whereas the latter attains its end by an immediate application to the devil himfelf: and the devil's complaifance is

Fig. 1.

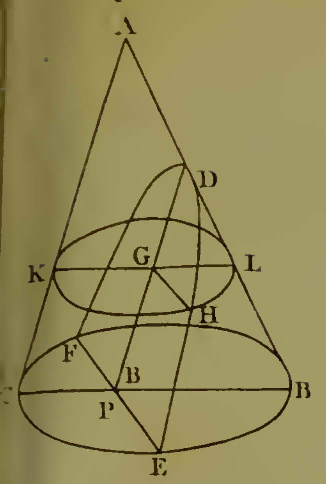


Fig. 2.

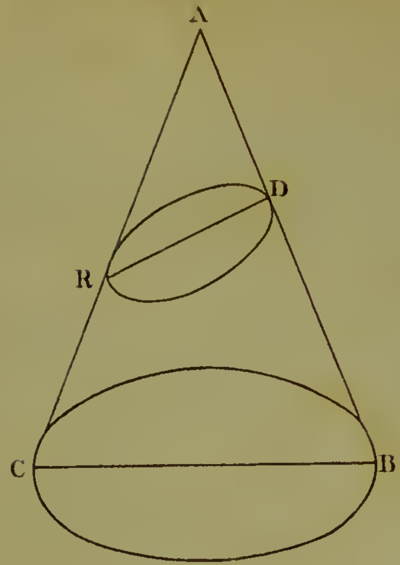
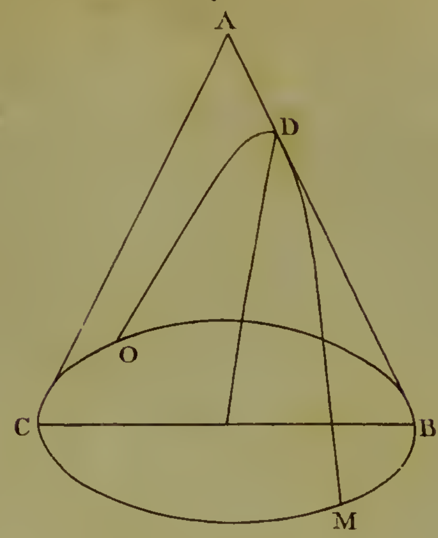


Fig. 3.



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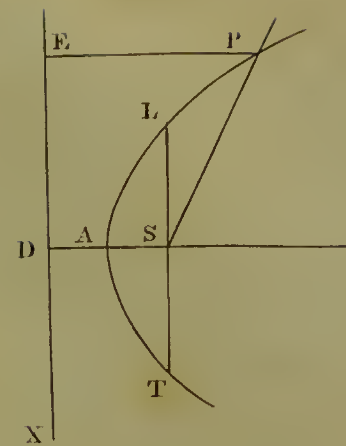

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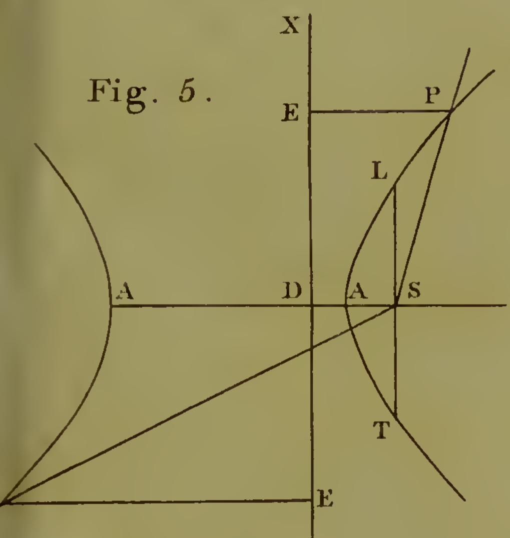

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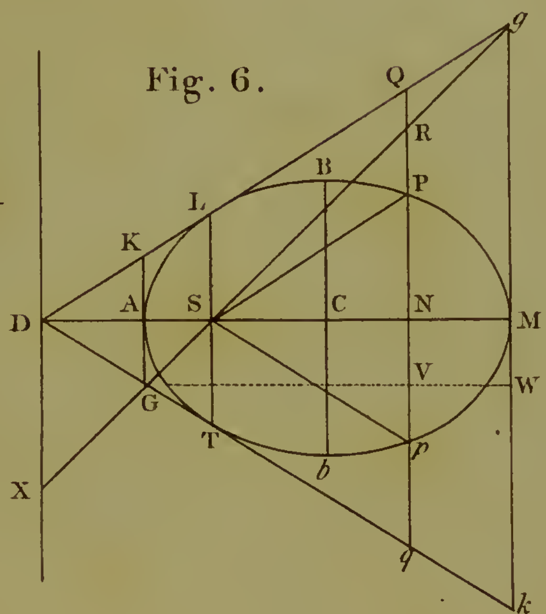

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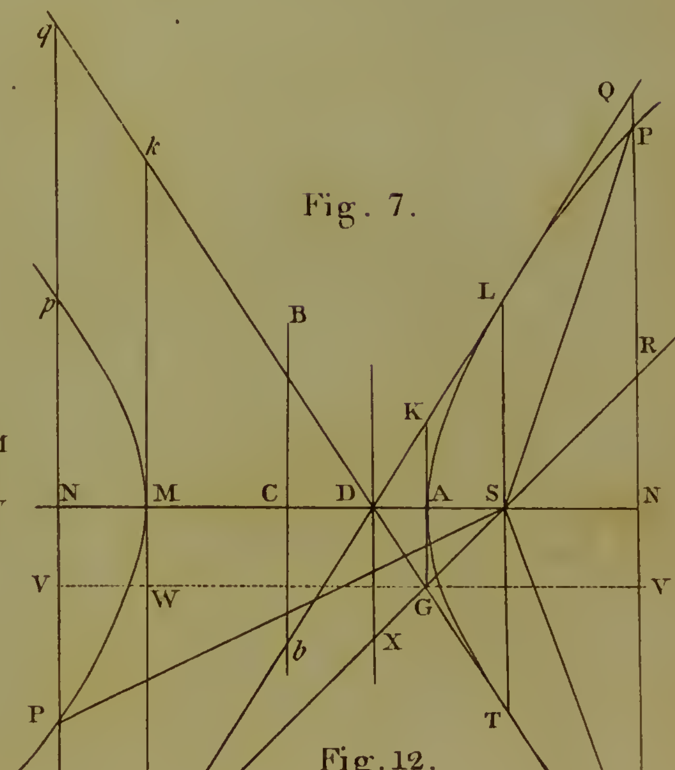

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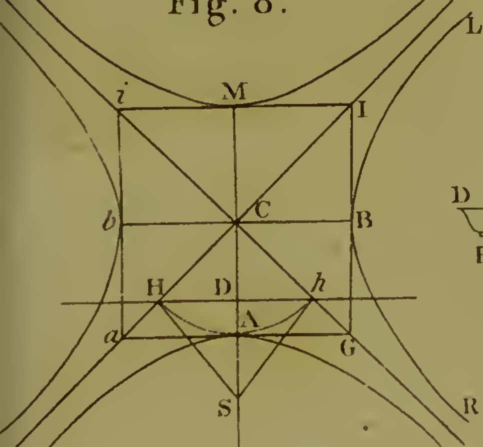


Fig. 9.

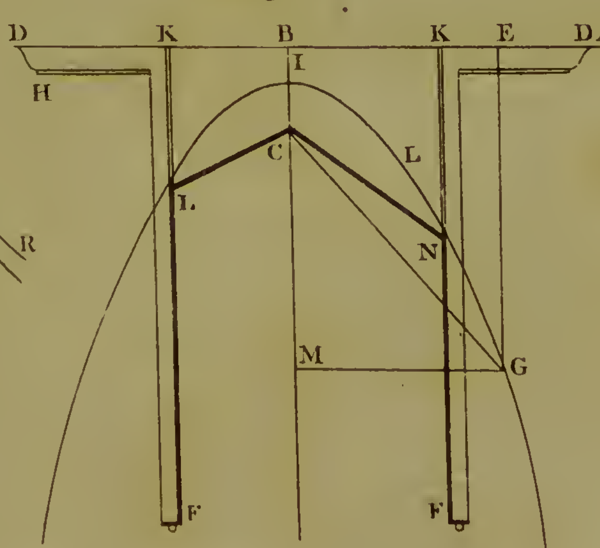


Fig. 10.

Fig. 11.

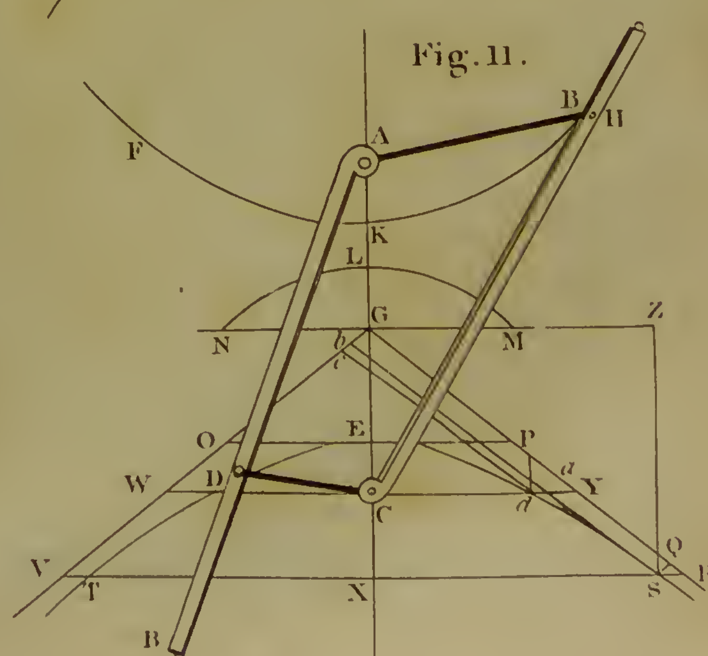
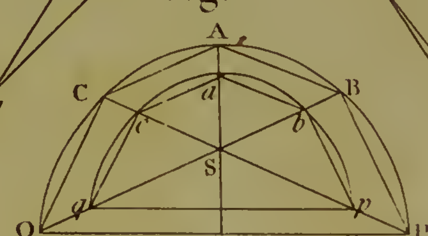


Fig. 12.



Barlow sculp

ſuppoſed to be the conſequence of ſome compact between them, ſo that the devil and the witch have a good underſtanding together. Both theſe again differ from enchantment and ſorcery; in that theſe latter operate ſecretly and ſlowly by ſpells, charms, &c. without ever calling on the devil or having any conference with him.

CONN. See COND.

CONNARUS, CEYLON SUMACH; a genus of the decandria order, belonging to the monadelphia claſs of plants; and in the natural method ranking with thoſe of which the order is doubtful. The ſtigma is ſimple, the capſule bivalved, unilocular, and monoſpermous. There is but one ſpecies, viz. the monocarpus. This is a native of India, and riſes with a ligneous ſtalk eight or ten feet high, which is hard, rigid, and covered with a black bark, and divides upward into two or three branches garniſhed with trifoliate leaves, having long footſtalks placed alternate. It is propagated by cuttings, and is to be treated in the ſame manner with other tender exotics.

CONNAUGHT, a province of Ireland, bounded on the E. by Leinſter, on the W. by the ocean, on the N. and N. W. by the ocean and Ulſter, and on the S. and E. by Munſter. It is 130 miles in length, and 84 in breadth. It has no rivers of note beſide the Shannon. It has ſeveral convenient bays and creeks, and is fertile in many places. It had ſeveral dangerous bogs, overrun with woods, which are now, in ſome meaſure, cleared away. It produces abundance of cattle, ſheep, deer, hawks, and honey; but the inhabitants being indolent, it is the leaſt cultivated of all the four provinces. It contains one archbiſhopric, five biſhoprics, ſix counties, ſeven market towns, 10 boroughs, and 330 pariſhes.

CONNECTICUT, one of the five ſtates of New-England in N. America. It is 82 miles long and 57 broad, and is bounded on the N. by Maſſachuſetts, on the E. by Rhode-Iſland, on the W. by New-York, and on the S. by the Sound, which divides it from Long Iſland. Though ſubject to the extremes of heat and cold in their ſeaſons, and to frequent ſudden changes, this country is very healthful. It is the moſt populous, in proportion to its extent, of any of the United States. It reſembles a well-cultivated garden, which, with that degree of induſtry which is eſſential to happineſs, produces the neceſſaries and conveniencies of life in abundance. Its principal rivers are the Connecticut, the Houſatonik, the Thames, and their reſpective branches. It contains the counties of Hartford, New-Haven, New London, Fairfield, Windham, Litchfield, Middleſex, and Tolland. In 1782, the number of inhabitants was 276,395.

CONNECTICUT, a river of New England in N. America, which riſes in a ſwamp in lat. 45. 10. N. and lon. 71. 0. W. and, taking a ſoutherly direction, falls into the Sound, oppoſite Long Iſland. Between Walpole on the E. and Weſtminſter on the W. ſide of the river, are the great falls. The whole river, compreſſed between two rocks, ſcarcely 30 feet aſunder, ſhoots with amazing rapidity into a broad baſon below. Over theſe falls, a bridge, 160 feet in length, under which the higheſt floods may paſs without injury to it, was built in 1784; the firſt bridge ever erected over this noble river. From its ſource to its mouth it is about 300 miles; and on its banks are many pleaſant well-built towns.

CONNECTION, or CONNEXION, the relation or dependence of one thing upon another. CONNECTION, or *Continuity*, in the drama, conſiſts in the joining of the ſeveral ſcenes together. The connection is ſaid to be obſerved, when the ſcenes of an act ſucceed one another immediately, and are ſo joined as that the ſtage is never left empty.

CONNECTIVES, in grammar, one of the four ſpecies, under which, according to Mr. Harris, all words may be included. They are of two kinds: and as they connect ſentences or words, are called by the different names of *conjunctions* and *prepoſitions*. See GRAMMAR.

CONNIVENT VALVES, in anatomy, thoſe wrinkles, cellules, and vaſcules, which are found in the inſide of the two inteſtines ilium and jejunum. See ANATOMY, page 190.

CONNOISSEUR, a French term, of late uſed in Engliſh: it literally denotes a perſon well verſed in any thing; being formed of the verb *connoitre*, "to know, underſtand." Hence it comes to be uſed in our language for a critic, or perſon who is a thorough judge or maſter in any way, particularly in matters of painting and ſculpture.

CONNOR, a city of Ireland, in the county of Antrim and province of Ulſter. W. lon. 6. 30. N. lat. 54. 50.

CONOCARPUS, BUTTON-WOOD; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 48th order, *Aggregatæ*. The corolla is pentapetalous; the ſeeds naked, ſolitary, inferior; the flowers aggregate. There are two ſpecies, the erecta and procumbens, both natives of the Weſt Indies. They riſe to the height of about 16 feet, but are trees of no beauty, nor is the wood of them uſed for any mechanic purpoſe in the countries where they grow naturally. They are, however, preſerved in ſome botanic gardens in Britain for the ſake of variety.

CONOID, in geometry, a ſolid body, generated by the revolution of a conic ſection about its axis. See CONIC *Sections*.

CONOIDES, in anatomy, a gland found in the third ventricle of the brain, called *pinealis*, from its reſemblance to a pine-apple. See ANATOMY, page 203.

CONON, the renowned Athenian general and admiral, flouriſhed 394 years before Chriſt. After his defeat by Lyſander, he fled to Evagoras king of Cyprus: after which he put himſelf under the protection of Artaxerxes king of Perſia; with whoſe army he delivered Athens from the oppreſſion of ſtrangers, and rebuilt its walls. In the 360th year of Rome, he beat the Lacedemonians in a ſea-fight near Cnidus upon the coaſt of Aſia, deprived them of the ſovereign rule they had on the ſea ever ſince the taking of Athens, and gained ſome other conſiderable advantages over them: but falling into the hands of Teribazus a Perſian, who envied his glory, he was put to death.

CONOPS, in zoology; a genus of inſects belonging to the order diptera, the characters of which are: the roſtrum is porrected and jointed like a knee: the antennæ terminate by a flat and ſolid articulation, reſembling the bowl of a ſpoon, with a lateral briſtle, which when cloſely examined appears to be very hairy. Of this genus there are ſeveral ſpecies. 1. The calcitrans is to be found every where, eſpecially in autumn, when it haraſſes the horſes, and draws blood from them with its ſting. 2. The macrocephala might at firſt ſight be miſtaken for a ſpecies of waſp. It is ſmooth; the forepart of the head is lemon-colour, as are the poiſers; the feet are dun-coloured. The thorax is variegated with black and reddiſh dun. The ſame takes place with reſpect to the ſegments of the abdomen; ſome of which are edged with lemon-colour, chiefly the ſecond, and part of the third, towards the ſides. The wings are brown, watered, and clouded. This beautiful conops is found in meadows. There are eleven or twelve other ſpecies.

CONQUEST, in civil juriſprudence, is the acquiſition of property in common by a number of perſons. In ſome countries they confound acquiſition with conqueſt: but, according to the moſt general acceptation, acquiſition is the gaining of unappropriated goods before the eſtabliſhment of a community: whereas by the term *conqueſt*, is ordinarily intended, whatever is acquired by a number of perſons in community; or by ſome one for all the others. As it is more eſpecially in the union of perſons by marriage that a community of property takes place; ſo it is in reference to them that we frequently uſe the word *conqueſt*. There are nevertheleſs conqueſts alſo among other perſons who are in a tacit community or ſociety; ſuch as obtain by particular

local cuſtoms. According to this ſenſe of the word, it has been contended by ſeveral, that William I. claimed this kingdom; that is, not by right of arms, but by right of conqueſt or acqueſt; under promiſe of ſucceſſion made by Edward the Confeſſor, and a contract entered into by Harold to ſupport his pretenſions to that ſucceſſion: and by old writers, *conqueſtus*, *acquiſitio*, and *perquiſitio*, are frequently uſed as ſynonymous terms.

CONQUEST, in law of nations, is the acquiſition of ſovereignty by force of arms, by ſome foreign prince; who reduces the vanquiſhed under his empire. The right of conqueſt is derived from the laws of war; and when a people is ſubjected, the conduct of the conqueror is regulated by four kinds of law. Firſt, the law of nature, which dictates whatever tends to ſelf-preſervation; ſecondly, our reaſon, which teaches us to uſe others as we would be treated ourſelves; thirdly, the laws of political ſociety, to which nature has not aſſigned any preciſe boundary; laſtly, the law which is derived from the particular circumſtances attending the conqueſt. Thus, a ſtate conquered by another will be treated in one of the four methods following: Either the conqueror will continue it under its own laws, and will only claim the exerciſe of civil and eccleſiaſtical ſovereignty; or he will impoſe a new form of government; or he will deſtroy the frame of their ſociety, and incorporate the inhabitants with others; or he will exterminate them.

CONSANGUINITY, or KINDRED, is defined by the writers on theſe ſubjects to be, *vinculum perſonarum ab eodem ſtipite deſcendentium*; "the connection or relation of perſons deſcended from the ſame ſtock or common anceſtor." This conſanguinity is either lineal or collateral.

Lineal conſanguinity is that which ſubſiſts between perſons of whom one is deſcended in a direct line from the other; as between John Stiles (the *propoſitus* in the table of conſanguinity) and his father, grandfather, great grandfather, and ſo upwards in the direct aſcending line; or between John Stiles and his ſon, grandſon, great grandſon, and ſo downwards in the direct deſcending line. Every generation, in this direct lineal conſanguinity, conſtitutes a different degree, reckoning either upwards or downwards: the father of John Stiles is related to him in the firſt degree, and ſo likewiſe is his ſon; his grandſire and grandſon, in the ſecond; his great grandſire and great grandſon in the third. This is the only natural way of reckoning the degrees in the direct line; and therefore univerſally obtains, as well in the civil and canon, as in the common law.

The doctrine of lineal conſanguinity is ſufficiently plain and obvious; but it is, at the firſt view, aſtoniſhing to conſider the number of lineal anceſtors which every man has, within no very great number of degrees: and ſo many different bloods is a man ſaid to contain in his veins, as he hath lineal anceſtors. Of theſe he has two in the firſt deſcending degree; his own parents: he hath four in the ſecond; the parents of his father, and the parents of his mother: he hath eight in the third, the parents of his two grandfathers, and of his two grandmothers: and, by the ſame rule of progreſſion, he hath 128 in the ſeventh; 1024 in the 10th; and at the 20th degree, or the diſtance of 20 generations, every man hath above a million of anceſtors, as common arithmetic will demonſtrate. This lineal conſanguinity, we may obſerve, falls ſtrictly within the definition of *vinculum perſonarum ab eodem ſtipite deſcendentium*; ſince lineal relations are ſuch as deſcend one from the other, and both of courſe from the ſame common anceſtor.

Collateral kindred anſwers to the ſame deſcription: collateral relations agreeing with the lineal in this, that they deſcend from the ſame ſtock or anceſtor; but differing in this, that they do not deſcend the one from the other. Collateral kinſmen, then, are ſuch as lineally ſpring from one and the ſame anceſtor, who is the *ſtirps*, or "root," the *ſtipes*, "trunk," or common ſtock, from whence theſe relations are branched out. As if John Stiles hath two ſons, who have each a numerous iſſue: both theſe iſſues are lineally deſcended from John Stiles as their common anceſtor: and they are collateral kinſmen to each other, becauſe they are all deſcended from this common anceſtor, and all have a portion of his blood in their veins, which denominates them *conſanguineous*.

We muſt be careful to remember, that the very being of collateral conſanguinity conſiſts in this deſcent from one and the ſame common anceſtor. Thus Titius and his brother are related; why? becauſe both are derived from one father. Titius and his firſt couſin are related; why? becauſe both deſcend from the ſame grandfather; and his ſecond couſin's claim to conſanguinity is this, that they are both derived from one and the ſame great-grandfather. In ſhort, as many anceſtors as a man has, ſo many common ſtocks he has from which collateral kinſmen may be derived. And as we are taught by holy writ, that there is one couple of common anceſtors belonging to us all, from whom the whole race of mankind is deſcended, the obvious and undeniable conſequence is, that all men are in ſome degree related to one another. For, indeed, if we only ſuppoſe each couple of our anceſtors to have left, one with another, two children; and each of thoſe children to have left, on an average, two more (and without ſuch a ſuppoſition the human ſpecies muſt be daily diminiſhing); we ſhall find that all of us have now ſubſiſting near 270 millions of kindred in the 15th degree, at the ſame diſtance from the ſeveral common anceſtors as we ourſelves are; beſides thoſe that are one or two degrees nearer to or farther from the common ſtock, who may amount to as many more. And if this calculation ſhould appear incompatible with the number of inhabitants on the earth, it is becauſe, by intermarriages among the ſeveral deſcendants from the ſame anceſtor, a hundred or a thouſand modes of conſanguinity may be conſolidated in one perſon; or he may be related to us a hundred or a thouſand different ways.

The method of computing theſe degrees in the canon law, which we have adopted, is as follows: We begin at the common anceſtor, and reckon downwards; and in whatſoever degree the two perſons, or the moſt remote of them, is diſtant from the common anceſtor, that is the degree in which they are related to each other. Thus, Titius and his brother are related in the firſt degree; for from the father to each of them is counted only one: Titius and his nephew are related in the ſecond degree; for the nephew is two degrees removed from the common anceſtor, *viz.* his own grandfather, the father of Titius: or (to give a more illuſtrious inſtance from the Engliſh annals) King Henry VII. who ſlew Richard III. in the battle of Boſworth, was related to that prince in the fifth degree. Let the *propoſitus*, therefore, in the table of conſanguinity, repreſent King Richard III. and the claſs marked E, King Henry VII. Now their common ſtock or anceſtor was King Edward III. the *abavus* in the ſame table: from him to Edmund duke of York, the *proavus* is one degree: to Richard earl of Cambridge, the *avus*, two; to Richard duke of York, the *pater*, three; to King Richard III. the *propoſitus*, four; and from King Edward III. to John of Gaunt (A) is one degree; to John earl of Somerſet (B) two; to John duke of Somerſet (C) three; to Margaret Counteſs of Richmond (D) four; to King Henry VII. (E) five. Which laſt-mentioned prince, being the fartheſt removed from the common ſtock, gives the denomination to the degree of kindred in the canon and municipal law. Though according to the computation of the civilians (who count upwards from either of the perſons related, to the common ſtock, and then downwards again, to the other; reckoning a degree for each perſon both aſcending and deſcending), theſe two princes were related in the ninth degree; for from King Richard III. to Richard duke of York, is one degree; to Richard earl of Cambridge, two; to Edmund duke of York, three; to King Edward III. the common anceſ-

tor, four; to John of Gaunt, five; to John earl of Somerfet, fix; to John duke of Somerfet, feven; to Margaret countefs of Richmond, eight; to King Henry VII. nine. See the Table of Confanguinity in Plate 89, wherein all the degrees of collateral kindred to the *propofitus* are computed, as far as the tenth of the civilians and the feventh of the canonifts inclufive; the former being diftinguifhed by the numeral letters, the latter by the common ciphers.

Consanguinity and *Affinity* (degrees of), forbidden in marriage. See Marriage.

CONSCIENCE, a fecret teftimony of the foul, whereby it gives its approbation to things that are naturally good, and condemns thofe that are evil. See Moral *Philofophy*.

Courts of Conscience, are courts for recovery of fmall debts, conftituted by act of parliament in London, Weftminfter, &c. and other populous and trading diftricts.

CONSCIOUSNESS. Metaphyficians, in lieu of the word *confcience*, which feems appropriated to theological or moral matters, ordinarily ufe that of *confcioufnefs*; whereby they mean an inner fentiment of a thing, whereof one may have a clear and diftinct notion. In this fenfe they fay that we do not know our own foul, nor are affured of the exiftence of our own thoughts otherwife than by felf-confcioufnefs. See Metaphysics.

CONSCRIPT, in Roman antiquity, an appellation given to the fenators of Rome, who were called *confcript fathers*, on account of their names being all entered in one regifter.

CONSECRATION, the act of devoting any thing to the fervice and worfhip of God. The Mofaical law ordained, that all the firft-born, both of man and beaft, fhould be fanctified or confecrated to God. We find alfo, that Jofhua confecrated the Gibeonites, as Solomon and David did the Nethinims, to the fervice of the temple; and that the Hebrews fometimes confecrated their fields and cattle to the Lord, after which they were no longer in their power. Among the ancient Chriftians, the confecration of churches was performed with a great deal of pious folemnity. In what manner it was done for the three firft ages, is uncertain; the authentic accounts reaching no higher than the fourth, when, in the peaceable reign of Conftantine, churches were every where built, and dedicated with great folemnity. Some think the confecration confifted in fetting up the fign of the crofs, or in placing a communion table in the church; and others, that no more was done than preaching a panegyrical fermon in commemoration of the founder, and that then they proceeded to prayers, one of which was compofed on purpofe for the church to be confecrated. The Romanifts have a great deal of pious foppery in the ceremonies of confecration; which they beftow on almoft every thing, as bells, candles, books, water, oil, afhes, palms, fwords, banners, pictures, croffes, agnus dei's, rofes, children's clouts, &c. In England churches have been always confecrated with particular ceremonies, the form of which was left to the difcretion of the bifhop. That obferved by bifhop Laud, in confecrating St. Catherine Creed church, in London, gave great offence.

Consecration is particularly ufed for the benediction of the elements in the euchariſt.

Consecration, among medalifts, is the ceremony of the apotheofis of an emperor, or his tranflation into heaven and reception among the gods. On medals the confecration is thus reprefented: on one fide is the emperor's head, crowned with laurel, fometimes veiled; and the infcription gives him the title of *divus*: on the reverfe is a temple, a buftum, an altar, or an eagle taking its flight towards heaven, either from off the altar, or from a cippus: at other times the emperor is feen in the air, borne up by the eagle; the infcription always, *confecratio*. Thefe are the ufual fymbols: yet on the reverfe of that of Antoninus is the Antonine column. In the apotheofis of empreffes, inftead of an eagle there is a peacock. As to the honours rendered thefe princes after death, they were explained by the words *confecratio*, *pater*, *divus*, and *deus*. Sometimes around the temple or altar are put, *memoria felix*, or *memoria æterna*: for princeffes, *æternitas*, and *fideribus recepta*: on the fide of the head, *dea*, or Θεα.

CONSENT *of Parts*, in the animal economy, an agreement or fympathy, whereby when one part is immediately affected, another at a diftance becomes affected in the fame manner. This mutual accord or confent is fuppofed to be effected by the commerce of the nerves, but in a way with which anatomifts are as yet unacquainted. See Sympathy.

CONSENTES, the name which the Romans gave to the 12 fuperior gods, the *Dii majorum gentium*. The word fignifies as much as *confentientes*; that is, who confented to the deliberations of Jupiter's council. They were twelve in number, whofe names Ennius has briefly expreffed in thefe lines,

Juno, Vefta, Minerva, Ceres, Diana, Venus, Mars,
Mercurius, Jovi, Neptunus, Vulcanus, Apollo.

CONSEQUENCE, in logic, the conclufion, or what refults from reafon or argument. See Conclusion. The confequence is that other propofition in which the extremes or premifes of a fyllogifm are joined, or feparated; and is gained from what was afferted in the premifes. This word, in a more reftrained fenfe, is ufed for the relation or connection between two propofitions, whereof one is inferred from the other.

CONSEQUENT, fomething deduced or gathered from a former argument. But, in a more precife fenfe, it is ufed for the propofition which contains the conclufion, confidered in itfelf, without any regard to the antecedent: in which fenfe the confequent may be true, though the confequence be falfe. See the preceding article.

CONSERVATOR, an officer ordained for the fecurity and prefervation of the privileges of fome cities and communities, having a commiffion to judge of and determine the differences among them. In moft catholic univerfities there are two confervators; the confervator of royal privileges, or thofe granted by kings; and the confervator of apoftolical privileges, or thofe granted by the pope. The firft takes cognizance of perfonal and mixed caufes between the regents, ftudents, &c. and the latter of fpiritual matters between ecclefiaftics. Anciently there were appointed confervators of treaties of peace between princes; which confervators became judges of the infractions made on a treaty, and were charged with procuring fatisfaction to be made. Thefe were ufually the feudatories of the feveral powers. In lieu of confervators, princes now have recourfe to other indifferent princes to guarantee their treaties.

Conservator *of Scots Privileges* at Campvere, is an officer belonging to the royal boroughs of Scotland, who takes care of the mercantile affairs of Scotland, agreeable to the ftaple contract between them and the States-General.

Conservator *of the Peace*, in the ancient Englifh cuftoms, was a perfon who had an efpecial charge, by virtue of his office, to fee the king's peace kept. Till the erection of juftices of the peace by king Edward III. there were feveral perfons who by common law were interefted in keeping the fame: fome having that charge as incident to other offices; and others fimply, or of itfelf, called *cuftodes* or *confervators of the peace*. The chamberlain of Chefter is ftill a confervator in that county; and petty conftables are, by the common law, confervators, &c. in the firft fenfe, within their own jurifdiction: fo are alfo the coroner and the fheriff within their own county. The king is the principal confervator of the peace within all his dominions: the lord chancellor, lord treafurer, lord high fteward, lord marfhal, lord high conftable, all the juftices of the court of king's bench, by their office, and the mafter of the rolls, by prefcription, are gene-

ral confervators of the peace through the whole kingdom, and may commit breakers of the peace, and bind them in recognizances to keep it.

Conservator *of the Truce, and safe Conducts*, was an officer appointed in every fea-port, under the king's letters patent. His charge was to enquire of all offences committed againft the king's truce, and fafe conducts upon the main fea, out of the franchifes of the cinque-ports, as the admirals were wont to do, and fuch other things as are declared *anno* 3 Hen. V. cap. 6.

CONSERVATORIOS, are mufical fchools eftablifhed for the inftruction of children in the profeffion of mufic. There are four of thefe at Venice, defigned for the education of girls, and three at Naples, for the education of boys. It has been fuggefted that the operation of caftration was performed in the confervatorios; but the practice is abfolutely prohibited; and the young caftrati are brought from Lucia in Puglia: but before the operation is performed, their voices are tried in a confervatorio. The fcholars of the Venetian confervatorios have been chiefly celebrated for tafte and neatnefs of execution; and thofe of Naples have had the reputation of being the firft *contrapuntifts*, or compofers, in Europe.

CONSERVATORY, a term fometimes ufed for a greenhoufe or ice-houfe.

CONSERVE, in pharmacy, a form of medicine contrived to preferve the flowers, herbs, roots, or fruits of feveral fimples, as near as poffible, to what they are when frefh gathered. See Pharmacy.

CONSIGNMENT, in law, the depofiting any fum of money, bills, papers, or commodities, in good hands; either by appointment of a court of juftice, in order to be delivered to the perfons to whom they are adjudged; or voluntarily, in order to their being remitted to the perfons they belong to, or fent to the places they are defigned for.

Consignment *of Goods*, in commerce, is the delivering or making them over to another: thus, goods are faid to be configned to a factor, when they are fent to him to be fold, &c. or when a factor fends back goods to his principal, they are faid to be configned to him.

CONSISTENCE, in phyfics, that ftate of a body wherein its component particles are fo connected or entangled among themfelves, as not to feparate or recede from each other. It differs from continuity in this, that it implies a regard to motion or reft, which continuity does not, it being fufficient to denominate a thing continuous that its parts are contiguous to each other.

CONSISTENTES, in church hiftory, a kind of penitents who were allowed to affift at prayers, but who could not be admitted to receive the facrament.

CONSISTORY, *Confiftorium*, fignifies as much as *prætorium*, a tribunal: it is commonly ufed for a council-houfe of ecclefiaftical perfons, or place of juftice in the fpiritual court; a feffion or affembly of prelates. And every archbifhop and bifhop of every diocefe hath a confiftory court held before his chancellor or commiffary in his cathedral church, or other convenient place of his diocefe, for ecclefiaftical caufes. The bifhop's chancellor is the judge of his court, fuppofed to be fkilled in the civil and canon law; and in places of the diocefe far remote from the bifhop's confiftory, the bifhop appoints a commiffary to judge in all caufes within a certain diftrict, and a regifter to enter his decrees, &c.

Consistory, at Rome, denotes the college of cardinals, or the pope's fenate and council, before whom judiciary caufes are pleaded. Du Cange derives the word from *confiftorium*; i. e. *locus ubi confiftitur*; ufed chiefly for a veftibule, gallery, or antichamber, where the courtiers wait for admiffion; and called *à confiftente multitudine.* The confiftory is the firft court, or tribunal of Rome: it never meets but when the pope pleafes to convoke it: the pope prefides in it in perfon, mounted on a magnificent throne, and habited in his *pontificalia*; on the right are the cardinal-bifhops and priefts, and on the left the cardinal-deacons. The place where it is held, is a large hall in the apoftolical palace, where princes and ambaffadors of kings are received. The other prelates, prothonotaries, auditors of the rota, and other officers, are feated on the fteps of the throne: the courtiers fit on the ground; ambaffadors on the right, and confiftorial and fifcal advocates behind the cardinals. Befides the public confiftory, there is alfo a private one, held in a retired chamber, called the *chamber of papegay*; the pope's throne here being only raifed two fteps high. Nobody is here admitted but the cardinals, whofe opinions are collected, and called *fentences.* Here are firft propofed and paffed all bulls for bifhoprics, abbeys, &c. Hence bifhoprics and abbeys are faid to be confiftorial benefices; in regard they muft be propofed in the confiftory, the annates be paid to the pope, and his bulls taken. Anciently they were elective; but by the concordat, which abolifhes elections, they are appointed to be collated by the pope alone, on the nomination of the prince.

Consistory was alfo the name of a court under Conftantine, where he fat in perfon, and heard caufes: the members of this court were called *comites.*

Consistory is alfo ufed among the reformed, for a council or affembly of minifters and elders, to regulate their affairs, difcipline, &c.

Consistory, or court Chriftian in the Englifh laws, is a council of ecclefiaftical perfons, or the place of juftice in an ecclefiaftical or fpiritual court. Every archbifhop and bifhop has a confiftory-court, held before his chancellor or commiffary, either in his cathedral, in fome chapel, aifle, or portico, belonging thereto; or in fome other convenient place of his diocefe, for ecclefiaftical caufes. The fpiritual court was anciently, in the time of the Saxons, joined with the county or hundred court; and the original of the confiftory court, as divided from thofe courts, is found in a law of the conqueror, quoted by lord Coke. From this court there lies an appeal to the archbifhop of each province refpectively.

CONSOLATION, one of the points in rhetoric, wherein the orator endeavours to abate and moderate the grief or concern of another.

CONSOLE, in architecture, an ornament cut upon the key of an arch, which has a projecture, and on occafion ferves to fupport little cornices, figures, bufts, and vafes.

CONSOLIDATION, in law, the combining and uniting two benefices into one. The term is borrowed from the civil law; where it properly fignifies an union of the poffeffion, or occupation, with the property. Thus, if a man have by legacy *ufumfructum fundi*, and afterwards buy the property, or fee-fimple, of the heir; this is called a *confolidation.*

Consolidation, in furgery, the action of uniting broken bones, or the lips of wounds. This has been attempted by means of *confolidating remedies*, as they have been called; but, in fact, it is merely a procefs of nature.

CONSONANCE, in mufic. See Interval.

CONSONANT, a letter that cannot be founded without fome fingle or double vowel before or after it; as *b*, *c*, *d*, &c.

CONSORT, *Queen* Consort. See Queen.

CONSPIRACY, in law, fignifies an agreement between two or more, falfely to indict, or procure to be indicted, an innocent perfon, of felony.

CONSPIRATORS are, by ftatute, defined to be fuch as bind themfelves by oath, covenant, or other alliance, to affift one another falfely and malicioufly to indict perfons, or falfely to maintain pleas. Confpirators, in treafon, are thofe that plot againft the king and the government.

CONSTABLE, according to fome, is a Saxon word, com-

pounded of *coning*, "king," and *ſtaple* which ſignifies the "ſtay or ſupport of the king." But as we borrowed the name as well as office of *Conſtable* from the French, Sir William Blackſtone is rather inclined to deduce it, with Sir Henry Spelman and Dr. Cowel, from that language; wherein it is plainly derived from the Latin *comes ſtabuli*, an officer well known in the empire; ſo called, becauſe, like the great conſtable of France, as well as the lord high conſtable of England, he was to regulate all matters of chivalry, tilts, tournaments, and feats of arms, which were performed on horſeback.—The

Lord High CONSTABLE *of England* is the ſeventh great officer of the crown; and he, with the earl marſhal of England, were formerly judges of the court of chivalry, called in king Henry IV.'s time, *Curia Militaris*, and afterwards the court of honour. It is the fountain of the martial law, and anciently was held in the king's hall. The power of the lord high conſtable was formerly ſo great, and of which ſo improper a uſe was made, that ſo early as the 13th of king Richard II. a ſtatute paſſed for regulating and abridging the ſame, together with the power of the earl marſhal of England; and by this ſtatute, no plea could be tried by them or their courts, that could be tried by the common law of the realm. The office of conſtable exiſted before the conqueſt. After the conqueſt, the office went with inheritance, and by the tenure of the manors of Harlefield, Newman, and Whitenhurſt, in Glouceſterſhire, by grand ſerjeanty in the family of the Bohuns earls of Hereford and Eſſex, and afterwards in line of Seſſord as heirs general to them; but, in 1521, this great office became forfeited to the king in the perſon of Edward Stafford duke of Buckingham, who was that year attainted of high treaſon; and in conſideration of its extenſive power, dignity, and large authority, both in time of war and peace, it has never been granted to any perſon, otherwiſe than *hac vice*, and that to attend at a coronation, or trial by combat. In France, the ſame office was alſo ſuppreſſed about a century after by an edict of Louis XIII; though it has been exerciſed, in the command of the MARSHALS, by the firſt officer in the army.

Lord High CONSTABLE *of Scotland* was an office of great antiquity and dignity. The firſt upon record is Hugo de Morvelle in the reign of David I. He had two grand prerogatives, viz. Firſt, the keeping of the king's ſword, which the king, at his promotion, when he ſwears fealty, delivers to him naked. Hence the badge of the conſtable is a naked ſword.—Second, the abſolute and unlimited command of the king's armies while in the field, in the abſence of the king: but this command does not extend to caſtles and garriſons. He was likewiſe judge of all crimes committed within two leagues of the king's houſe, which precinct was called the *Chalmer of Peace*; though his juriſdiction came at laſt to be exerciſed only as to crimes during the time of parliament, which ſome extended likewiſe to all general conventions. This office was conferred heritably upon the noble family of Errol, by King Robert Bruce; and with them it ſtill remains, being expreſsly reſerved by the treaty of union.

Inferior CONSTABLES. From the great office of high conſtable is derived that inferior order, ſince called the *conſtables of hundreds and franchiſes*; theſe were firſt ordained in the 13th year of Edward I. by the ſtatute of Wincheſter; which, for the conſervation of the peace, and view of armour, appointed that two conſtables ſhould be choſen in every hundred and franchiſe. Theſe are what we now call *conſtabularii capitales*, or *high conſtables*; becauſe continuance of time, and increaſe of people, &c. have occaſioned others of a like nature, but inferior authority, in every town, called *petty conſtables*, or *ſub-conſtabularii*, firſt inſtituted about the reign of Edward III.

The former, or modern *high conſtables*, are appointed at the court-leets of the franchiſe or hundred over which they preſide; or, in default of that, by the juſtices at their quarter-ſeſſions; and are removeable by the ſame authority that appoints them. The *petty conſtables* have two offices united in them, the one ancient, and the other modern. Their ancient office is that of head-borough, tithing-man, or borſholder; who are as ancient as the time of king Alfred: their more modern office is that of conſtable merely; which was appointed ſo lately as the reign of Edward III. in order to aſſiſt the high-conſtable. And in general the ancient head-boroughs, tithing-men, and borſholders, were made uſe of to ſerve as petty conſtables; though not ſo generally, but that in many places they ſtill continue diſtinct officers from the conſtables. They are all choſen by the jury at the court-leet; or, if no court-leet be held, are appointed by two juſtices of the peace.

The general duty of all conſtables, both high and petty, as well as of the other officers, is to keep the king's peace in their ſeveral diſtricts; and to that purpoſe they are armed with very large powers of arreſting and impriſoning, of breaking open houſes, and the like: of the extent of ſuch powers, conſidering what manner of men are for the moſt part put upon theſe offices, it is perhaps very well that they are generally kept in ignorance. One of their principal duties ariſing from the ſtatute of Wincheſter, which appoints them, is to keep watch and ward in their reſpective juriſdictions. Ward, guard, or *cuſtodia*, is chiefly intended of the day-time, in order to apprehend rioters, and robbers on the highways; the manner of doing which is left to the diſcretion of the juſtices of the peace and the conſtable: the hundred being, however, liable for all the robberies committed therein by day-light, for having kept negligent guard. Watch is properly applicable to the night only (being called among the Saxons *wach't* or *waſtu*); and it begins when ward ends, and ends when that begins: for, by the ſtatute of Wincheſter, in walled towns the gates ſhall be cloſed from ſunſetting to ſun-riſing; and watch ſhall be kept in every borough and town, eſpecially in the ſummer ſeaſon, to apprehend all rogues, vagabonds, and night-walkers, and make them give an account of themſelves. The conſtable may appoint watchmen at his diſcretion, regulated by the cuſtom of the place; and theſe, being his deputies, have, for the time being, the authority of their principal.

There are alſo conſtables denominated from particular places, as conſtable of the Tower, of Dover-caſtle, of Windſor-caſtle, of the caſtle of Caernarvon, and many other of the caſtles of Wales; whoſe office is the ſame with that of the caſtellani, or governors of caſtles.

CONSTABLES *of London*. The city of London is divided into 26 wards, and the wards into precincts, in each whereof is a conſtable. They are nominated by the inhabitants of each precinct on St. Thomas's day, and confirmed, or otherwiſe, at the court of wardmote. After confirmation, they are ſworn into their offices at a court of aldermen, on the next Monday after Twelfth day. Such as are choſen into the office, are obliged to place the king's arms, and the arms of the city, over their doors; and if they reſide in alleys, at the end of ſuch alleys toward the ſtreets, to ſignify that a conſtable lives there, and that they may be the more eaſily found when wanted.

CONSTABLES *to Juſtices of the Peace*, in Scotland, are the proper officers for executing their orders. They have power to ſuppreſs tumults, and to apprehend delinquents and thoſe who can give no good account of themſelves, and carry them to the next juſtice.

CONSTANCE, a ſtrong town of Germany, in the circle of Suabia, with a biſhop's ſee, whoſe biſhop is a prince of the empire. It has a handſome bridge, and ſeveral fine ſtructures, as well ſacred as profane. It carries on a great trade, and is well fortified; and though it pretends to be an imperial town, the Auſtrians keep a garriſon here. It is famous for a council held here in 1514, when there were three popes; but they were all

deposed, and Martin V. was elected in their room. The council caused Jerom of Prague to be burnt, though the emperor Sigismund had given him a safe conduct; in pursuance of this maxim, "that no faith is to be kept with heretics." They likewise condemned the doctrine of Wickliff, and ordered his bones to be burned 40 years after he was dead. However, the inhabitants now are protestants. It is seated on a lake of the same name. E. long. 9. 12. N. lat. 47. 35.

CONSTANCE, a great lake of Germany, between Suabia and Swisserland. It is 30 miles in length, and 8 in breadth. It is crossed by the river Rhine; and there are several towns on its banks.

CONSTANCY, in a general sense, denotes immutability, or invariableness.—In ethics, or when applied to the human mind, the term implies resolution or steadiness, particularly under sufferings and the trials of adversity. It was the saying of a heathen philosopher, that there cannot be imagined upon earth a spectacle more worthy the regard of the Creator intent on his works, than a brave man superior to his sufferings. Nothing indeed can be more noble or honourable than to have courage enough to execute the commands of reason and conscience; to maintain the dignity of our nature, and the station assigned us; and to be proof against poverty, pain, and death itself, so far as not to do any thing that is scandalous or sinful to avoid them. To be thus, is to be great above title and fortune. This argues the soul of an heavenly extraction, and is worthy the offspring of the Deity. Of this virtue many noble examples are recorded in history.

CONSTANTIA, a district at the Cape of Good Hope, consisting of two farms, which produce the well-known wine so much prized in Europe, and known by the name of *Cape* or *Constantia* wine. This place is situated at the distance of a mile and a half from Alphen, in a bending formed by and nearly under the ridge of hills, which comes from Meuisen-mountain, and just where it strikes off towards Hout-bay. One of these farms is called *Little Constantia.* Here the white Constantia wine is made. The other produces the red. According to M. de la Cail's account, not more than 60 figgars of red, and 90 of the white Constantia wine are made, each figgar being reckoned at 600 French pints, or about 150 Swedish cans; so that the whole produce amounts to 22,500 cans. As the company are used to keep one third of this for themselves, the remainder is always bespoke by the Europeans long before it is made. At the Cape this wine is seldom seen at table, partly because it is dear, and partly because it is the produce of the country. The red Constantia wine sells for about 60 rixdollars the half awme; but the white is usually to be purchased at a more reasonable rate.

CONSTANTINA, a strong and considerable town of Africa, in the kingdom of Algiers, and capital of a territory of the same name. It is the largest and strongest place in all the eastern parts; and it is seated on the top of a great rock. There is no way to it but by steps cut out of the rock; and the usual way of punishing criminals here is to throw them down the cliff. Here are a great many Roman antiquities, particularly a triumphal arch. E. long. 7. 12. N. lat. 36. 4.

CONSTANTINA, a town of Spain, in Andalusia, and capital of a small territory of the same name, with a castle seated on a mountain. W. long. 5. 35. N. lat. 37. 40.

CONSTANTINE, a kingdom of Barbary of that name, in Africa. It is bounded on the north by the Mediterranean, on the east by the kingdom of Tunis, on the south by Bildulgerid, and on the west by the river Sufegmar, which separates it from the kingdom of Bugia. The country is the new Numidia of the ancients, and had its own king: but it is now a province to Algiers.

CONSTANTINE the Great, the first emperor of the Romans who embraced Christianity. His father, Constantius Chlorus, rendered himself famous by his victorious expeditions to Germany and Britain: upon the abdication of Dioclesian, he shared the Roman empire with Galerius Maximinus in 305, and was at that time at York, where he died in 306; having first caused his son Constantine the Great to be proclaimed emperor by his army, and by the English. Galerius at first refused to admit Constantine to his father's share in the imperial throne; but after having lost several battles, he consented in 308. Maxentius, who succeeded Galerius, opposed him; but was defeated, and drowned himself in the Tyber. Constantine, after various struggles, at length became sole master of the western and eastern empires, and immediately formed the plan of establishing Christianity as the religion of the state; for which purpose, he convoked several ecclesiastical councils: but finding he was likely to meet with great opposition from the Pagan interest at Rome, he conceived the design of founding a new city, to be the capital of his Christian empire; viz. CONSTANTINOPLE. The glory Constantine had acquired by establishing the Christian religion, was tarnished by the part he took in the persecutions carried on by the Arians, towards the close of his reign, against their Christian brethren who differed from them. Seduced by Eusebius of Nicomedia, he banished several eminent prelates; soon after which, he died in 337, the 66th year of his age, and 31st of his reign.

CONSTANTINOPLE, the ancient Byzantium, one of the largest and most celebrated cities in Europe, standing at the eastern extremity of Romania, and capital of the Ottoman empire. It is seated on a small neck of land, which advances toward Natolia, from which it is separated by a strait a mile in breadth. The sea of Marmora washes its walls on the S. and a gulf of the strait of Constantinople does the same on the N. It is delightfully situated between the Black Sea and the Archipelago. Constantine the Great chose this place for his abode, and rebuilt it after the model of Rome. It was taken, in 1453, by the Turks, who have kept possession of it ever since. The Grand Signior's palace, called the Seraglio, is on the sea-side, and is surrounded by walls flanked with towers, and separated from the city by canals. The number of houses must be prodigious, since one fire has burnt 30,000 in a day, without greatly changing the aspect of the city. However, in general, they are but mean, especially on the outside, where there are few or no windows; and the streets being narrow, give them a melancholy look. They reckon that there are 3770 streets and lanes, but they are seldom or ever clean; and the people are infested with the plague almost every year. The inhabitants are half Turks, two thirds of the other half Christians, and the rest Jews. Here are a great number of ancient monuments still remaining, and particularly the superb temple of St. Sophia, which is converted into a mosque, and surpasses all the rest. The street called Adrianople is the longest and broadest in the city; and the bazars, or bezesteins, are the markets for selling all sorts of merchandise. They are large square buildings, covered with domes, supported by arcades, and containing all sorts of goods, which are there exposed to sale. There is a market for slaves of both sexes; and the Jews are the principal merchants, who bring them here to be sold. There are a great number of girls brought from Hungary, Greece, Candia, Circassia, Mingrelia, and Georgia, for the service of the Turks, who generally buy them for their seraglios. The great square, near the mosque of Sultan Bajazet, is the place for public diversions, where the jugglers and mountebanks play a great variety of tricks. The circumference of this city is by some said to be 15 miles, and by Tournefort 23 miles; to which, if we add the suburbs, it may be 34 miles in compass. The suburb, called Pera, is charmingly situated, and is the place where the ambassadors of England, France, Venice, and Holland, reside. The city is built in the

form of a triangle; and as the ground rifes gradually, there is a view of the whole town from the fea. The palaces, mofques, bagnios, and caravanfaras, are many of them magnificent. It is 112 miles S. of Adrianople, 700 S. E. of Vienna, and 1500 S. E. of London. E. lon. 28. 59. N. lat. 41. 1.

CONSTANTINOPLE, THE STRAIT OF, anciently called the Thracian Bofphorus, and forming the communication between the Euxine or Black Sea, and the Propontis, now the fea of Marmora. It is 20 miles long, and a mile and a quarter broad, where it is narroweft. The Turks have built two caftles, oppofite to each other, to defend the paffage. It forms the feparation here between Ruffia and Afia; and the adjacent country is delightful. On one fide of it is fituated Conftantinople, and, on the other, Scutari, where the Grand Signior has his feraglio, and which is confidered as a fuburb to the city.

CONSTAT, in law, the name of a certificate which the clerk of the pipe and auditors of the exchequer make at the requeft of any perfon who intends to plead or move in that court for the difcharge of any thing; and the effect of it is, the certifying what does *conftare* upon record touching the matter in queftion. —A conftat is held to be fuperior to a certificate; becaufe this may err or fail in its contents; that cannot, as certifying nothing but what is evident upon record.—Alfo the exemplification under the great feal of the inrolment of any letters patent is called a *conftat*.

CONSTELLATION, in aftronomy, a fyftem of feveral ftars that are feen in the heavens near to one another. Aftronomers not only mark out the ftars, but, that they may better bring them into order, they diftinguifh them by their fituation and pofition in refpect to each other; and therefore they diftribute them into afterifms or conftellations, allowing feveral ftars to make up one conftellation: and for the better diftinguifhing and obferving them, they reduce the conftellations to the forms of animals, as men, bulls, bears, &c.; or to the images of fome things known, as of a crown, a harp, a balance, &c.; or give them the names of thofe whofe memories, in confideration of fome notable exploit, they had a mind to tranfmit to future ages. The divifion of the ftars by images and figures is of great antiquity, and feems to be as old as aftronomy itfelf: for in the moft ancient book of Job, Orion, Arcturus, and the Pleiades, are mentioned; and we meet with the names of many of the conftellations in the writings of the firft poets, Homer and Hefiod. The ancients, in their divifion of the firmament, took in only fo much as came under their notice, diftributing it into 48 conftellations; but the modern aftronomers comprehend the whole ftarry firmament, dividing it into three regions. See ASTRONOMY.

CONSTERNATION is defined by ethical writers to be an excefs of horror, owing to the ill government of our admiration and fear: or fuch an immoderate degree of fear as confounds the faculties, and incapacitates a perfon for confultation and execution.

CONSTIPATION, in medicine, a hardnefs of the belly, with great coftivenefs. See COSTIVENESS.

CONSTITUENT PART, in phyfiology, an effential part in the compofition of any thing, differing little from what is otherwife called *element* or *principle*.

CONSTITUTION, in matters of policy, fignifies the form of government eftablifhed in any country or kingdom.

CONSTITUTION alfo denotes an ordinance, decifion, regulation, or law, made by authority of any fuperior, ecclefiaftical or civil.

Apoftolical CONSTITUTIONS, a collection of regulations attributed to the apoftles, and fuppofed to have been collected by St. Clement, whofe name they likewife bear. It is the general opinion, however, that they are fpurious, and that St. Clement had no hand in them. They appeared firft in the 4th age, but have been much changed and corrupted fince that time. They are divided into eight books, confifting of a great number of rules and precepts, relating to the duties of Chriftians, and particularly the ceremonies and difcipline of the church. Mr. Whifton, in oppofition to the general opinion, afferts them to be a part of the facred writings, dictated by the apoftles in their meetings, and written down from their own mouth by St. Clement; and intended as a fupplement to the New Teftament, or rather as a fyftem of Chriftian faith and polity. The reafon why the Conftitutions are fufpected by the orthodox, and perhaps the reafon alfo why their genuinenefs is defended by Mr. Whifton, is, that they feem to favour Arianifm.

CONSTITUTION, in a phyfical fenfe, fignifies the particular temperature of the body. It is curious to obferve, fays Dr. Percival, the revolution which hath taken place, within this century, in the conftitutions of the inhabitants of Europe. Inflammatory difeafes more rarely occur, and, in general, are much lefs rapid and violent in their progrefs than formerly; nor do they admit of the fame antiphlogiftic method of cure that was practifed with fuccefs 100 years ago. The experienced Sydenham makes 40 ounces of blood the mean quantity to be drawn in the acute rheumatifm; whereas this difeafe, as it now appears in the London hofpitals, will not bear above half that evacuation. Vernal intermittents are frequently cured by a vomit and the bark, without venefection; which is a proof that at prefent they are accompanied with fewer fymptoms of inflammation than they were wont to be. This advantageous change, however, is more than counterbalanced by the introduction of a numerous clafs of nervous ailments, in a great meafure unknown to our anceftors; but which now prevail univerfally, and are complicated with almoft every other difeafe. It is evident that fo great a revolution could not be effected without a concurrence of many caufes; but amongft thefe (according to Dr. Percival), the prefent general ufe of TEA holds the firft and principal rank. The fecond place may perhaps be allowed to excefs in fpirituous liquors. This pernicious cuftom, in many inftances at leaft, owes its rife to the former, which, by the lownefs and depreffion of fpirits it occafions, renders it almoft neceffary to have recourfe to fomething cordial and exhilarating. And hence proceed thofe odious and difgraceful habits of intemperance, with which too many of the fofter fex are now, alas! chargeable.

CONSTRICTOR, an appellation given to feveral mufcles, on account of their conftringing or clofing fome of the orifices of the body.

CONSTRUCTION, in geometry, is the drawing fuch lines, fuch a figure, &c. as are previoufly neceffary for making any demonftration appear more plain and undeniable.

CONSTRUCTION *of Equations*. See EQUATIONS.

CONSTRUCTION, in grammar; fyntax, or the arranging and connecting the words of a fentence according to the rules of the language. See GRAMMAR, and LANGUAGE. The conftruction is generally more fimple, eafy, and direct, in the modern tongues than in the ancient: we have very few of thofe inverfions which occafion fo much embarraffment and obfcurity in the Latin; our thoughts are ufually delivered in the fame order wherein the imagination conceives them: the nominative cafe, for inftance, always precedes the verb, and the verb goes before the oblique cafes it governs. The Greeks and Latins, M. St. Evremont obferves, ufually end their periods, where, in good fenfe and reafon, they fhould have begun; and the elegance of their language confifts, in fome meafure, in this capricious arrangement, or rather in this tranfpofal and difpofal of the words. See LANGUAGE.

CONSUALIA, in antiquity, feafts which were held among the ancients, in honour of the god Confus, *i. e.* Neptune; different from thofe other feafts of the fame deity called Neptunalia. They were introduced with a magnificent cavalcade, or

proceſſion on horſeback; becauſe Neptune was reputed to have firſt taught men the uſe of horſes. Evander is ſaid to have firſt inſtituted this feaſt: it was re-eſtabliſhed by Romulus, under the name of *Conſus*; becauſe it was ſome god under the denomination of Conſus that ſuggeſted to him the rape of the Sabines. It is ſaid, that it was with a view to this rape that he made that eſtabliſhment. This, however, is certain, that it was to this feaſt all his neighbours were invited; when, taking advantage of the ſolemnities and ſacrifices, he ſeized the women. The conſualia were of the number of feaſts called ſacred; as being conſecrated to a divinity.—Originally they were not diſtinguiſhed from thoſe of the Circus: whence it is, that Valerius Maximus ſays, that the rape of the Sabines was effected at the games of the Circus.

Plutarch obſerves, that during the days of this ſolemnity, horſes and aſſes were left at reſt, and were dreſſed up with crowns, &c. on account of its being the feaſt of Neptunus Equeſtris.—Feſtus ſays, the cavalcade was performed with mules; it being an opinion, that this was the firſt animal uſed to draw the car. Servius gives us to underſtand, that the conſualia fell on the 13th of Auguſt; Plutarch, in the life of Romulus, places them on the 18th, and the old Roman calendar on the 21ſt of that month.

CONSUBSTANTIAL, in theology, a term of like import with co-eſſential; denoting ſomething of the ſame ſubſtance with another. The orthodox believe the Son of God to be conſubſtantial with the Father. The term *conſubſtantial* was firſt adopted by the fathers of the councils of Antioch and Nice, to expreſs the orthodox doctrine the more preciſely, and to ſerve as a barrier and precaution againſt the errors and ſubtleties of the Arians; who owned every thing except the conſubſtantiality.

CONSUBSTANTIATION, a tenet of the Lutheran church with regard to the manner of the change made in the bread and wine in the euchariſt. The divines of that profeſſion maintain that after the conſecration, the body and blood of our Saviour are ſubſtantially preſent, together with the ſubſtance of the bread and wine, which is called conſubſtantiation, or impanation.

CONSUL, the chief magiſtrate of the Roman commonwealth, inveſted with regal authority for the ſpace of one year. They were two in number, called conſuls *à conſulendo*, and annually choſen in the Campus Martius. The two firſt conſuls were L. Jun. Brutus, and L. Tarquinius Collatinus, choſen in the year of Rome 244, after the expulſion of the Tarquins. In the firſt times of the republic the two conſuls were always choſen from Patrician families or noblemen, but the people obtained the privilege in the year of Rome 388, of electing one of the conſuls from their own body, and ſometimes both were plebeians. The firſt conſul among the plebeians was L. Sextius. It was required that every candidate for the conſulſhip ſhould be 43 years of age, called *legitimum tempus*. He was always to appear at the election as a private man without a retinue, and it was requiſite before he canvaſſed for the office to have diſcharged the functions of quæſtor, edile, and prætor. Sometimes theſe qualifications were diſregarded. Val. Corvinus was made a conſul in his 23d year, and Scipio in his 24th. Young Marius, Pompey, and Auguſtus, were alſo under the proper age when they were inveſted with the office, and Pompey had never been quæſtor or prætor. The power of the conſuls was unbounded, and they knew no ſuperior but the gods and the laws; but after the expiration of their office their conduct was minutely ſcrutinized by the people, and miſbehaviour was often puniſhed by the laws. The badge of their office was the *prætexta*, a robe fringed with purple, afterwards exchanged for the *toga picta* or *palmata*. They were preceded by 12 lictors carrying the *faſces* or bundles of ſticks, in the middle of which appeared an axe. The axe, as being the characteriſtic rather of tyranny than of freedom, was taken away from the *faſces* by Valerius Poplicola, but it was reſtored by his ſucceſſor. They took it by turns monthly to be preceded by the lictors while at Rome, leſt the appearance of two perſons with the badges of royal authority ſhould raiſe apprehenſions in the multitude. While one appeared publicly in ſtate, only a crier walked before the other, and the lictors followed behind without the faſces. Their authority was equal; yet the Valerian law gave the right of priority to the older, and the Julian law to him who had moſt children; and he was generally called *conſul major* or *prior*. As their power was abſolute, they preſided over the ſenate, and could convene and diſmiſs it at pleaſure. The ſenators were their counſellors; and among the Romans the manner of reckoning their years was by the name of the conſuls, as by *M. Tull. Cicerone et L. Antonio Conſulibus*, for inſtance, the year of Rome 689 was always underſtood. This cuſtom laſted from the year of Rome 244 till the 1294th, or 541ſt of the Chriſtian era. In public aſſemblies the conſuls ſat in ivory chairs, and held in their hand an ivory wand called *ſcipio eburneus*, which had an eagle on its top as a ſign of dignity and power. The office of conſul, ſo dignified during the times of the commonwealth, became a mere title under the emperors, and retained nothing of its authority but the uſeleſs enſigns of original dignity. Even the dignity of the office, which was originally annual, was reduced to two or three months by J. Cæſar; but they who were admitted on the firſt of January denominated the year, and were called *ordinarii*. Their ſucceſſors during the year were diſtinguiſhed by the name of *ſuffecti*. Tiberius and Claudius abridged the time of the conſulſhip; and the emperor Commodus made no leſs than 25 conſuls in one year. Conſtantine the Great renewed the original inſtitution, and permitted them to be a whole year in office.

Consul, at preſent, is an officer eſtabliſhed by virtue of a commiſſion from the king and other princes, in all foreign countries of any conſiderable trade, to facilitate and diſpatch buſineſs, and protect the merchants of the nation. The conſuls are to keep up a correſpondence with the miniſters of England reſiding in the courts whereon their conſulate depends. They are to ſupport the commerce and the intereſt of the nation, to diſpoſe of the ſums given and the preſents made to the lords and principals of places, to obtain their protection, and prevent the inſults of the natives on the merchants of the nation.

CONSUMMATION, the end, period, or completion of any work. Thus, we ſay, the *conſummation* of all things, meaning the end of the world. By the incarnation, all the prophecies are ſaid to be *conſummated*. See Prophecy, and Accomplishment.

Consummation *of Marriage*, denotes the laſt act of marriage, which makes its accompliſhment; or the moſt intimate union between the married pair.

CONSUMPTION, in medicine, a word of very extenſive ſignification, implies all diſorders that bring any decay or waſte upon the body; but is moſt commonly uſed for the *phthiſis pulmonalis*. See Medicine.

Consumption, in farriery. See Farriery.

CONSUS, the pagan god of counſel. He had an altar under ground in the great circus at Rome, to ſhow that counſel ought to be kept ſecret. See Consualia.

CONTACT, is when one line, plane, or body, is made to touch another; and the parts that do thus touch are called the *points* or *places of contact*.

CONTAGION, in phyſic, the communicating a diſeaſe from one body to another. In ſome diſeaſes it is only effected by an immediate contact or touch, as the virus of the venereal diſeaſe; in others conveyed through the air by means of effluvia from the bodies of the ſick, as in the ſmall-pox, the plague, and other peſtilential diſorders.

CONTEMPORARY, or COTEMPORARY, a perfon or thing that exifted in the fame age with another. Thus, Socrates, Plato, and Ariftophanes, were contemporaries.

CONTEMPT, in law, is a difobedience to the rules and orders of a court, which hath power to punifh fuch offence; and as this is fometimes a greater, and fometimes a leffer offence, fo it is punifhed with greater or lefs punifhment, by fine, and fometimes by imprifonment.

CONTENT, in geometry, the area or quantity of matter or fpace included in certain bounds.

CONTESSA, a port-town of Turkey in Europe, in the province of Macedonia, fituated on a bay of the Archipelago, about 200 miles weft of Conftantinople. E. long. 25. 0. N. lat. 41. 0.

CONTEXT, among divines and critics, that part of fcripture or other writing which lies about the text, before or after it, or both. To take the full and genuine fenfe of the text, the context fhould be regarded.

CONTEXTURE, a word frequently ufed in fpeaking both of the works of nature and art; and denoting the difpofition and union of the conftituent parts with refpect to one another.

CONTI, a town of France, in the department of Somme, and late province of Picardy. It gave the title of prince to one of the branches of the laft royal family of France. It is feated on the river Seille, 14 miles S. W. of Amiens, and 62 N. of Paris. E. lon. 2. 13. N. lat. 49. 42.

CONTIGUITY, in geometry, is when the furface of one body touches that of another.

CONTINENCE, in ethics, a moral virtue, by which we refift concupifcence. It fhould feem that there is this diftinction between chaftity and continence, in that it requires no effort to be chafte, which refults from conftitution; whereas continence appears to be the confequence of a victory gained over ourfelves. The verb *continere*, in the Latin, fignifies "to reftrain." The term, however, is moft ufually applied to men; as *chaftity* is to women.

CONTINENT, in geography, a great extent of land not interrupted by feas, in contradiftinction to ifland and peninfula, &c. See GEOGRAPHY.—Sicily is faid to have been anciently torn from the continent of Italy; and it is an old tradition, which fome of our antiquaries ftill have a regard to, that Britain was formerly a part of the continent of France. The world is ufually divided into two great continents, the old and new. Whether there exifts in the fouthern hemifphere another continent, or the whole be only an immenfe watery region, is a queftion that for near three centuries has engaged the attention of the learned as well as the commercial world, and given rife to many interefting voyages and difcoveries.

CONTINGENT, fomething cafual or unufual. Hence future contingent, denotes a conditional event which may or may not happen, according as circumftances fall out. CONTINGENT is alfo a term of relation for the quota that falls to any perfon upon a divifion. Thus each prince of Germany in time of war is to furnifh fo many men, fo much money, and ammunition, for his contingent.

CONTINUED, or CONTINUAL, in a general fenfe, means inceffant, or proceeding without interruption. Thus a CONTINUED *Fever* is fuch a one as fometimes remits, but never intermits or goes entirely off till its period.

CONTINUED *Bafs*, in mufic, thus called, fays Rouffeau, becaufe it is continued through the whole piece. Its principal ufe, befides that of regulating the harmony, is to fupport the voice and preferve the tone. They pretend that it was one Ludovico Viana, of whom a treatife ftill remains, who towards the end of the laft century firft put the continued bafs in practice.

CONTINUED *Proportion*, in arithmetic, is that where the confequent of the firft ratio is the fame with the antecedent of the fecond; as 4 : 8 : : 8 : 16; in contradiftinction to difcrete proportion.

CONTINUITY, is defined by fome fchoolmen the immediate cohefion of parts in the fame quantum; by others, a mode of a body, whereby its extremities become one; and by others, a ftate of body refulting from the mutual implication of its parts. There are two kinds of continuity, mathematical and phyfical. The firft is merely imaginary, fince it fuppofes real or phyfical parts where there are none. The other, or phyfical continuity, is that ftate of two or more particles, in which their parts are fo mutually implicated as to conftitute one uninterrupted quantity or continuum.

CONTINUO, in mufic, fignifies the thorough bafs, as *baffo continuo* is the continual or thorough bafs, which is fometimes marked in mufic-books by the letters B. C.

CONTOBABDITES, a fect in the fixth century. Their firft leader was Severus of Antioch; who was fucceeded by John the grammarian furnamed Philoponus, and one Theodofius whofe followers were alfo called *Theodofians*. Part of them, who were willing to receive a book compofed by Theodofius on the Trinity, made a feparate body, and were called *Contobabdites*, from fome place, which Nicephorus does not mention, but which muft apparently have been the place where they held their affemblies. The Contobabdites allowed of no bifhops; which is the only circumftance given us concerning them.

CONTOR, CONDOR, or CUNDUR, the American name of a fpecies of VULTUR.

CONTORSION, in general, fignifies the action of twifting or wrefting a member of the body out of its natural fituation. Rope-dancers accuftom themfelves to contorfions of their limbs from their youth, to render the fibres of their articulations lax, and fupple to all kinds of poftures.

CONTORSION, in medicine, has many fignifications. 1. It denotes the iliac paffion. 2. An incomplete diflocation, when a bone is in part, but not entirely, forced from its articulation. 3. A diflocation of the vertebræ of the back fide-ways, or a crookednefs of thefe vertebræ. And, 4. A diforder of the head, in which it is drawn to one fide, either by a fpafmodic contraction of the mufcles on the fame fide, or a palfy of the antagonift mufcles on the other.

CONTORTÆ, the name of the 30th order in Linnæus's Fragments of a natural method, confifting of plants which have a fingle petal that is twifted or bent on one fide. This order contains the following genera, viz. echites, gardenia, genipa, microcnemum, nerium, periploca, rawolfia, tabernæmontana, vinca, apocynum, afclepias, comeraria, ceropegia, cynanchum, plumeria, ftapelia.

CONTOUR, in painting, the outline, or that which defines a figure. A great part of the fkill of the painter lies in managing the contours well. Contour, with the Italian painters, fignifies the lineaments of the face.

CONTOURNE, in heraldry, is ufed when a beaft is reprefented ftanding or running with its face to the finifter fide of the efcutcheon, they being always fuppofed to look to the right, if not otherwife expreffed.

CONTOURNIATED, a term among antiquaries applied to medals, the edges of which appear as if turned in a lathe. This fort of work feems to have had its origin in Greece; and to have been defigned to perpetuate the memory of great men, particularly thofe who had borne away the prize at the folemn games. Such are thofe remaining of Homer, Solon, Euclid, Pythagoras, Socrates, and feveral athletæ.

CONTRABAND, in commerce, a prohibited commodity, or merchandife bought or fold, imported or exported, in pre-

judice to the laws and ordinances of a ſtate, or the public prohibitions of the ſovereign. Contraband goods are not only liable to confiſcation themſelves, but alſo ſubject all other allowed merchandiſe found with them in the ſame box, bale, or parcel, together with the horſes, waggons, &c. which conduct them. There are contrabands likewiſe, which, beſides the forfeiture of the goods, are attended with ſeveral penalties and diſabilities.

CONTRACT, in a general ſenſe, a mutual conſent of two or more parties, who voluntarily promiſe and oblige themſelves to do ſomething, pay a certain ſum, or the like. All donations, exchanges, leaſes, &c. are ſo many different contracts. Thoſe contracts are ſaid to be *null* which the law prohibits the making of; ſuch are all contracts between perſons incapable of contracting, as minors, religious; lunatics, wives with conſent of their huſbands, &c.

Contract is particularly uſed in common law, for an agreement or covenant between two, with a lawful conſideration or cauſe. As, if I ſell my horſe for money; or covenant, in conſideration of 20l. to make you a leaſe of a farm; theſe are good contracts, becauſe there is *quid pro quo*.

Uſurious Contract, is a contract to pay more intereſt for money than the laws allow. See Usury.

Contract is alſo uſed for the inſtrument in writing, which ſerves as a proof of the conſent granted, and the obligation paſſed between the parties. Among the ancient Romans, contracts, and all voluntary acts, were written, either by the parties themſelves, or by one of the witneſſes, or by a domeſtic ſecretary of one of the parties, whom they called a *notary*, but who was no public perſon as among us. The contract, when finiſhed, was carried to the magiſtrate, who gave it a public authority by receiving it *inter acta*, into the number of acts under his juriſdiction; giving each of the parties a copy thereof, tranſcribed by his clerks or domeſtic regiſters, and ſealed with his ſeal; which practice paſſed into France, where it obtained a long time.

CONTRACTILE force, that property or power inherent in certain bodies, whereby, when extended, they are enabled to draw themſelves up again to their former dimenſions.

CONTRACTION, in phyſics, the diminiſhing the extent or dimenſions of a body, or the cauſing its parts to approach nearer to each other; in which ſenſe it ſtands oppoſed to dilatation or expanſion.

Contraction is frequently uſed by anatomical writers, to expreſs the ſhrinking up of a fibre, or an aſſemblage of fibres, when extended. Convulſions and ſpaſms proceed from a preternatural contraction of the fibres of the muſcles of the part convulſed.

Contraction, in grammar, is the reducing of two ſyllables into one, as *can't* for *cannot*, *ſhould'ſt* for *ſhouldeſt*, &c.

CONTRADICTION, a ſpecies of direct oppoſition, wherein one thing is found diametrically oppoſite to another.

CONTRADICTORY propositions, are oppoſites, one of which imports a mere and naked denial of the other. Seeming contradictories is when the members of a period quite diſagree in appearance and ſound, but perfectly agree and are conſiſtent in ſenſe: thus, Shakeſpear ſays,

"Cowards die many times before their death:
"The valiant never taſte of death but once."

CONTRAFISSURE, in ſurgery, a kind of fracture, or fiſſure, in the cranium, which ſometimes happens on the ſide oppoſite to that which received the blow, or, at leaſt, at ſome diſtance from it.

CONTRAINDICATION, in medicine, is an indication which forbids that to be done which the main ſcope of a diſeaſe points out. Suppoſe, *e. g.* in the cure of a diſeaſe a vomit were judged proper; if the patient be ſubject to a vomiting of blood, it is a ſufficient contraindication as to its exhibition.

CONTRARIETY, an oppoſition between two things, which imports their being contrary to one another; and conſiſts in this, that one of the terms implies a negation of the other, either mediately or immediately; ſo that contrariety may be ſaid to be the contraſt, or oppoſition of two things, one of which imports the abſence of the other, as love and hatred.

CONTRAST, oppoſition or diſſimilitude of figures, by which one contributes to the viſibility or effect of the others. See Resemblance.

Contrast, in painting and ſculpture, expreſſes an oppoſition or difference of poſition, attitude, &c. of two or more figures, contrived to make a variety in a painting, &c. as where in a groupe of three figures, one is ſhown before, another behind, and another ſide-ways, they are ſaid to be in contraſt. The contraſt is not only to be obſerved in the poſition of figures, but alſo in that of the ſeveral members of the ſame figure: thus, if the right arm advance fartheſt, the right leg is to be hindermoſt; if the eye be directed one way, the arm to go the contrary way, &c. The contraſt muſt be purſued even in the drapery.

Contrast, in architecture, is to avoid the repetition of the ſame thing, in order to pleaſe by variety.

CONTRATE-wheel, in watch-work, that next to the crown, the teeth and hoop whereof lie contrary to thoſe of the other wheels, from whence it takes its name. See Watch-*Making*.

CONTRAVALLATION, or *the Line of* Contravallation, in fortification, a trench guarded with a parapet, and uſually cut round about a place by the beſiegers, to ſecure themſelves on that ſide, and to ſtop the ſallies of the garriſon. See Fortification.

CONTRAVENTION, in law, a man's failing to diſcharge his word, obligation, duty, or the laws or cuſtoms of the place.

CONTRAYERVA, in botany. See Dorstenia.

CONTRE, in heraldry, an appellation given to ſeveral bearings, on account of their cutting the ſhield contrary and oppoſite ways: thus we meet with contre-bend, contre-chevron, contre-pale, &c. when there are two ordinaries of the ſame nature to each other, ſo as colour may be oppoſed to metal, and metal to colour.

CONTRIBUTION, the payment of each perſon's quota of the part he is to bear in ſome impoſition, or common expence. See Contingent, &c.—Contributions are either involuntary, as thoſe of taxes and impoſts; or voluntary, as thoſe of expences for carrying on ſome undertaking for the intereſt of the community.

Contributions, in a military ſenſe, are impoſitions paid by frontier countries to ſecure themſelves from being plundered, and ruined by the enemy's army. The peaſants till their ground under the faith of contributions, as ſecurely as in time of profound peace.

CONTRITION, in theology, a ſorrow for our ſins, reſulting from the reflection of having offended God, from the ſole conſideration of his goodneſs, without any regard to the puniſhment due to the treſpaſs, and attended with a ſincere reſolution of reforming them. The word is derived from the Latin *conterere*, to break or bruiſe.

CONTROL, is properly a double regiſter kept of acts, iſſues, &c. of the officers of commiſſioners in the revenue, army, &c. in order to perceive the true ſtate thereof, and to certify the truth, and the due keeping of the acts ſubject to the enregiſterment.

CONTROLLER, or COMPTROLLER, an officer appointed to control or overfee the accounts of other officers; and, on occafion, to certify whether or no things have been controlled or examined. In Britain we have feveral officers of this name; as controller of the cuftoms, controller of the mint, &c.

CONTROLLER *of the Hanaper*, an officer that attends the lord chancellor daily, in term and in feal-time, to take all things fealed in leathern bags from the clerks of the hanaper, and to make the number and effect thereof, and enter them in a book, with all the duties belonging to the king and other officers for the fame, and fo charge the clerk of the hanaper with them.

CONTROLLER *of the Houfehold*, the fecond officer under the lord fteward. The name of his office comes from the French word *contrerouler*. His office is to control the accounts and reckonings of the Green Cloth, of which board he is always a member. He carries a white ftaff, and is always one of the privy council. He has 107l. 17s. 6d. a-year falary, and 1092l. 2s. 6d. board-wages.

CONTROLLER *of the pipe*, an officer of the exchequer that makes out a fummons twice every year, to levy the farms and debts of the pipe. See PIPE and EXCHEQUER.

CONTROLLERS *of the Pells*, two officers of the exchequer, who are the chamberlain's clerks, and keep a control of the pell of the receipts, and goings out.

CONTUMACY, in law, a refufal to appear in court when legally fummoned, or the difobedience to the rules and orders of a court having power to punifh fuch offence.

CONTUSION, in furgery, any hurt of the body that is inflicted by a blunt inftrument. See SURGERY.

CONVALESCENCE, in medicine, the infenfible recovery of health; or that ftate in which, after the cure of a diforder, the body which has been reduced has not yet regained its vigour, but begins to refume its powers. Proper aliments conduce to the re-eftablifhment of the languid faculties; but as the tone of the bowels is weakened, the digeftive faculty is not equal to its office, which is fhown by light fweats over the whole body; and the fmalleft excefs in this refpect is oftentimes the occafion of dangerous relapfes.

CONVALLARIA, or LILY OF THE VALLEY, in botany, a genus of the monogynia order, belonging to the hexandria clafs of plants; and in the natural method ranking under *Sarmentaceæ*, or 11th order. The corolla is fexfid; the berry fpotted and trilocular. The fpecies are eight, three of which are natives of Britain, viz. the maialis, or may-lily; the multiflora, or folomon's-feal. They are plants of confiderable beauty, and may be eafily propagated by their creeping roots.

CONVENTICLE, a diminutive of convent; denoting properly a cabal, or fecret affembly, of a part of the monks of a convent, to make a brigue or party in the election of an abbot. From the ill ufe of thefe affemblies, the word is come into difrepute; and now ftands for any mifchievous, feditious, or irregular affembly. F. Doucine obferves, the occidentals always efteemed the fifth general council an unlawful conventicle. The term conventicle is faid, by fome, to have been firft applied in England to the fchools of Wickliffe, and has been fince ufed to fignify the religious affemblies of all in that country who do not conform to the eftablifhed doctrines and worfhip of the church of England.

By 22 Car. II. cap. 1. it is enacted, That if any perfons of the age of 16 years, fubjects of this kingdom, fhall be prefent at any conventicle, where there are five or more affembled, they fhall be fined 5s. for the firft offence, and 10s. for the fecond: and perfons preaching incur a penalty of 20l. Alfo fuffering a meeting to be held in a houfe, &c. is liable to 20l. penalty. Juftices of the peace have power to enter fuch houfes, and feize perfons affembled, &c. And if they neglect their duty, they fhall forfeit 100l. And if any conftable, &c. know of fuch meetings, and do not inform a juftice of peace, or chief magiftrate, &c. he fhall forfeit 5l. But the 1ft W. and M. cap. 18. ordains, that proteftant diffenters fhall be exempt from penalties: though if they meet in a houfe with the doors locked, barred, or bolted, fuch diffenters fhall have no benefit from 1 W. and M. Officers of the government, &c. prefent at any conventicle, at which there fhall be ten perfons, if the royal family be not prayed for in exprefs words, fhall forfeit 40l. and be difabled: Stat. 10 Anne, cap. 2.

CONVENTION, a treaty, contract, or agreement between two or more parties.

CONVENTION is alfo a name given to an extraordinary affembly of parliament, or the eftates of the realm, held without the king's writ. Of this kind was the convention parliament which reftored Charles II. This parliament met above a month before his return, and fat full feven months after his reftoration, and enacted feveral laws ftill in force, which were confirmed by ftat. 13 Car. II. c. 7. and c. 14. Such alfo was the convention of eftates in 1688, who, upon the retreat of king James II. came to a conclufion that he had abdicated the throne, and that the right of fucceffion devolved to king William and queen Mary; whereupon their affembly expired as a convention, and was converted into a parliament.

CONVENTION *of Eftates*, in Scotland, was partly of the nature of a parliament; but differing in this, that the former could only lay on taxes, while parliament could both impofe taxes and make laws.

CONVENTUAL, fomething belonging to a convent or monaftery. See MONASTERY, and COENOBITE.

CONVENTUAL is particularly ufed for a religious who actually refides in a convent; in contradiftinction to thofe who are only guefts, or are entertained there, or in poffeffion of benefices depending on the houfe. See MONK.

CONVENTUS JURIDICI, were courts of juftice eftablifhed in the Roman provinces; with a refort or extent of jurifdiction, circumfcribed and confined within certain limits of diftrict, whither all who were of the refort were to repair for juftice. The unfeafonable affectation of changing forms of war into forms of civil courts, proved the ruin of Varus and of three legions in Germany (Florus). *Conventum agere*, is to hold a court of juftice.

CONVERGING or CONVERGENT *Lines*, in geometry, are fuch as continually approach nearer one another, or whofe diftances become ftill lefs and lefs. Thefe are oppofed to divergent lines, the diftances of which become continually greater: thofe lines which converge one way, diverge the other.

CONVERGING *Rays*, in optics, thofe rays that, iffuing from divers points of an object, incline towards another, till at laft they meet and crofs, and then become diverging rays.

CONVERSE, in mathematics. One propofition is called the *converfe* of another, when after a conclufion is drawn from fomething fuppofed in the converfe propofition, that conclufion is fuppofed; and then, that which in the other was fuppofed, is now drawn as a conclufion from it: thus, when two fides of a triangle are equal, the angles under thefe fides are equal; and, on the converfe, if thefe angles are equal, the two fides are equal.

CONVERSION, in a moral fenfe, implies a repentance for a temper and conduct unworthy our nature, and unbecoming our obligations to its Author, and a refolution to act a wifer and a better part for the future.

CONVERSION, in war, a military motion, whereby the front of the battalion is turned where the flank was, in cafe the battalion is attacked in the flank.

CONVERSION *of Equations*, the fame with reduction of equations by multiplication. See ALGEBRA.

CONVERT, a perfon who has undergone a converfion. This term is chiefly ufed in refpect of changes from one religion, or fect, to another. Converts with relation to the religion turned to, are denominated *apoftates* with regard to that they have relinquifhed. The Jews formerly converted to Chriftianity in England, were called *converfos*. Henry III. built them a houfe in London, and allowed them a competent fubfiftence for their lives; which houfe was called *domus converforum*. But the number afterwards increafing, they grew a burthen to the crown; upon which they were diftributed among the monafteries: and after the expulfion of the Jews under Edward III. the *domus converforum* was given for keeping of the rolls.

Converts, in a monaftic fenfe, are lay-friars, or brothers, admitted for the fervice of the houfe; without orders, and not allowed to fing in the choir. Till the eleventh century, the word was ufed for perfons who embraced the monkifh life at the age of difcretion: by which they were diftinguifhed from thofe devoted in their childhood by their parents, called *oblati*. But in the eleventh century, when they began to receive into monafteries illiterate perfons, incapable of being clerks, and only deftined for bodily labour, the fignification of the word was neceffarily changed. F. Mabillon obferves, that it was John firft abbot of Vallombrofa who firft introduced thefe brother-converts, diftinguifhed by their ftate from the monks of the choir, who were then either clerks or capable of becoming fo.

CONVEX, an appellation given to the exterior furface of gibbous or globular bodies; in oppofition to the hollow inner furface of fuch bodies, which is called *concave*; thus we fay, a convex frieze, lens, mirror, fuperficies, &c.

CONVEXITY, the exterior furface of a convex, *i. e.* gibbous and globular thing; in oppofition to concavity, or the inner furface, which is hollow or depreffed. A convex mirror reprefents its images fmaller than the objects; as a concave one reprefents them larger: a convex mirror reflects the rays from it, diverging; and therefore difperfes and weakens their effect: as a concave one reflects them converging; fo as they concur in a point, and have their effect increafed: and by how much the mirror is a portion of a fmaller fphere, by fo much does it diminifh the objects, and difperfe the rays the more. See Mirror. A convex lens is either convex on both fides, called a *convexo-convex*; or it is plain on one fide and convex on the other, called a *plano-convex*; or concave on one fide and convex on the other, called a *convexo-concave*, or *concavo-convex*, as the one or the other furface prevails, *i. e.* as this or that is a portion of a fmaller fphere. All convex lenfes inflect the rays of light in their paffage, *i. e.* fend them out from their convex furface converging, fo as they concur in a point or focus. Hence all convex lenfes magnify, *i. e.* reprefent their images larger than their objects; and this the more as they are portions of fmaller fpheres.

CONVEYANCE, in law, a deed or inftrument that paffes land, &c. from one perfon to another.

CONVICT, in common law, a perfon that is found guilty of an offence by the verdict of a jury. See the following article.

CONVICTION, in law. When a jury has given a verdict upon trial, finding the prifoner guilty, he is faid to be *convicted* of the crime whereof he ftands indicted. See Trial. When the offender is thus convicted, there are two collateral circumftances that immediately arife. 1. On a conviction in general for any felony, the reafonable expences of profecution are by ftatute 25 Geo. II. c. 36. to be allowed the profecutor out of the county-ftock, if he petitions the judge for that purpofe; and by ftatute 27 Geo. II. c. 3. poor perfons, bound over to give evidence, are likewife entitled to be paid their charges, as well without conviction as with it. 2. On a conviction of larceny in particular, the profecutor fhall have reftitution of his goods by virtue of the ftatute 21 Hen. VIII. c. 11. For by the common law there was no reftitution of goods upon an indictment; becaufe it is at the fuit of the king only; and therefore the party was enforced to bring an appeal of robbery, in order to have his goods again. But, it being confidered that the party profecuting the offender by indictment, deferves to the full as much encouragement as he who profecutes by appeal, this ftatute was made, which enacts, that if any perfon be convicted of larceny by the evidence of the party robbed, he fhall have full reftitution of his money, goods, and chattels, or the value of them out of the offender's goods, if he has any, by a writ to be granted by the juftices. And the conftruction of this act having been in a great meafure conformable to the law of appeals, it has therefore in practice fuperfeded the ufe of appeals in larceny. For inftance, as formerly upon appeals, fo now upon indictments of larceny, this writ of reftitution fhall reach the goods fo ftolen, notwithftanding the property of them is endeavoured to be altered by fale in market overt. And though this may feem fomewhat hard upon the buyer, yet the rule of the law is, that *fpoliatus debet ante omnia reftitui*, efpecially when he has ufed all the diligence in his power to convict the felon. And, fince the cafe is reduced to this hard neceffity, that either the owner or the buyer muft fuffer; the law prefers the right to the owner, who has done a meritorious act by purfuing a felon to condign punifhment, to the right of the buyer, whofe merit is only negative, that he has been guilty of no unfair tranfaction. And it is now ufual for the court, upon the conviction of a felon, to order, without any writ, immediate reftitution of fuch goods as are brought into court, to be made to the feveral profecutors. Or elfe, fecondly, without fuch writ of reftitution, the party may peaceably retake his goods wherever he happens to find them, unlefs a new property be fairly acquired therein. Or, laftly, if the felon be convicted and pardoned, or be allowed his clergy, the party robbed may bring his action of trover againft him for his goods, and recover a fatisfaction in damages. But fuch action lies not before profecution; for fo felonies would be made up and healed: and alfo recaption is unlawful, if it be done with intention to fmother and compound the larceny; it then becoming the heinous offence of *theft-bote*.

It is not uncommon, when a perfon is convicted of a mifdemeanour, which principally and more immediately affects fome individual, as a battery, imprifonment, or the like, for the court to permit the defendant to *fpeak with the profecutor*, before any judgement is pronounced; and if the profecutor declares himfelf fatisfied, to inflict but a trivial punifhment. This is done to reimburfe the profecutor his expences, and make him fome private amends, without the trouble and circuity of a civil action.

Conviction, in theology, expreffes the firft degree of repentance, wherein the finner becomes fenfible of his guilt, of the evil nature of fin, and of the danger of his own ways.

CONVOCATION, an affembly of the clergy of England, by their reprefentatives, to confult of ecclefiaftical matters. It is held during the feffion of parliament, and confifts of an upper and a lower houfe. In the upper fit the bifhops, and in the lower the inferior clergy, who are reprefented by their proctors; confifting of all the deans and archdeacons, of one proctor for every chapter, and two for the clergy of every dioecefe, in all 143 divines; *viz.* 22 deans, 53 archdeacons, 24 prebendaries, and 44 proctors of the dioecefan clergy. The lower houfe choofes its prolocutor; whofe bufinefs it is to take care that the members attend, to collect their debates and votes, and to carry their refolutions to the upper houfe. The convocation is fummoned by the king's writ, directed to the archbifhop of each province, requiring him to fummon all bifhops, deans, archdeacons, &c. The power of the convocation is limited by a

ſtatute of Henry VIII. They are not to make any canons or eccleſiaſtical laws without the king's licence; nor, when permitted to make any, can they put them in execution, but under ſeveral reſtrictions. They have the examining and cenſuring all heretical and ſchiſmatical books and perſons, &c. but there lies an appeal to the king in chancery, or to his delegates. The clergy in convocation, and their ſervants, have the ſame privileges as members of parliament. Since the year 1665, when the convocation of the clergy gave up the privilege of taxing themſelves to the houſe of commons, they ſeldom have been allowed to do any buſineſs; and are generally prorogued from time to time till diſſolved, a new one being generally called along with a new parliament. The only equivalent for giving up the privilege of taxing themſelves, was their being allowed to vote at elections for members to the houſe of commons, which they had not before.

CONVOLUTION, a winding motion, proper to the trunks of ſome plants, as the convolvulus, or bind-weed; the claſpers of vines, bryony, &c.

CONVOLVULUS, BIND-WEED; a genus of the pentandria order, belonging to the monogynia claſs of plants; and in the natural method ranking under the 29th order, *Campanaceæ*. The corolla is campanulated and plaited; there are two ſtigmata; the capſule is bilocular, and the cells are diſpermous.

Of this genus there are a great number of ſpecies; the moſt remarkable of which are the following: 1. The *ſepium*, or large white bind-weed, is often a troubleſome weed in gardens, when its roots are interwoven with thoſe of trees and ſhrubs, or under hedges, as every ſmall piece of root is apt to grow. It flouriſhes under moiſt hedges, and hath white or purpliſh bloſſoms. 2. The *ſcammonia*, or Syrian bind-weed, grows naturally in Syria. The roots are thick, run deep into the ground, and are covered with a dark bark. The branches extend on every ſide to the diſtance of 10 or 12 feet: they are ſlender, and trail on the ground, and are garniſhed with narrow, arrow-pointed leaves. The flowers are of a pale yellow, and come out from the ſide of the branches, two ſitting upon each long footſtalk: theſe are ſucceeded by roundiſh ſeed-veſſels, having three cells filled with ſeeds. 3. The *purpureus*, or convolvulus major, is an annual plant growing naturally in Aſia and America, but has been long cultivated in the Britiſh gardens. If theſe plants are properly ſupported, they will riſe 10 or 12 feet high in warm ſummers. There are three or four laſting varieties: the moſt common hath a purple flower: the others have a white, a red, or a whitiſh-blue flower, which laſt hath white ſeeds. They flower in June, July, and Auguſt, and their ſeeds ripen in autumn. 4. The *nil*, or blue bind-weed, riſes with a twining ſtalk 8 or 10 feet high, garniſhed with heart-ſhaped leaves, divided into three lobes, which end in ſharp points. Theſe are woolly, and ſtand upon long foot-ſtalks. The flowers alſo come out on long foot-ſtalks, each ſuſtaining two flowers of a very deep blue colour, whence their name of nil or indigo. This is one of the moſt beautiful plants of the genus: it flowers all the latter part of the ſummer; and in good ſeaſons the ſeeds ripen very well in the open air. 5. The *battatas*, or Spaniſh potato, hath eſculent roots, which are annually imported from Spain and Portugal, where they are greatly cultivated for the table; but they are too tender to thrive in the open air in Britain. Their roots are like the common potato, but require much more room: for they ſend out many trailing ſtalks, which extend ſix or eight feet every way; and at their joints ſend out roots which in warm countries grow to be very large bulbs; ſo that from a ſingle root planted 40 or 50 large potatos are produced. 6. The *canarienſis*, with ſoft woolly leaves, is a native of the Canaries; but hath long been preſerved in the Britiſh gardens. It hath a ſtrong fibrous root, from whence ariſe ſeveral twining woody ſtalks, which, where they have ſupport, will grow more than 20 feet high, garniſhed with oblong heart-ſhaped leaves, which are ſoft and hairy. The flowers are produced from the wings of the leaves, ſeveral ſtanding upon one footſtalk. They are for the moſt part of a pale blue; but there is a variety with white flowers. They appear in June, July, and Auguſt, and ſometimes ripen ſeeds here. 7. The *tricolor*, or convolvulus minor, is a native of Portugal; but hath long been cultivated in the gardens of this country. It is an annual plant, which hath ſeveral thick herbaceous ſtalks growing about two feet long, which do not twine like the other ſorts, but decline towards the ground, upon which many of the lower branches lie proſtrate: they are garniſhed with ſpear-ſhaped leaves, which ſit cloſe to the branches: the footſtalks of the flowers come out juſt above the leaves of the ſame joint, and at the ſame ſide of the ſtalks. They are about two inches long, each ſuſtaining one large open bell-ſhaped flower, which, in ſome, is of a fine blue colour with a white bottom; in others they are pure white, and ſome are beautifully variegated with both colours. The white flowers are ſucceeded by white ſeeds, and the blue by dark-coloured ſeeds: which difference is pretty conſtant. 8. The *ſoldanella*, or ſea-bind-weed, ſtyled alſo *braſſica marina*, grows naturally on the ſea-beaches in many parts of England, but cannot be long preſerved in gardens. It hath many ſmall white ſtringy roots, which ſpread wide and ſend out ſeveral weak trailing branches. Theſe twine about the neighbouring plants like thoſe of the common bind-weed, garniſhed with kidney-ſhaped leaves like thoſe of the leſſer celandine. The flowers are produced on the ſide of the branches at each joint. They are of a reddiſh purple colour, and appear in July. They are ſucceeded by round capſules, having three cells, each containing one black ſeed. 9. The *turpethum* is a native of the iſland of Ceylon. This hath fleſhy thick roots which ſpread far in the ground, and abound with a milky juice that flows out when the roots are broken or wounded, and ſoon hardens into a reſinous ſubſtance when expoſed to the ſun and air. From the root ſhoot forth many twining branches, which twiſt about each other, or the neighbouring plants, like the common bind-weed. They are garniſhed with heart-ſhaped leaves that are ſoft to the touch, like thoſe of the marſhmallow. The flowers are produced at the joints on the ſide of the ſtalks, ſeveral ſtanding together on the ſame footſtalk; they are white, and ſhaped like thoſe of the common great bind-weed, and are ſucceeded by round capſules, having three cells containing two ſeeds each. 10. The *jalappa*, or jalap, uſed in medicine, is a native of Aleppo in Spaniſh America, ſituated between La Vera Cruz and Mexico. It hath a large root of an oval form, which is full of a milky juice; from which come out many herbaceous twining ſtalks riſing eight or ten feet high, garniſhed with variable leaves; ſome of them being heart-ſhaped, others angular, and ſome oblong and pointed. They are ſmooth, and ſtand upon long footſtalks: the flowers are ſhaped like thoſe of the common greater bind-weed, each footſtalk ſupporting only one flower.

The firſt and ſecond ſorts are propagated by ſeeds, which muſt be ſown on a border of light earth. The ſecond ſort muſt have ſome tall ſtakes placed near them for their branches to twine about, otherwiſe they will ſpread on the ground and make a bad appearance. The third ſort is annual, and muſt be propagated by ſeeds ſown on a hot-bed in the ſpring; and towards the end of May they ſhould be planted out in warm borders, and treated in the ſame manner with the former. The fourth ſpecies is ſometimes propagated in this country. The roots muſt be planted on a hot-bed in the ſpring; and if the plants are covered in bad weather with glaſſes, they will produce flowers and ſome ſmall bulbs from the joints of the ſtalks: but if they are expoſed to the open air, they ſeldom grow to any ſize. The fifth is propagated by laying down the young ſhoots in the ſpring, which generally put out roots in three or four months: they

may then be taken from the old plants, and each placed in a feparate pot, which is to be fet in the fhade till they have taken new root; after which they may be placed with other hardy green-houfe plants till autumn, when they fhould be removed into the green-houfe, and afterwards treated in the fame manner as myrtles and other green-houfe plants. The turbith and jalap are too tender to live in this country, unlefs they are conftantly kept in a ftove. The other fpecies require no particular directions for their cultivation.

The root of the firft fort proves a very acrid purgative to the human race, but is eaten by hogs in large quantities without any detriment. The infpiffated juice of the fecond fpecies is ufed in medicine as a ftrong purgative; as are alfo the roots of the jalappa and turpethum. The foldanella has likewife been ufed with the fame intention. Half an ounce of the juice, or a drachm of the powder, is an acrid purge. The leaves applied externally are faid to diminifh dropfical fwellings of the feet. See SCAMMONY, JALAP, and TURPETH.

CONVOY, in naval affairs, one or more fhips of war, employed to accompany and protect merchant fhips, and prevent their being infulted by pirates, or the enemies of the ftate in time of war.

CONVOY, in military matters, a body of men that guard any fupply of men, money, ammunition, or provifion, conveyed by land into a town, army, or the like, in time of war.

CONUS, a CONE, in botany: a fpecies of fruit, or fcaly feed-veffel, fo termed by Tournefort and other botanifts. Linnæus has fubftituted STROBILUS in its place.

CONVULSION, a preternatural and violent contraction of the membranous and mufcular parts of the body. See the treatife on MEDICINE.

CONWAY, a market-town of Caernarvonfhire in North Wales, fituated near the mouth of a river of the fame name, 15 miles weft of St Afaph. W. long. 3. 50. N. lat. 53. 20.

CONYZA, FLEABANE; a genus of the polygamia fuperflua order, belonging to the fyngenefia clafs of plants; and in the natural method ranking under the 49th order, *Compofitæ*. The pappus is fimple, the calyx imbricated and roundifh, the corollulæ of the radius trifid. There are 19 fpecies, none of which merit any particular defcription.

CONZA, a town of the kingdom of Naples in Italy, fituated on the farther principate, on the river Offanto, 50 miles fouth-eaft of the city of Naples. E. long. 16. 0. N. lat. 41. 0. It is the fee of an archbifhop.

COOK (Sir Anthony), defcended from Sir Thomas Cook lord mayor of London, was born in 1506, and fuppofed to have been educated at Cambridge. He was fo eminent for his learning, piety, and prudence, that the guardians of king Edward VI. appointed him to be his chief inftructor in learning, and to form his manners. He had four daughters; and being refolved to have fons by education, left he fhould have none by birth, he taught his daughters thofe leffons by night that he had inftilled into the prince by day: he was happy in his endeavours, as they proved learned in Greek and Latin, and equally diftinguifhed by virtue, piety, and good fortune. Mildred was married to the great lord Burleigh; Ann to Sir Nicholas Bacon, lord keeper of the great feal; Elizabeth to Sir John Ruffel, fon and heir of Francis earl of Bedford; and Catharine to Sir Henry Killigrew. He lived in exile during the Marian perfecution; and returning on the acceffion of queen Elizabeth, fpent the reft of his days in peace and honour, dying in 1576.

COOK (Captain James), one of the moft celebrated navigators ever produced by Britain or any other country, was the fon of James Cook, fuppofed to have been a native of the county of Northumberland. His ftation was no higher than that of a fervant in hufbandry, and he was married to a woman in his own fphere of life at Morton, a village in the North riding of Yorkfhire. From this place they removed to another village in the fame riding named *Marton*, where Captain Cook was born on the 27th of October 1728. He was one of nine children, all of whom are now dead except a daughter, who married a fifherman of Redcar. He received the firft rudiments of education from the fchoolmiftrefs of the village; and afterwards, on his father's removal to Great Ayton, he was put to a day-fchool, at the expence of Mr. Skottow, his father's employer, where he was inftructed in writing and in a few of the firft rules of arithmetic. Before the age of thirteen he was bound apprentice to Mr. W. Sanderfon, a haberdafher or fhopkeeper at Straiths, about ten miles from Whitby: but fome difagreement taking place between him and his mafter, he indulged his own inclination in binding himfelf apprentice to Meffrs. Walkers of Whitby, who had feveral veffels in the coal trade; and after ferving a few years longer in the fituation of a common failor, he was at length raifed to be mate of one of Mr. Walker's fhips. During all this period it was not recollected that he exhibited any thing peculiar either in his abilities or conduct.

Early in the year 1755, when hoftilities broke out between France and England, Cook entered on board the Eagle of fixty guns, to which veffel Sir Hugh Pallifer was foon after appointed, who foon diftinguifhed him as an active and diligent feaman; and his promotion was forwarded by a letter of recommendation which was written by Mr. Ofbaldefton, member for Scarborough, at the requeft of feveral neighbours, in Mr. Cook's favour. On the 15th of May 1759, he was appointed mafter of the Mercury, which foon after failed to America, and joined the fleet under Sir Charles Saunders at the memorable fiege of Quebec. His intereft with the admiralty appears even then to have been very ftrong; for on Mr. Ofbaldefton's letter he was appointed mafter of the Grampus floop; but the proper mafter having unexpectedly returned to her, the appointment did not take place. Four days after he was made mafter of the Garland; when upon enquiry it was found that he could not join her, as the veffel had already failed; and the next day, May 15th 1759, he was made mafter of the Mercury. On this occafion he was recommended by Captain Pallifer to a difficult and dangerous fervice, viz. to take the foundings of the river St. Lawrence, between the ifland of Orleans and the north fhore, which he performed in the moft complete manner; and foon afterwards he was employed to furvey the moft dangerous parts of the river below Quebec: thefe were his firft efforts with the pencil. After this expedition he was appointed, on the 22d of September, mafter of the Northumberland, ftationed at Halifax, where he firft read Euclid, and applied to aftronomy and other branches of fcience. In the year 1762 he was with the Northumberland, affifting at the recapture of Newfoundland; and in the latter end of the fame year he returned to England, and married, at Barking in Effex, Mifs Elizabeth Batts. Early in 1763, when admiral (then Captain) Greaves was appointed governor of Newfoundland, Mr. Cook went out with him to furvey the coafts of that ifland. At the end of the feafon he returned to England; but in the beginning of 1764, Sir Hugh Pallifer being appointed governor of Newfoundland and Labradore, Mr. Cook accompanied him in the fame capacity of furveyor, and had the Grenville fchooner to attend him on that bufinefs: in this fituation he continued till 1767.

While Mr. Cook remained on this ftation, he had an opportunity of exhibiting publicly a fpecimen of his progrefs in the ftudy of aftronomy, by a fhort paper printed in the 57th volume of the Philofophical Tranfactions, intitled "An obfervation of an eclipfe of the fun at the ifland of Newfoundland, Auguft 5, 1766, with the longitude of the place of obfervation deduced from it." Mr. Cook's obfervation was made at one of the Burgeo iflands near Cape Ray, in N. lat. 47° 36′ 19″; and by the comparifons of it made by Mr. Mitchel, with an

obſervation of Dr. Hornſby at Oxford, it appeared to have been accurately done: and Mr. Cook at that time obtained the character of an able aſtronomer.

In the mean time a ſpirit for geographical diſcoveries, which had gradually declined ſince the beginning of the 17th century, began to diſcover itſelf anew. Two voyages of this kind had been performed in the reign of George II. the one under Captain Middleton, the other by Captains Moore and Smyth, with a view to diſcover a north-weſt paſſage through Hudſon's Bay to the Eaſt Indies. Two others, under Captains Byron, Wallis, and Carteret, had been undertaken ſoon after the concluſion of the peace in 1763 by order of his preſent Majeſty; and before the return of theſe navigators, who were ordered to ſail round the world, another voyage was reſolved upon for aſtronomical purpoſes. It having been calculated that a tranſit of Venus over the ſun's diſk would happen in 1769, a long memorial to his Majeſty was preſented by the Royal Society; in which they ſet forth the great importance of making proper obſervations on this phenomenon; the regard that had been paid to it by the different courts of Europe; and entreating, among other things, that a veſſel might be fitted out, at the expence of government, for conveying proper perſons to ſome of the Friendly Iſlands, in order to make the neceſſary obſervations. This being complied with on the part of his Majeſty, Alexander Dalrymple, Eſq. an eminent member of the Royal Society, was appointed to take the command of the bark appropriated for the purpoſe. In the execution of the project, however, an unexpected difficulty occurred. Mr. Dalrymple, ſenſible of the impoſſibility of guiding a veſſel through unknown and dangerous ſeas without any proper command over the crew, demanded a brevet commiſſion as captain of the veſſel, in the ſame manner as had formerly been granted to Dr. Halley in a voyage of diſcovery made by him. This commiſſion Sir Edward Hawke abſolutely refuſed to ſign; declaring, when preſſed upon the ſubject, that he would rather ſuffer his right hand to be cut off than truſt any of his Majeſty's ſhips to a perſon who had not been properly bred to the ſervice; and in this proceeding he ſeemed to be juſtified by the mutinous behaviour of Dr. Halley's crew; who, denying the legality of his authority over them, had involved him in a very diſagreeable diſpute, and which was attended with pernicious conſequences. Mr. Dalrymple, on the other hand, being equally determined in his refuſal to proceed without the authority in queſtion, there was a neceſſity for finding out ſome perſon of ſcience who might alſo be free from the objection made by Sir Edward Hawke. Mr. Cook therefore was propoſed by Mr. Stephens; and his recommendation being ſeconded by Sir Hugh Palliſer, he was immediately appointed to direct the expedition; and on this occaſion was promoted to the rank of lieutenant in his Majeſty's ſervice.

Mr. Cook's commiſſion as lieutenant was dated May 25, 1786; a veſſel of 370 tons, named the Endeavour, was provided for him; and while the neceſſary preparations were making for the voyage, Captain Wallis returned. It having been recommended to this gentleman to fix upon a proper place for making the aſtronomical obſervations, he had accordingly choſen the iſland named by him *George's Iſland*, but ſince known by the name of *Otaheite*; judging alſo that Port Royal harbour in it would afford an eligible ſituation. This propoſal being accepted, directions for the purpoſe were accordingly given to Mr. Cook, with whom Mr. Charles Green was joined in the aſtronomical part; the latter having been aſſiſtant to Dr. Bradley in the Royal Obſervatory at Greenwich, and thus judged to be every way qualified for the office. The lieutenant was likewiſe accompanied by Mr. Banks, now Sir Joſeph Banks, Dr. Solander, &c. The principal deſign of the voyage was, as has already been hinted, to make obſervations on the tranſit of Venus; but this being done, Mr. Cook was directed to make further diſcoveries in the Pacific Ocean; and on the 30th of July, 1768, he ſet ſail on his expedition. An account of the voyage, and of the diſcoveries made during the time of it, is given in the next article; here it is ſufficient to obſerve, that throughout the whole Mr. Cook approved himſelf an able ſeaman; and from his behaviour both to his own people and to the ſavage nations he occaſionally met with, ſhowed a moſt exact regard to the rules both of juſtice and humanity. On his firſt arrival at Otaheite, the following regulations were drawn up for his people, which he took care ſhould be punctually obeyed: 1. To endeavour, by every fair means, to cultivate a friendſhip with the natives, and to treat them with all imaginable humanity. 2. A proper perſon or perſons to be appointed to treat with the natives for proviſions, fruits, &c. and no other perſon belonging to the ſhip to do ſo without leave. 3. Every perſon on ſhore to attend punctually to his duty, and to pay proper attention to his tools or arms; and if loſt through negligence, to have the full value charged againſt his pay, with ſuch farther puniſhment inflicted as occaſion might require. 4. The ſame penalty to be inflicted on every one who ſhould embezzle, trade with, or offer to trade with, any part of the ſhip's ſtores; and, 5. No iron to be given in exchange for any thing but proviſions. His rigid adherence to theſe rules was manifeſted in ſeveral inſtances, particularly by ſeverely puniſhing the ſhip's butcher, who had threatened the life of a woman, wife to one of the chiefs of the iſland, for refuſing a ſtone hatchet on the terms he propoſed. On erecting their obſervatory, in order to go through the aſtronomical obſervations, an accident happened which had like to have diſconcerted the whole ſcheme. This was the loſs of their quadrant, which had been ſtolen by ſome of the natives; but, chiefly through the exertions of Mr. Banks, it was recovered, and the obſervations made accordingly. Scarce was this accompliſhed, however, before another theft of the natives demanded the moſt ſerious conſideration of the commander. Some of them taking advantage of the attention of the officers being otherwiſe engaged, took the opportunity of breaking into one of the ſtore-rooms, and ſtealing from thence a bag of ſpike nails of no leſs than an hundred weight. This was a moſt important affair; for as thoſe nails were of great eſtimation among the Indians, the poſſeſſion of ſuch a quantity muſt undoubtedly have much leſſened their value, and thus rendered proviſions of every kind greatly dearer on the iſland than before. One of the thieves therefore being diſcovered, was puniſhed with 200 laſhes; notwithſtanding which he obſtinately refuſed to diſcover any of his accomplices. Repeated thefts committed afterwards required all the wiſdom and reſolution of Mr. Cook to conduct himſelf in a proper manner. After due conſideration, he judged it to be a matter of importance to put an end to theſe practices at once, by doing ſomething which might engage the natives themſelves to prevent them for their common intereſt. This, however, he was not at preſent able to accompliſh; nor indeed did it ſeem poſſible to prevent them without uſing fire-arms, which from motives of humanity he ſtill determined to avoid. At laſt, after a ſtay of three months, when preparing to take his leave, the moſt diſagreeable adventure took place that he had hitherto met with. This was the deſertion of two of his people, who having married young women of the country, determined to take up their reſidence in it. Mr. Cook was now obliged to ſeize ſome of the chiefs, and to inform them that they could not obtain their liberty unleſs the deſerters were recovered. This at laſt produced the deſired effect; the deſerters were given up, and Mr. Cook ſet ſail, along with Tupia (who had formerly been the prime miniſter to Oberea, a princeſs of the iſland), and a boy of 13 years of age, both of whom were deſirous of accompanying him to England.

While Mr. Cook proceeded to viſit others of the South Sea Iſlands, Tupia occaſionally ſerved as an interpreter. On his

arrival in New Zealand, Mr. Cook found the people extremely hoftile and infolent. At their very firft meeting, one of the natives having threatened to dart his lance into the boat, was fhot dead. Another, having carried off Mr. Green's hanger, was fired at with fmall fhot; and upon his ftill refufing to reftore it, was fired at with ball, and killed. This, however, produced very little effect on the reft, who offered to make an attack upon them, till feveral mufkets were fired with fmall fhot, which wounded three or four more. Next day the commander, having determined to force fome of the natives on board, in order to conciliate their affections by kind treatment, directed his men to follow two canoes whom he perceived under way before him. One made her efcape, but the other, not obferving the boats in purfuit, was overtaken; on which the favages plied their oars fo brifkly, that the fhip's boats were not able to keep up with them. Tupia, whofe language the New Zealanders underftood, called to them to return, with affurances that no hurt fhould be done them; but they continued their flight without minding him. A mufket was then fired over their heads with a view to intimidate them, but upon this they prepared to fight; and on the coming up of the boats began the attack with fo much vigour, that the lieutenant's people were obliged to fire upon them with ball, by which four out of feven that were in the boat were killed, and the other three jumped into the water, and were taken on board.

This part of Mr. Cook's conduct feems inconfiftent with that humanity for which he was in general fo eminently diftinguifhed; he was aware of the cenfure, and makes the following apology: " Thefe people certainly did not deferve death for not choofing to confide in my promifes, or not confenting to come on board my boat, even if they had apprehended no danger: but the nature of my fervice required me to obtain a knowledge of their country, which I could no otherwife obtain but by forcing into it in an hoftile manner, or gaining admiffion through the confidence and good-will of the people. I had already tried the power of prefents without effect; and I was now prompted by my defire to avoid farther hoftilities, to attempt to get fome of them on board; the only method we had left of convincing them that we intended them no harm, and had it in our power to contribute to their gratification and convenience. Thus far my intentions certainly were not criminal; and though in the conteft, which I had not the leaft reafon to expect, our victory might have been complete without fo great an expence of life; yet in fuch fituations, when the command to fire has once been given, no man can pretend to reftrain its excefs, or prefcribe its effect."

Notwithftanding the difafter juft mentioned, to which the three New Zealanders, who were taken on board, had been witneffes, they were foon conciliated, and began to fing with a degree of tafte that furprifed the Englifh gentlemen. They were boys, the oldeft about 19 and the youngeft about 11; but no kindnefs which could be fhown them was in any degree effectual to bring about a reconciliation with the reft. On the contrary, having perceived the fhip in fome diftrefs, they inftantly fhowed a difpofition to make an attack; and from this they were only prevented by the firing of a four-pounder charged with grape-fhot. Even this did not produce any permanent effect; another attack was determined upon, and would undoubtedly have been made, had not Tupia informed them, that if they perfifted in the attempt, the arms of their adverfaries, like thunder, would deftroy every one of them. This was enforced by the fire of another four-pounder with grape fhot, which fpreading wide in the water, terrified them to fuch a degree that they began to paddle away as faft as poffible. Notwithftanding this, however, fome intercourfe began to take place; but in every inftance the New Zealanders manifefted their hoftility and treachery in fuch a manner as fhowed that they were not to be gained by fair means. At laft an attempt to carry off Tayeto, Tupia's boy, rendered it abfolutely neceffary to fire upon them in order to refcue him from certain deftruction, fome of the favages having got him into a canoe, where they held him down by violence. In confequence of this one of the favages was killed on the fpot, and feveral more wounded, by the difcharge of mufkets from the boats; Tayeto recovered his liberty, jumped into the water, and fwam to the fhip. Some partial intercourfe again took place: but ftill it appeared that the innate rancour of thefe favages was neither to be fubdued by fair means nor foul; and it was only by the powerful arguments of cannon and mufketry that they could be kept from attempting to do mifchief.

From the account of this voyage publifhed by Dr. Hawkefworth, indeed, it appears, that a confiderable number of favages perifhed in a manner fimilar to that above mentioned, and they feem to have manifefted a more hoftile behaviour than afterwards: on thofe melancholy occafions, however, it is obferved to the honour of Mr. Cook, that his humanity was eminently confpicuous beyond that of the common people, who all along fhowed as much inclination to deftroy the Indians as a fportfman does to kill the game he purfues.

While Mr. Cook coafted the iflands of New Zealand, he was fometimes in the moft imminent danger of being fhipwrecked. In the latitude of 35° fouth, and in the midft of fummer in that climate, he met with fuch a gale of wind as he fcarce ever experienced before; fo that he was no lefs than three weeks in getting ten leagues to the weftward, and two more before he could get 30 leagues farther. Fortunately, however, they were all this time a confiderable way from land, otherwife it is probable that the ftorm muft have proved fatal.

Mr. Cook having fpent fix months in circumnavigating and fully exploring the iflands of New Zealand, he failed from thence on the 31ft of March 1770. It muft be obferved, however, that the extreme hoftility manifefted by the inhabitants in that part of the ifland where he firft arrived, was not univerfally diffufed, but that a friendly intercourfe was for a long time maintained with thofe about Queen Charlotte's Sound. From New Zealand he proceeded to New Holland, and on the 28th of April came in fight of Botany Bay. Here all their endeavours to induce the natives to have any intercourfe with them proved ineffectual, though happily there was no blood fpilt in any quarrel.

During their navigation round New Holland, the coafts of which are full of dangerous rocks and fhoals, our navigators were brought into a more perilous fituation than ever; and from which the efcape was fo extraordinary, that it deferves a particular relation. This happened on the 10th of June 1770, as they purfued their courfe from Trinity Bay, and nearly in the latitude affigned to the iflands difcovered by Quiros. At that time they had the advantage of a fine breeze and a clear moonlight; and in ftanding off from fix till near nine o'clock, the fhip had deepened her water from 14 to 21 fathoms; but while the navigators were at fupper, it fuddenly fhoaled to 12, 10, and 8 fathoms in the fpace of a few minutes. Every thing was then ready for putting the fhip about, when they fuddenly got into deep water again, and continued in 20 and 21 fathoms for fome time, fo that the gentlemen went to bed in perfect fecurity. A little before eleven, however, the water fhoaled at once from 20 to 17 fathoms; and before the lead could be heaved again, the fhip ftruck, and remained immoveable, excepting as far as fhe was heaved up and down, and dafhed againft the rocks by the furge. The alarm was now univerfal, and not indeed without the greateft reafon. It appeared that the veffel had been lifted over the ledge of a rock, and lay in a hollow within it, where there were in fome places from three to four fathoms water, and in others fcarce as many feet: the

ſheathing boards were disjoined, and floating round the ſhip in great numbers; and at laſt the falſe keel alſo was deſtroyed, while the rock kept grating her bottom with ſuch force as to be heard in the fore ſtore-room. It was now neceſſary to lighten the ſhip as much as poſſible; and this was done with all expedition to the amount of more than 50 tons. In the morning of the 11th of June they diſcovered the land at about eight leagues diſtance, without any iſland between, on which they could have been ſent aſhore in the event of the ſhip going to pieces, that ſo they might have been carried to the main land by turns. To add to their diſtreſs, the ſhip drew ſo much water, that it could ſcarce be kept under by three pumps. Laſtly, it appeared, that even the riſing of the tide, on which they had ultimately depended for relief, was inſufficient to anſwer the purpoſe, as the day-tide fell conſiderably ſhort of that in the night-time. Having therefore lightened the ſhip ſtill farther, by throwing out every thing that could poſſibly be ſpared, they waited with patience for the next tide; when, after incredible exertion, the ſhip righted, and they got her over the ledge of the rock into deep water. By continual labour, however, the men were at laſt ſo much exhauſted, that they could not ſtand to the pumps more than five or ſix minutes at a time; after which they threw themſelves flat on the deck, though a ſtream of water between three and four inches deep ran over it; and in this ſituation they lay till others, exhauſted as well as them themſelves, took their places, on which they ſtarted up again, and renewed their exertions. In this dreadful extremity, Mr. Monkhouſe, a midſhipman, propoſed the expedient of fothering the ſhip, as it is called, by which means he ſaid that he had ſeen a merchant-ſhip brought from Virginia to London after ſhe had ſprung a leak that admitted more than four feet water in an hour. The expedient being approved of, it was put in execution in the following manner: He took a lower ſtudding-ſail, and having mixed a large quantity of oakum and wool together, ſtitched them down by handfuls as lightly as poſſible, the whole being afterwards ſpread over with the dung of the ſheep and other filth. The ſail was then hauled under the ſhip's bottom by means of ropes which kept it extended. When it came under the leak, the wool and oakum, with part of the ſail, were forced inwards by the preſſure of the water, which thus prevented its own ingreſs in ſuch an effectual manner, that one pump, inſtead of three, was now ſufficient to keep it under. Thus they got the ſhip into a convenient port on the coaſt of New Holland, where there was an opportunity of fully repairing her defects. Here they diſcovered that their preſervation had not been owing entirely to the expedient above mentioned; for one of the holes was in a great meaſure filled up by a piece of rock which had broken off and ſtuck in it; and this hole was ſo large, that had it not been filled up in the manner juſt mentioned, they muſt undoubtedly have periſhed notwithſtanding all the aſſiſtance that could have been derived from the pumps.

The dangers they ſuſtained in navigating this coaſt were innumerable, inſomuch that for very near three months they were obliged to have a man conſtantly in the chains heaving the lead. They were always entangled among rocks and ſhoals, which could not have failed to deſtroy a leſs experienced navigator; and even Mr. Cook, with all his ſagacity, could not ſometimes have extricated himſelf, had it not been for the favourable interpoſition of ſome natural events, which no human penetration could foreſee or have the leaſt dependence upon. Of this we ſhall only give the following inſtance: Having at laſt, as they thought, got ſafely over the vaſt reeefs of ſunk rocks with which the coaſt of New Holland is ſurrounded, they flattered themſelves that all danger was paſſed, and the vaſt ſwell of the water convinced them that they were now in the open ocean. The remembrance of former dangers, however, induced them frequently to take the precaution of ſounding; notwithſtanding which, in the latitude of about $14\frac{1}{2}°$ S. they found themſelves one morning only about a mile diſtant from the moſt hideous breakers, though the ſea all around was unfathomable. Their ſituation was rendered the more dreadful by its being a dead calm, at the ſame time that they were carried towards the rock with ſuch rapidity, that by the time they had got the ſhip's head turned by means of the boats, ſhe was ſcarcely 100 yards diſtant from it. Their only reſource then was to tow the ſhip, if poſſible, by means of the boats and pinnace, out of a ſituation ſo very perilous; but all their efforts would have been unſucceſsful, had not a breeze of wind ſprung up, which, though too light to have been noticed at any other time, was found to ſecond their efforts ſo effectually, that the ſhip began to move perceptibly from the reef in an oblique direction: during the time that this breeze laſted, which was not more than ten minutes, they had made a conſiderable way. A dead calm ſucceeding, they began to loſe ground, and in a little time were driven within 200 yards of the rocks: but fortunately the breeze returned, and laſted ten minutes more; during which time a ſmall opening was perceived in the reef at the diſtance of about a quarter of a mile. The mate being ſent out to examine this opening, reported that it was not more than the length of the ſhip in breadth, but that there was ſmooth water within. On this it was determined to puſh into it by all means. The attempt failed of ſucceſs; as, juſt when they had brought the ſhip with great labour to the mouth of the opening, they found a current ſetting out from it by reaſon of the tide now beginning to ebb. But though their hopes were diſappointed in getting through the opening, they were, by the current ſetting out from it, driven in a very ſhort time to the diſtance of a quarter of a mile from the rocks; and by dint of towing and other exertions, they were got by noon to the diſtance of two miles. This temporary deliverance, however, afforded but ſmall proſpect of being ultimately relieved. They had ſtill no other expectation than of being forced back into their former ſituation by the return of the tide; but happily now they perceived another opening about a mile to the weſtward. Mr. Hicks the lieutenant being ſent to examine this opening, returned with an account of its being narrow and hazardous, but capable of being paſſed. To this place therefore the ſhip was directed by every poſſible means; and a light breeze happening to ſpring up, they fortunately reached it, and were inſtantly hurried through with great rapidity by the current of the returning tide; which, had it not been for this opening, would undoubtedly have daſhed them to pieces againſt the rocks.

From the time they quitted the coaſt of New Holland till their arrival at Batavia in the iſland of Java, our navigators met with no other danger but what is common in ſea-voyages. They were obliged to ſtay for ſome time at this place to repair their damages; and on viewing the condition of the ſhip, found they had more reaſon than ever to admire the manner in which they had been preſerved. Both the falſe-keel and main-keel were greatly injured; great part of the ſheathing was torn off; ſeveral of the planks were much damaged, and among theſe were two, and half of another, which for ſix feet in length were not above the eighth part of an inch in thickneſs, beſides being penetrated with worms quite to the timbers. Here the crew were exceſſively annoyed by ſickneſs, which obliged them to remain much longer than they would otherwiſe have done: and it is worthy of notice, that every one of the crew was ill excepting the ſail-maker, an old man between 70 and 80 years of age, and who was drunk every night. Poor Tupia, with his boy Tayeto, fell ſacrifices to the unhealthineſs of the climate, as well as the ſurgeon, three ſeamen, and Mr. Green's ſervant. Nor did the evil ſtop here; for on their ſetting out from Batavia, the ſeeds of diſeaſe which had been received

there broke out in the moſt violent and fatal manner, inſomuch that in the courſe of about ſix weeks there died one of Mr. Banks's aſſiſtants, by name Mr. Sporing, Mr. Parkingſon his natural hiſtory painter, Mr. Green the aſtronomer, the boatſwain, carpenter, and mate; Mr. Monkhouſe the midſhipman, the corporal of the marines, two of the carpenter's crew, and nine ſeamen. Even the jolly old ſail-maker could now hold out no longer; but whether his death may not in ſome meaſure be attributed to his being leſs plentifully ſupplied with liquors than formerly, might have deſerved enquiry. Theſe unfortunate events probably made a conſiderable impreſſion on Mr. Cook's mind; and perhaps induced him to direct his attention to thoſe methods of preſerving the health of ſeamen which he afterwards put in execution with ſo much ſucceſs. After touching at St. Helena, they continued their voyage for England, where they arrived on the 11th of June 1771; and on the 29th of Auguſt the ſame year, his Majeſty teſtified his approbation of Mr. Cook's conduct by appointing him a captain in the navy. On this occaſion Mr. Cook wiſhed to have been advanced to the rank of poſt-captain, which, though not more profitable than the other, is more honourable; but this being inconſiſtent with the rules of preferment in the navy, the earl of Sandwich, at that time at the head of the admiralty, could not agree to it.

Captain Cook was not allowed to remain long inactive. The idea of a ſouthern continent had long been entertained, and Mr. Dalrymple had renewed the attention of the public towards the queſtion, by his hiſtorical collection of voyages to the Pacific Ocean, publiſhed in two quarto volumes, one in 1770, the other in 1771. To determine the matter finally, Captain Cook was again ſent out: and the object of this voyage was not merely to ſettle the queſtion juſt mentioned, but to extend the geography of the globe to its utmoſt limits. That the undertaking might be carried on with the greater advantage, it was determined to employ two ſhips, on the choice and equipment of which the utmoſt attention was beſtowed. The ſucceſsful voyage which had already been made in the Endeavour, ſuggeſted the idea of that ſhip being a proper model for the two which were to be ſent out; and the opinion of Lord Sandwich concurring with the general idea, two veſſels, conſtructed by the ſame perſon who built the Endeavour, were purchaſed for the voyage. Theſe were about 14 or 16 months old at the time they were purchaſed; and, in the opinion of Captain Cook, were as fit for the purpoſe as if they had been but newly built. The larger of the two, of 462 tons burden, was named the *Reſolution*; the ſmaller, of 336 tons, had the name of the *Adventure*; the complement of men on board the former, of which Captain Cook was commander, being 112; on the latter, commanded by Mr. Tobias Furneaux, 81. In their equipment, every article that could be ſuppoſed neceſſary, however much out of the common line, was procured, and every circumſtance that could be ſuppoſed to contribute to the ſucceſs of the voyage was attended to in the moſt ſcrupulous manner. Beſides the uſual ſtores and proviſions, all of which were of the beſt kinds, the ſhips were furniſhed with malt, ſour-krout, ſalted cabbage, portable ſoup, ſalop, muſtard, marmalade of carrots, beer, and inſpiſſated wort. Mr. Hodges, an excellent landſcape painter, was engaged to make drawings and paintings of ſuch objects as required them. Mr. John Reinhold Forſter, with his ſon, were both engaged, in order to explore and collect the natural hiſtory of the countries through which they paſſed; and laſtly, that nothing might be wanting to render the voyage as complete as poſſible, Mr. William Wales and Mr. William Bayley were engaged by the board of longitude to make celeſtial obſervations. They were furniſhed with the beſt inſtruments of every kind, and among the reſt with four time-pieces; three conſtructed by Mr. Arnold, and one by Mr. Kendal on Mr. Harriſon's principles.

At Plymouth Captain Cook received his inſtructions; which were not only to ſail round the globe, but to ſail round it in high ſouthern latitudes, and to make ſuch traverſes as might finally reſolve the queſtion concerning the ſouthern continent. In purſuance of theſe inſtructions he ſet ſail on the 13th of July 1772, and on the 29th of the ſame month reached the Madeiras. As he proceeded afterwards in his voyage, he made three puncheons of beer from the inſpiſſated wort carried along with him, and found it excellently to anſwer the purpoſe, provided the material could have been kept without fermentation in its inſpiſſated ſtate; but as this was found impoſſible, the expedient ſeems to have failed. In this voyage, however, the Captain uſed with the greateſt ſucceſs ſuch methods as appeared likely to contribute to the preſervation of his men. In rainy weather, he took care that the ſhip ſhould be aired and dried by the means of fires made between the decks; the damp places were ſmoked, and the people were ordered to air their bedding, and waſh and dry their clothes, whenever an opportunity offered. Thus he reached the Cape of Good Hope without having a ſingle man ſick. Having left it, and kept on his courſe to the ſouthward, he ſoon began to meet with cold and ſtormy weather, by which he loſt almoſt the whole of his live ſtock of ſheep, hogs and geeſe. The bad effects of this ſtormy weather upon the men were guarded againſt by an addition to their clothing, and giving them a dram on particular occaſions. On the ſixth of December, being in the longitude of 50° 40′, he fell in with iſlands of ice, and continued among them in various latitudes till the 17th of January 1773; when he ſet ſail for New Zealand, which he reached on the 27th.

The reception of our navigator by the New Zealanders was now much more friendly than in the former voyage, ſo that there were no conteſts with the natives; nor did Captain Cook obſerve any one of thoſe whom he had ſeen before, neither was there the ſmalleſt remembrance of former hoſtilities. Having ſtaid in this country till the 7th of June, our navigators ſet ſail for Otaheite; but during the voyage the crews of both ſhips were attacked by the ſcurvy. Thoſe of the Adventure were in a very ſickly ſtate; the cook was dead, and 20 of her beſt men incapable of duty. On board the Reſolution matters were much better; and the only reaſon that could be conjectured for the difference was, that the people of the Adventure had been in an habit of body more inclined to the ſcurvy than thoſe of the Reſolution, and had eat fewer vegetables. Here it was obſerved, that the averſion of ſeamen to a change of diet is ſo great, that it can only be overcome by the ſteady and perſevering example of a commander. While he remained at New Zealand, the Captain had diſcovered a tree which greatly reſembled the American black ſpruce. Perſuaded, therefore, that it would be attended with effects equally ſalutary on the health of the people, he employed them in brewing beer from it. This was done while they continued at Duſky Bay, in order to ſupply the want of vegetables, which were not to be procured there; but on removing to Queen Charlotte's Sound, they were more fortunate. Captain Cook himſelf went to look out for antiſcorbutic vegetables; and returned in a very ſhort time with a boat-load of ſcurvy-graſs, celery, &c. Theſe were boiled with the peas and wheat; and though ſome of the people diſliked them at firſt, they ſoon became ſo ſenſible of the good effects, that they cheerfully followed the example of the reſt; and the freedom of the crew from the ſcurvy and other diſtempers was by every one attributed to the New Zealand ſpruce beer and vegetables. From this time forward the Captain had ſcarce occaſion to give orders for gathering vegetables when they came to any land.

During this voyage Captain Cook experienced another narrow eſcape from ſhipwreck. Being becalmed at the diſtance of half a league from a reef of rocks near Oſnaburg Iſland, it was found neceſſary to order out the boats to tow off the ſhips;

but this was found impoſſible. The calm continuing, and the ſituation of our navigators becoming every moment more dangerous, the Captain attempted to get through an opening in the reef which he had judged practicable: but on approaching it, found that there was not ſufficient depth of water; at the ſame time that the draught of the tide through it forced the ſhip thither in a manner ſcarce to be reſiſted. One of the warping machines, with about 400 fathoms of rope, was then ordered out, but did not produce any effect. They were within two cables length of the breakers, and no bottom could be found for caſting anchor. Having no other reſource, however, they did drop an anchor; but before it took hold, the Reſolution was in leſs than three fathoms water, and ſtruck at every fall of the ſea, which broke violently cloſe under her ſtern, threatening deſtruction to every one on board. At laſt the tide ceaſing to act in the ſame direction, the boats were ordered to try to tow off the veſſel; in which being aſſiſted by the land-breeze, which fortunately ſprung up at that inſtant, they with much labour ſucceeded.

Having ſpent a conſiderable time in the South Sea iſlands, Captain Cook returned to New Zealand, and from thence ſet ſail to the ſouthern part of the continent of America. Here he explored all the iſlands in the neighbourhood, and then returned to England, where he arrived in ſafety on the 30th of July 1774, having been abſent three years and 18 days; and in all that time loſt only one man, who died of a conſumption probably begun before he ſet out on the voyage.

The reception our navigator now met with was ſuited to his merit. He was immediately raiſed to the rank of poſt-captain, and ſoon after unanimouſly elected a member of the Royal Society; from whom he received the prize of the gold medal for the beſt experimental paper that had appeared throughout the year. It was the cuſtom of Sir John Pringle, at the delivery of this medal, annually, to make an elaborate diſcourſe, containing the hiſtory of that part of ſcience for which the medal was given; and as the ſubject of Captain Cook's paper (the means of preſerving the health of ſeamen) was analogous to the profeſſion of Sir John Pringle himſelf as a phyſician, he had the greater opportunity of diſplaying his eloquence on the occaſion. The ſpeech he made was in the higheſt degree honourable to Captain Cook. He remarked, that the Society had never more meritoriouſly beſtowed the medal than on the perſon who now received it. "If (ſays he) Rome decreed the civic crown to him who ſaved the life of a ſingle citizen, what wreaths are due to the man who, having himſelf ſaved many, perpetuates in your Tranſactions the means by which Britain may now, on the moſt diſtant voyages, preſerve numbers of her intrepid ſons, her mariners; who, braving every danger, have ſo liberally contributed to the fame, to the opulence, and to the maritime empire of the country?" Theſe honourable teſtimonies of the public regard, however, Captain Cook did not receive, being already embarked on another voyage, from which he never returned.

The third voyage of this celebrated navigator was not undertaken by any expreſs command of his Majeſty. Captain Cook had already done ſo much, that it was thought but reaſonable he ſhould now ſpend the remainder of his life in quiet; and in order to enable him to do this in a more comfortable manner, beſides his rank of poſt-captain in the navy, he was alſo made a captain in Greenwich. Still, however, there were ſome points in the ſcience of geography which had very much engaged the attention of the public, and were indeed of ſuch importance as to become a national concern. Theſe were to diſcover the connection between Aſia and America, and to determine whether there was not a poſſibility of ſhortening the paſſage to the Eaſt Indies by ſailing round the northern parts of the continents of Europe and Aſia. Many attempts, indeed, had already been made by various navigators of different nations: but all of them had failed, and, what was worſe, had left the point ſtill undetermined. An act of parliament had been paſſed in 1745, by which a reward of 20,000l. was held out to the ſhips of any of his Majeſty's ſubjects for accompliſhing this important voyage, but without mentioning any thing of thoſe belonging to his Majeſty; and this reward was further confined to the finding out the north-weſt paſſage to the Eaſt Indies through Hudſon's Bay. In the year 1776, however, both the errors juſt mentioned were corrected. It was now enacted, "That if any ſhip belonging to any of his Majeſty's ſubjects, or to his Majeſty, ſhall find out, and ſail through, any paſſage by ſea between the Atlantic and Pacific Oceans, in any direction or parallel of the northern hemiſphere, to the northward of the 52d degree of northern latitude; the owners of ſuch ſhips, if belonging to any of his Majeſty's ſubjects; or the commanders, officers, and ſeamen of ſuch ſhip belonging to his Majeſty, ſhall receive, as a reward for ſuch diſcovery, the ſum of 20,000l.

It was not, as has already been hinted, now deemed proper to ſolicit Captain Cook to undergo freſh dangers by undertaking a voyage of this kind; nevertheleſs, as he was univerſally looked upon to be the fitteſt perſon in the kingdom for the purpoſe, the eyes of every one were tacitly fixed upon him: he was conſulted on every thing relating to it, and ſolicited to name the perſon whom he judged moſt proper to conduct it. To determine this point, Captain Cook, Sir Hugh Palliſer, and Mr. Stephens, were invited to the houſe of Lord Sandwich to dinner; where, beſides the conſideration of the proper officer for conducting the expedition, many things were ſaid concerning the nature of the deſign. They enlarged upon its grandeur and dignity, its conſequences to navigation and ſcience, and the completeneſs it would give to the whole ſyſtem of diſcoveries; until at laſt Captain Cook was ſo much inflamed by the repreſentation of the importance of the voyage, that he ſtarted up, and declared that he would conduct it himſelf. This was what the parties preſent had deſired, and probably expected; his offer was therefore inſtantly laid before the king, and Captain Cook appointed commander of the expedition by the 10th of February 1776. At the ſame time it was agreed, that on his return from the voyage he ſhould be reſtored to his place at Greenwich; and if no vacancy occurred during the interval, the officer who ſucceeded him was to reſign in his favour. The inſtructions he now received were, that he ſhould attempt the high latitudes between the continents of Aſia and America, and if poſſible return to England along the northern coaſts of Aſia and Europe. This was moſt probably the reſult of the Captain's own deliberations, and what had been ſuggeſted by him to Lord Sandwich and other people in power. He was particularly deſired to ſail firſt into the Pacific Ocean through the chain of newly diſcovered iſlands which he had lately viſited. After having croſſed the equator, and paſſed into the northern parts of the ocean juſt mentioned, he was then to hold ſuch a courſe as might tend to ſettle many intereſting points of geography, and produce ſome immediate diſcoveries, before he arrived at the main ſcene of operation. With regard to this principal object, he was ordered, immediately on his arrival on the coaſt of New Albion, to proceed northward as far as the latitude of 65 degrees, without loſing any time in exploring creeks or rivers previous to his arrival in that latitude: and for his further encouragement, the act of 1745, offering a premium for the diſcovery of the paſſage, was amended in the manner above mentioned. That nothing might be wanting which could promote the ſucceſs of the grand expedition, Lieutenant Pickerſgill was ſent out, in 1776, with directions to explore the coaſts of Baffin's Bay; and the next year Lieutenant Young was commiſſioned not only to examine the weſtern parts of that bay, but to endeavour to find a paſſage on that ſide from the Atlantic to the Pacific Ocean. Nothing, however, was performed by either

of theſe gentlemen which in the leaſt could promote Captain Cook's ſucceſs. Two veſſels were provided as in the former voyage, viz. the Reſolution and Diſcovery; the command of the former being given to Captain Cook, and of the latter to Captain Charles Clerke. The only thing in which the appointment of the Diſcovery differed from that of the Reſolution was, that the former had no marine officer on board. Every degree of attention was beſtowed, as in the former voyage, upon the proper victualling and other neceſſaries for the two ſhips; and that the inhabitants of thoſe countries which our navigator intended to viſit might derive ſome permanent benefit from the intercourſe they had with him, it was determined to ſend abroad a breed of domeſtic animals, and likewiſe a quantity of uſeful ſeeds, to be left in proper places. With this view, a bull, two cows with their calves, and ſeveral ſheep, with hay and corn for their ſubſiſtence, were taken on board; and it was likewiſe purpoſed to take in others at the Cape of Good Hope. A large aſſortment of iron tools and trinkets was alſo ſent out; and, in ſhort, every thing that could be judged proper either to conciliate the good will of the natives or to prove ſerviceable to them, was provided for the voyage, as well as every convenience for the ſhips' companies. In the former voyage Captain Cook had brought along with him a native of one of the South Sea iſlands, named *Omai*, who reſided in England during the interval between the ſecond and third voyages, and was now happy at getting an opportunity of returning home to his own country. Though he could by no means complain of the entertainment he had met with in England, the idea of returning home loaded with treaſure, which might enable him to make a figure among his countrymen, ſoon overcame all uneaſy ſenſations which the leaving of his Engliſh friends might excite. His majeſty had taken care to furniſh him with every thing that could poſſibly be of uſe when he came to his native country; and he had beſides received ſeveral valuable preſents from Lord Sandwich, Sir Joſeph Banks, and ſeveral ladies and gentlemen of his acquaintance; ſo that nothing was omitted which could poſſibly be done to convey, by his means, to the inhabitants of the South Sea Iſlands an idea of the Britiſh power and liberality.

Every thing being prepared for the voyage, our navigator ſet ſail from the Nore on the 25th of June 1776: but by reaſon of ſome delay in receiving his inſtructions, did not leave Plymouth till the 12th of July. He had not been long at ſea before he began his operations for preſerving the health of his people; which were found equally efficacious in this as in the former voyage. Finding his ſtock of provender for the animals on board likely to run ſhort, he touched at Teneriffe, in order to procure a ſupply, having judged that to be a more proper place than Madeira for the purpoſe. On ſailing from thence he ran a great riſk of running upon ſome rocks on the iſland of Bonaviſta; but in this, as well as on other occaſions of danger, he behaved with the ſame judgment, coolneſs, and preſence of mind, that diſtinguiſhed him throughout the whole courſe of his life. On the 12th of Auguſt he arrived before Port Praya, in one of the Cape de Verde iſlands named *St. Jago*; but not finding it neceſſary to go in there, he continued his voyage to the ſouthward. The weather now becoming gloomy and rainy, required a continuance of the methods he had already practiſed for preſerving the health of his people; and, as formerly, they were attended with the greateſt ſucceſs. In this voyage, the effect of theſe precautions was the more remarkable, as at this time the ſeams of the veſſel were opened to ſuch a degree as to admit the rain, ſo that ſcarce any perſon on board could lie dry in his bed; and all the officers in the gun-room were driven out of their cabbins by the water which came through the ſides. Such was the humanity of the commander, however, that, while the ſhips continued at ſea, he would not truſt the workmen over their ſides to repair the defects, though caulkers were employed in the inſide as ſoon as ſettled weather returned. On the 1ſt of September our navigators croſſed the equator, and on the 18th of October anchored in Table Bay at the Cape of Good Hope. Here they met with a violent tempeſt, the effects of which were felt both on ſea and land. It laſted three days, and the Reſolution was the only ſhip in the bay that rode out the ſtorm without dragging her anchors. On ſhore the tents and obſervatory were deſtroyed, and the aſtronomical quadrant narrowly eſcaped irreparable damage. The Diſcovery, which had been ſome time later in ſailing from England, was driven off the coaſt, and did not arrive till the 10th of November.

While they remained in this place, a diſaſter happened which threatened the loſs of moſt of their live ſtock. The bull and two cows had been put aſhore to graze among other cattle; but Captain Cook had been adviſed to keep the ſheep, 16 in number, near the tents, where they were penned in every night. Some dogs having got in among them in the night-time, killed four, and diſperſed the reſt. Six of them were recovered the next day, but the two rams and two of the fineſt ewes in the flock were miſſing. The captain applied to Baron Plettenburg the governor; but all his endeavours were unſucceſsful, until he employed ſome of the meaneſt and loweſt of the people, fellows whoſe character was, that for a ducatoon they would cut their maſter's throat, burn the houſe over his head, and bury him and his whole family in aſhes. This is mentioned as an inſtance how far the boaſted policy of the Dutch government at the Cape of Good Hope falls ſhort of its alleged perfection. After all, two of the fineſt ewes in the flock were miſſing, and never could be recovered. The captain, therefore, to repair this loſs, and to make an addition to his original ſtock, purchaſed two young bulls, two ſtone-horſes, two mares, two heifers, two rams, ſeveral ewes and goats, with ſome rabbits and poultry; when, having finiſhed all his buſineſs, he ſet ſail on the 30th of November, though it was not till the 3d of December that he got clear of land. Soon after his putting to ſea, he had the misfortune to loſe ſeveral of the goats, eſpecially the males, together with ſome ſheep; and it was with the utmoſt difficulty that the reſt of the cattle were preſerved, by reaſon of the ſhip toſſing and tumbling about in a very heavy ſea. Having explored ſome deſolate iſlands in the ſouthern ſeas, Captain Cook ſet ſail for New Zealand. During this part of the voyage, our navigators were involved in ſo thick a fog, that, according to the authors of Captain Cook's life, " they ſailed 300 leagues *in the dark*." The firſt land they afterwards reached was New Holland; where having remained till the 30th of January 1777, they ſet ſail for New Zealand, and on the 12th of February they anchored in Queen Charlotte's Sound. Here the people were ſhy and timorous, on account of their having formerly deſtroyed ten of Capt. Furneaux's people, who had been ſent aſhore to gather vegetables. The cauſe of the quarrel could not be known, as none of the party were left alive to tell the news. Lieutenant Burney, who went aſhore in queſt of them, found only ſome fragments of their bodies; from which it appeared that they had been killed and eaten by the ſavages. It was not the intention of Captain Cook, at this diſtance of time, to reſent the injury; he even refuſed to put to death a chief named *Kaboora*, who, as he was informed by the natives themſelves, had killed Mr. Rowe the commander of the party. He was, however, particularly careful that no opportunity ſhould now be given the ſavages of committing ſuch an action with impunity; and with this view a boat was never ſent on ſhore without being well armed, and the men under the command of ſuch officers as could be depended upon. The New Zealanders were no ſooner aſſured of Captain Cook's pacific diſpoſition, than they threw aſide their fears and ſuſpicions, and entered into a commercial intercourſe with the people. It

would have been the lefs excufable in Captain Cook to have revenged at this time the maffacre of Mr. Rowe's party, as he was affured that the quarrel originated from fome petty thefts of the favages, which were too haftily refented on the part of the Britifh; and had it not been for this, no mifchief would have happened.

On the 25th of February our navigator left New Zealand, taking with him, at the requeft of Omai, two boys, the eldeft about 18 and the youngeft about 10. Thefe were foon cured of their paffion for travelling, being both violently fea-fick: but as it was then too late to repent, they expreffed their grief in loud and almoft continual lamentation; and this in a kind of fong which feemed to confift of the praifes of their native country, from whence they were now to be feparated for ever. By degrees, however, the fea-ficknefs abated, their lamentation became lefs frequent, and at laft ceafed entirely; their native country was forgotten, and they appeared to be as firmly attached to their new friends the Englifh as if they had been born among them.

So much time was now fpent in failing up and down in the Pacific Ocean, where feveral new iflands were difcovered, that Captain Cook judged it impoffible to accomplifh any thing for this year in the high northern latitudes; for which purpofe he determined to bear away for the Friendly Iflands, in order to fupply himfelf with thofe neceffaries which he had found impoffible to be got at any of the iflands which he had juft difcovered. In his run thither feveral new iflands were vifited; and in profecuting thefe difcoveries our navigator once more narrowly efcaped being fhipwrecked. The danger at this time arofe from a low fandy ifland, which the Refolution was very near running upon. From this fhe was only faved by the circumftance of all the men having been accidentally called upon deck to put the veffel about, and moft of them being at their ftations when the danger was difcovered. Soon after this both fhips ftruck upon fome coral rocks, but happily were got off without damage.

After a ftay of between two and three months, Captain Cook took leave of the Friendly Iflands on the 13th of July 1777; and on the 12th of Auguft reached Otaheite, where he introduced Omai to his country people, and whofe reception by them is particularly related in various publications. Here the captain found the people of Otaheite ready to engage in a war with thofe of Eimeo; but though ftrongly folicited by the former to affift them in an expedition againft their enemies, he refufed to take any concern in the affair, alleging, by way of excufe, that the people of Eimeo had never offended him. This feemed to fatisfy moft of the chiefs; but one, named *Towha*, was fo much difpleafed, that Captain Cook could never regain his favour. He even threatened, that as foon as the captain fhould be gone, he would make war upon Otoo, one of the princes of thefe iflands whom he knew to be in ftrict friendfhip with him; but from this he was deterred by the captain's threatening to return and chaftife him if he made any fuch attempt. As a mark of Otoo's friendfhip, he gave our navigator a canoe, which he defired him to carry to the king of Britain, having nothing elfe, as he faid, worth his acceptance.

From Otaheite Captain Cook proceeded to Eimeo, where, on account of fome thefts committed by the natives, he was obliged to commence hoftilities, by burning a number of their war canoes, and even fome houfes. Thefe tranfactions gave him much concern; and the more that he had been fo much folicited to make war on thefe people by his friends at Otaheite, to whofe entreaties he had refufed to liften. From Eimeo he proceeded to Huaheine, where he faw Omai finally fettled, and left with him the two New Zealand youths already mentioned. The youngeft of thefe was fo much attached to the Englifh, that it was neceffary to carry him out of the fhip and put him afhore by force. During his ftay on this ifland, the captain was obliged to punifh a thief with greater feverity than he had ever done before, viz. by caufing his head and beard to be fhaved, and his ears cut off. Some other difagreeable tranfactions took place, particularly the defertion of two of his people, who were not recovered without the greateft difficulty. In the courfe of his exertions for their recovery, he found it neceffary to detain the fon, daughter, and fon-in law, of the chief of an ifland named Otaha. This had almoft produced very ferious confequences, the natives having formed a plot for carrying off Captain Cook himfelf, as well as Captain Clerke and Mr. Gore. With regard to the commander, they were difappointed by his own caution and vigilance; but Meffrs. Clerke and Gore were in particular danger: and it was only owing to the circumftance of one of them having a piftol in his hand, as they walked together on fhore, that they were not feized.

Having left the Society Iflands, and difcovered a new group, which, in honour of his patron the Earl of Sandwich, our commander named the *Sandwich Ifles*, he fet out on the 2d day of January 1778 on his voyage northward. In this he was very fuccefsful, afcertaining the vicinity of the continents of Afia and America, which had never been done, or but very imperfectly, before. From thefe defolate regions he returned to the ifland of Oonalafhka; whence having refitted and taken in provifions, he returned to the fouthward, and on the 26th of November reached the Sandwich Iflands, where he difcovered a new one named *Mowee*, and on the 30th of the fame month another of much larger extent, named *O-why-hee*. Seven weeks were fpent in exploring the coafts of this ifland; and during all this time he continued to have the moft friendly intercourfe with the people, who, however, appeared to be much more numerous and powerful than thofe of any ifland our navigators had yet touched at. Several of the chiefs and principal people had attached themfelves greatly to the commander, and in general the people appeared to be much more honeft in their difpofitions than any whom he had ever vifited. But by the time he had finifhed his circumnavigation of the ifland, and caft anchor in a bay called *Karakakooa*, matters were greatly altered. An univerfal difpofition to theft and plunder had now taken place; and in this it was evident that the common people were encouraged by their chiefs, who fhared the booty with them. Still, however, no hoftilities were commenced; the greateft honours were paid to the commander; and, on his going afhore, he was received with ceremonies little fhort of adoration. A vaft quantity of hogs and other provifions were procured for the fhips; and on the 4th of February 1779 they left the ifland, not without moft magnificent prefents from the chiefs, and fuch as they had never before received in any part of the world. Unluckily they met with a ftorm on the fixth and feventh of the fame month; during which the Refolution fprung the head of her foremaft in fuch a manner that they were obliged to return to Karakakooa bay to have it repaired. As they returned, Captain Cook had an opportunity of fhowing his humanity to the people by the relief he afforded to fome of their canoes which had fuffered in the ftorm. The fame friendly intercourfe which had formerly been held with the natives now commenced, and Captain Cook was treated with the ufual honours; but on the 13th of this month it was unhappily broken off on the following account: One of the natives being detected in ftealing the tongs from the armourer's forge in the Difcovery, was difmiffed with a pretty fevere flogging; but this example was fo far from being attended with any good effect, that in the afternoon another, having fnatched up the tongs and a chiffel, jumped overboard with them and fwam for the fhore. The mafter and midfhipman were inftantly difpatched in purfuit of him; but he efcaped on board a canoe, which paddled away fo quickly that the cutter could not come near it. A chief named Pareah, who was at

this time on board the Refolution, underftanding what had happened, promifed to go afhore and get back the ftolen goods; but before this could be done the thief had made his efcape into the country. Captain Cook, who was at that time afhore, had endeavoured to intercept the canoe when it landed, but was led out of the way by fome of the natives who pretended to be his guides. The tongs and chiffel, however, were brought back to the mafter as he advanced to the landing place; but he being now joined by fome of the reft of the people in the pinnace, could not be fatisfied with the recovery of the ftolen goods, but infifted upon having the thief or the canoe which carried him by way of reprifal. On his preparing to launch this laft into the water, he was interrupted by Pareah, who infifted that it was his property, and that he fhould not take it away. As the officer paid no regard to his remonftrances, Pareah, who feems to have been a very ftrong man, feized him, pinioned his arms behind, and held him faft by the hair of his head. On this one of the failors ftruck the chief with an oar; on which, quitting the officer, he inftantly fnatched the oar out of the man's hand, and broke it in two acrofs his knee. The Indians then attacked the failors with ftones, and foon drove them to their boats, to which they were forced to fwim, as they lay at fome diftance from the fhore. The officers who could not fwim retired to a fmall rock, where they were clofely purfued by the Indians: and here the mafter narrowly efcaped with his life, till Pareah returned and obliged the Indians to give over their attacks. The gentlemen, fenfible that Pareah's prefence alone could protect them, entreated him to remain with them till they could be brought off in the boats. On his refufal, the mafter fet out to the place where the obfervatories had been erected, for farther affiftance; but Pareah, who met him, and fufpected his errand, obliged him to return. In the mean time the multitude had begun to break in pieces the pinnace, after having taken every thing out of her that was loofe: on the return of Pareah, however, they were again difperfed, and fome of the oars reftored, after which the gentlemen were glad to get off in fafety. Before they reached the fhip Pareah overtook them in a canoe, and delivered the midfhipman's cap which had been taken from him in the fcuffle; he alfo joined nofes with them in token of friendfhip, and defired to know whether Captain Cook would kill him on account of what had happened. They affured him that he would not, and made figns of reconciliation on their part. On this he left them and paddled over to the town of Kavaroah; and that was the laft time that he was feen by the Englifh. In the night-time the fentinels were much alarmed by fhrill and melancholy founds from the adjacent villages, which they took to be the lamentations of the women. Next day it was found that the large cutter of the Difcovery had been carried off in the night-time; on which Captain Cook ordered the launch and fmall cutter to go under the command of the fecond lieutenant, and to lie off the eaft point of the bay in order to intercept all the canoes that might attempt to get out, and if neceffary to fire upon them. The third lieutenant of the Refolution was difpatched to the weftern part of the bay on the fame fervice; while the mafter was fent in purfuit of a large double canoe already under fail, and making the beft of her way out of the harbour. He foon came up with her, and, by firing a few fhots, obliged her to run on fhore, and the Indians to leave her. This was the canoe belonging to a chief named *Omea*, whofe perfon was reckoned equally facred with that of the king, and to the neglect of fecuring him we may attribute the fucceeding difafter. Captain Cook now formed the refolution of going in perfon to feize the king himfelf in his capital of Kavaroah; and as there was reafon to fuppofe that he had fled, it was his defign to fecure the large canoes, which on that account he caufed to be hauled up on the beach. With this view he left the fhip about feven o'clock in the morning of Sunday the 14th of February, being attended by the lieutenant of marines, a ferjeant, corporal, and feven private men. The crew of the pinnace, under the command of Mr. Roberts, were alfo armed; and as they rowed towards the fhore, the Captain ordered the launch to leave her ftation at the oppofite point of the bay, in order to affift his own boat. Having landed with the marines at the upper end of the town, the Indians flocked round him, and proftrated themfelves before him. No fign of hoftility, nor even much alarm, appeared; the king's fons waited on the commander as foon as he fent for them, and by their means he was introduced to the king, who readily confented to go on board; but in a little time the Indians began to arm themfelves with long fpears, clubs, and daggers, and to put on thick mats which they ufe as defenfive armour. This hoftile appearance was greatly augmented by an unlucky piece of news which was juft now brought by a canoe, viz. that one of the Indian chiefs had been killed by the people in the Difcovery's boats. On this the women, who had hitherto fat on the beach converfing familiarly, and taking their breakfafts, removed, and a confufed murmur ran through the crowd. An old prieft now appeared with a cocoa nut in his hand, which he held out to Captain Cook, finging all the while, and making a moft troublefome noife, as if he meant to divert the attention of the Captain and his people from obferving the motions of the Indians, who were now every where putting on their armour. Captain Cook beginning to think his fituation dangerous, ordered his lieutenant of the marines to march towards the fhore, as he himfelf did, having all the while hold of the king's hand, who very readily accompanied him, attended by his wife, two fons, and feveral chiefs. The Indians made a lane for them to pafs; and as the diftance they had to go was only about 50 or 60 yards, and the boats lay at no more than five or fix yards from land, there was not the leaft appearance of the cataftrophe which enfued. The king's youngeft fon Keowa went on board the pinnace without the leaft hefitation, and the king was about to follow, when his wife threw her arms about his neck, and, with the affiftance of two chiefs, forced him to fit down. The Captain might now have fafely got aboard, but did not immediately relinquifh the defign of taking the king along with him. Finding at laft, however, that this could not be accomplifhed without a great deal of bloodfhed, he was on the point of giving orders for the people to reimbark, when one of the Indians threw a ftone at him. This infult was returned by the Captain, who had a double barrelled piece, by a difcharge of fmall fhot from one of the barrels. This had little effect, as the man had a thick mat before him; and as he now brandifhed his fpear, the Captain knocked him down with his mufket. The king's fon, Keowa, ftill remaining in the pinnace, the detaining him would have been a great check upon the Indians; but unluckily Mr. Roberts, who commanded the pinnace, fet him afhore at his own requeft foon after the firft fire. In the mean time another Indian was obferved in the act of brandifhing his fpear at the commander; who thereupon was obliged to fire upon him in his own defence. Miffing his aim, however, he killed one clofe by his fide; upon which the ferjeant obferving that he had miffed the man he aimed at, received orders to fire alfo, which he did, and killed him on the fpot. This repreffed the foremoft of the Indians, and made them fall back in a body; but they were urged on again by thofe behind, and difcharged a volley of ftones among the marines, who immediately returned it by a general difcharge of their mufkets; and this was inftantly followed by a fire from the boats. Captain Cook expreffed his aftonifhment at their firing, waved his hand to them to ceafe, and called to the people in the boats to come nearer to receive the marines. This order was obeyed by Mr. Roberts; but the lieutenant who commanded the launch, inftead of coming nearer, put off to a greater diftance; and by this prepofterous conduct deprived the unfortunate commander

of the only chance he had for his life: for now the Indians, exasperated at the fire of the marines, rushed in upon them and drove them into the water, leaving the Captain alone upon the rock. A fire indeed was kept up by both boats; but the one was too far off, and the other was crowded with the marines, so that they could not direct their fire with proper effect. Captain Cook was then observed making for the pinnace, carrying his musket under his arm, and holding his other hand on the back part of his head to guard it from the stones. An Indian was seen following him, but with marks of fear, as he stopped once or twice seemingly undetermined to proceed. At last he struck the Captain on the back of the head with a club, and then precipitately retreated. The latter staggered a few paces, and then fell on his hand and one knee, and dropped his musket. Before he could recover himself another Indian stabbed him with a dagger in the neck, though still without putting an end to his life. He then fell into a pool of water knee-deep, where others crowded upon him; but still he struggled violently with them, got up his head, and looked towards the pinnace as if soliciting assistance. The boat was not above five or six yards distant; but such was the confused and crowded state of the crew, that no assistance could be given him. The Indians then got him under again, but in deeper water, though he still continued to struggle, and once more got his head up; but being quite spent, he turned towards the rock as if to support himself by it, when a savage struck him with a club, which probably put an end to his life, as he was never seen to struggle any more. The savages hauled his lifeless body upon the rocks, and used it in the most barbarous manner, snatching the daggers out of one anothers hands, in order to have the pleasure of mangling it. If any thing could add to the misfortune of this celebrated navigator's death, it was, that even his mangled remains were not saved from the hands of the barbarians. The lieutenant already mentioned, who, by his removing at a distance when he ought to have come on shore, seemed to have been the occasion of his death, returned on board without making any attempt to recover his body; though it appeared from the testimonies of four or five midshipmen who arrived soon after at the fatal spot, that the beach was almost deserted by the Indians, they having at last yielded to the continual fire from the boats. The officer alleged in his own excuse for removing at first from the shore, that he mistook the signals; but be this as it will, the complaints against him were so many and so great, that Captain Clerke was obliged publicly to take notice of them, and to take the depositions of his accusers in writing.—These papers, however, were not found, and it is supposed that the Captain's bad state of health had induced him to destroy them. After all we are informed, that, in the opinion of Captain Phillips, who commanded the marines, it is very doubtful whether any effectual relief could have been given to the commander, even if no mistake had been committed on the part of the lieutenant. The author of all the mischief was Pareah, the chief already mentioned, who had employed people to steal the boat in the night-time. The king was entirely innocent both of the theft and the murder of Captain Cook; but the latter was perpetrated by some chiefs who were his near relations. The chief who first struck him with a club was named *Karimans raba*, and he who stabbed him with the dagger was called *Nooah*. The latter, Mr. Samwell, from whose narrative this account is taken, observes, was stout and tall, had a fierce look and demeanour, and united in his person the two properties of strength and agility more than he had ever observed in any other person.—Both of them were held in great estimation by their countrymen on account of the hand they had in his death.

By reason of the barbarous disposition of the Indians, it was found impossible to recover Captain Cook's body after the first opportunity already mentioned was lost. By dint of threats and negotiations, however, some of the principal parts were procured with great difficulty; by which means the navigators were enabled to perform the last offices to their much respected commander. These being put into a coffin, and the service read over them, were committed to the deep with the usual military honours on the 21st of February 1779. Soon after his death a letter was issued by M. de Sartine, secretary to the marine department of France, and sent to all the commanders of French ships, importing, that Captain Cook should be treated as the commander of a neutral and allied power; and that all captains of armed vessels who might meet with him, should make him acquainted with the king's orders, but at the same time let him know, that on his part he must refrain from hostilities. This humane and generous proceeding, with regard to France, originated from Mr. Turgot; but the thought seems first to have struck Dr. Franklin. Thus much at least is certain, that the doctor, while ambassador from the United States, wrote a circular letter to the American naval commanders something to the purport of that already mentioned: but in this he was not supported by Congress; for an edict was instantly issued, that special care should be taken to seize Captain Cook if an opportunity for doing it occurred. The Spaniards proceeded in the same manner, and both acted on a principle equally mean and absurd, that the obtaining a knowledge of the western coast of America, or of a northern passage into the Pacific Ocean, might be attended with some bad consequence to their respective states.

Captain Cook was a man of a plain address and appearance, but well looking, and upwards of six feet high. His head was small, and he wore his hair, which was brown, tied behind. His face was full of expression; his nose exceedingly well shaped; his eyes, which were small and of a brown cast, were quick and piercing; his eye-brows prominent, which gave his countenance altogether an air of austerity. Notwithstanding this, it was impossible for any one to excel him in humanity, as is evident from the whole tenour of his behaviour both to his own people and the many savage nations with whom he had occasion to interfere. This amiable property discovered itself even in the final catastrophe of his life; his utmost care being directed to the preservation of his people, and the procuring them a safe retreat to their boats. And it cannot be enough lamented, that he who took so much care of others, should have perished in such a miserable manner for want of being properly supported by them. The perseverance with which he pursued every object which happened to be pointed out as his duty, was unequalled. Nothing ever could divert him from what he had once undertaken; and he persevered in the midst of dangers and difficulties which would have disheartened persons of very considerable strength and firmness of mind. For this he was adapted by nature, having a strong constitution, inured to labour, and capable of undergoing the greatest hardships. His stomach bore without difficulty the coarsest and most ungrateful food; and he submitted to every kind of self-denial with the greatest indifference. To this strength of constitution he joined an invincible fortitude of mind, of which the circumnavigation of New Holland, and his voyage towards the South Pole, furnish innumerable instances. He was master of himself on every trying occasion; and the greater the emergency, the greater always appeared his calmness and recollection; so that in the most dangerous situations, after giving proper directions to his people, he could sleep soundly the hours that he had allotted to himself. That he possessed genius in an eminent degree cannot be questioned: his invention was ready, and capable not only of suggesting the most noble objects of pursuit, but the most proper methods of attaining them. His knowledge of his own profession was unequalled: and to this he added a very considerable proficiency in other sciences. In astronomy, he became so

eminent, that he was at length enabled to take the lead in making the aftronomical obfervations during the courfe of his voyages. In general learning he likewife attained to fuch a proficiency as to be able to exprefs himfelf with clearnefs and propriety; and thus became refpectable as the narrator, as well as the performer of great actions. He was an excellent hufband and father, fincere and fteady in his friendfhip, and poffeffed of a general fobriety and virtue of character. In converfation he was unaffected and unaffuming; rather backward in urging difcourfe, but obliging and communicative to thofe who wifhed for information; and he was diftinguifhed by a fimplicity of manners almoft univerfally the attendant of truly great men. With all thefe amiable qualities, the Captain was occafionally fubject to an haftinefs of temper, which has been fet forth in its utmoft extent, if not exaggerated by fome, though but few, who are not his friends: but even thefe, as well as others, when taking a general view of his character, are obliged to acknowledge that he was undoubtedly one of the greateft men of his age.

Captain Cook is diftinguifhed as an author by an account of his fecond voyage written by himfelf. His firft voyage, as well as that of feveral other navigators, had been recorded by Dr. Hawkefworth; but on the prefent occafion it was not judged neceffary to have recourfe to any other than the pen of the author himfelf; and his journal, with a few occafional alterations, and being divided into chapters, was fufficient for the purpofe. The ftyle is clear, natural, and manly; and it is not improbable, that even a pen of more ftudied elegance could not have made it appear to more advantage. When it appeared, which was not till fome time after the author had left England, the book was recommended by the accuracy and excellence of its charts, and by a numerous collection of fine engravings done from the original drawings of Mr. Hodges.

We cannot conclude this article without taking fome notice of the honours paid to our celebrated navigator after his death, both by his own countrymen and thofe of other nations. Perhaps indeed it may be faid with juftice, that foreigners hold his memory in an eftimation unequalled even in this country; a remarkable proof of which occurs in the eulogy upon him by Michael Angelo Gianetti, read in the Florentine academy on the 9th of June 1785, and publifhed at Florence the fame year. It is faid alfo, that fome of the French literary academies propofed a prize for the beft eulogium on Captain Cook; and many poetical teftimonies of his merit appeared in our own language. The Royal Society of London refolved to teftify their refpect to him by a medal, for which purpofe a voluntary fubfcription was opened. A gold medal was given to fuch of the fellows as fubfcribed 20 guineas, and a filver one to thofe who fubfcribed fmaller fums; and each of the other members received one of bronze. Thofe who fubfcribed 20 guineas were, Sir Jofeph Banks prefident, the Prince of Anfpach, the Duke of Montague, Lord Mulgrave, and Meffrs. Cavendifh, Peachy, Perrin, Poli, and Shuttleworth. Many defigns were propofed on the occafion; but the following was that which was actually ftruck. On one fide was the head of Captain Cook in profile, with this infcription round it, JAC. COOK OCEANI INVESTIGATOR ACERRIMUS; and on the exergue, REG. SOC. LOND. SOCIO SUO. On the reverfe is a reprefentation of Britannia holding a globe, with this infcription round her, NIL INTENTATUM NOSTRI LIQUERE; and on the exergue, AUSPICIIS GEORGII III. One of the gold medal ftruck on this occafion was prefented to the king, another to the queen, and a third to the prince of Wales. Another was fent to the French king on account of the protection he had granted to the fhips; and a fecond to the emprefs of Ruffia, in whofe dominions they had been treated with every expreffion of friendfhip and kindnefs. Both thefe great perfonages condefcended to accept of the prefent with marks of fatisfaction. The French king wrote a handfome letter to the Society, figned by himfelf, and underfigned by the Marquis de Vergennes; and the Emprefs of Ruffia commiffioned Count Ofterham to fignify to Mr. Fitzherbert the fenfe fhe had of the value of the prefent, and that fhe had caufed it to be depofited in the mufeum of the Imperial Academy of Sciences. As a further teftimony of the pleafure fhe derived from it, the emprefs prefented to the Royal Society a large and beautiful gold medal, containing on one fide the effigies of herfelf, and on the other a reprefentation of the ftatue of Peter the Great. After the general affignment of the medals, which took place in 1784, there being a furplus of money ftill remaining, it was refolved by the prefident and council, that an additional number of medals fhould be thrown off, to be difpofed of in prefents to Mrs. Cook, the Earl of Sandwich, Dr. Benjamin Franklin, Dr. Cook provoft of King's College Cambridge, and Mr. Planta. At the fame time it was agreed that Mr. Aubert fhould be allowed to have a gold medal of Captain Cook on his paying for the gold, and the expence of ftriking it, in confideration of his intention to prefent it to the King of Poland.

During the two vifits of the fhips at Kamtfchatka, Colonel Behm, the commandant of that province, had beftowed, in the moft liberal manner, every kind of affiftance which it was in his power to beftow; and fuch was the fenfe entertained by the lords of the admiralty of the kindnefs he had fhewed, that they determined to make him a prefent of a magnificent piece of plate, with an infcription expreffive of his humane and generous conduct. The infcription was drawn up by Dr. Cook, and afterwards fubmitted to the opinion and correction of fome gentlemen of the firft eminence in claffical tafte.

Sir Hugh Pallifer, who had all along difplayed an uncommon refpect and kindnefs for Captain Cook, likewife teftified his regard for his memory in a moft eminent manner. On his eftate in Buckinghamfhire he conftructed a fmall building with a pillar, containing the character of Captain Cook, which is given at the end of the introduction to the laft voyage. This was drawn up by the Honourable Admiral Forbes, admiral of the fleet, and general of the marines, to whom Captain Cook was known only by his merit and extraordinary actions.

Amidft all thefe expreffions of unavailing praife, it was not forgotten to fhow fome effential fervice to the widow and family of our celebrated navigator. A memorial for a penfion of 200l. *per annum* was given in to the king from the commiffioners of the admiralty, and figned by the Earl of Sandwich, Mr. Buller, the Earl of Lifburne, Mr. Penton, Lord Mulgrave, and Mr. Mann. His Majefty complied with the requeft of the memorial, and the grant was paffed through the ufual forms with all poffible fpeed. By this 200l. *per annum* were fettled on the widow during life; and 25l. a-year on each of her three fons. After her death the 200l. was to be divided between each of her children; a fourth was allotted to Captain King, and the remaining fourth to Mr. Bligh and the reprefentative of Captain Clerke.

The number of countries difcovered by Captain Cook, and which had never before been vifited by any European, is very confiderable; of thefe we fhall more particularly fpeak under their proper heads.

COOKERY, the art of preparing and dreffing victuals for the table: an art, in its fimpleft and ordinary modes, fufficiently familiar to every houfe-keeper; and, in its luxurious refinements, too copioufly detailed in manuals and directories publifhed for the purpofe to require any attention here, were it even a topic that at all deferved confideration in a work of this nature.

COOLERS, in medicine, thofe remedies to which is attributed a property of abating the heat of the body in fevers, &c. Of this clafs are nitre and other neutral falts, diluting acidulated drinks, &c.

COOM, a term applied to the foot that gathers over an oven's mouth; alfo for that black, greafy fubftance, which works out of the wheels of carriages.

COOMB, or COMB, *of Corn*, a dry meafure containing 4 bufhels, or half a quarter.

COOP, in hufbandry, a tumbrel or cart enclofed with boards, and ufed to carry dung, grains, &c.

COOP is alfo the name of a pen, or enclofed place, where lambs, poultry, &c. are fhut up in order to be fed.

COOPER, a tradefman who makes cafks, tubs, and barrels, for holding liquors and other commodities. Every cuftom-houfe and excife-office has an officer called the *King's Cooper*; and every fhip of burthen has a cooper on board.

COOPER (Anthony-Afhley), firft earl of Shaftefbury, a moft able ftatefman, was the firft fon of Sir John Cooper, Bart. of Rockburn in Hampfhire, and was born in 1621. He was elected member for Tewkefbury, at 19 years of age, in the fhort parliament that met April 13, 1640. He feems to have been well affected to the king's fervice at the beginning of the civil wars; for he repaired to the king at Oxford with offers of affiftance: but prince Maurice violating his pledge to a town in Dorfetfhire that he had got to receive him, furnifhed him with a pretence for going over to the parliament, from whom he accepted a commiffion. When Richard Cromwell was depofed, and the Rump come again into power, they nominated Sir Anthony of their council of ftate, and a commiffioner for managing the army. At that very time he had engaged in a fecret correfpondence for reftoring Charles II. and, upon the king's coming over, was fworn of his privy council. He was one of the commiffioners for the trial of the regicides; was foon after made chancellor of the Exchequer, then a commiffioner of the treafury; in 1672 he was created earl of Shaftefbury; and foon after raifed to the rank of lord chancellor. He filled this office with great ability and integrity; and though the fhort time he was at the helm was in a tempeftuous feafon, it is doing him juftice to fay, nothing could either diftract or affright him. The great feal was taken from him in 1673, 12 months after his receiving it; but, though out of office, he ftill made a diftinguifhed figure in parliament, for it was not in his nature to remain inactive. He drew upon himfelf the implacable hatred of the Duke of York, by fteadily promoting, if not originally inventing, the famous project of an exclufion-bill. When his enemies came into power, he found it neceffary to confult his fafety, by retiring into Holland, where he died fix weeks after his arrival in 1683. While his great abilities are confeffed by all, it has been his misfortune to have his hiftory recorded by his enemies, who ftudied to render him odious. Butler has given a very fevere character of him in his Hudibras.

COOPER (Anthony Afhley), earl of Shaftefbury, was fon of Anthony earl of Shaftefbury, and grandfon of Anthony firft earl of Shaftefbury, lord high chancellor of England. He was born February 26, 1670-1, at Exeter-houfe in London. His father we have already pointed out; his mother was lady Dorothy Manners, daughter of John earl of Rutland. He was born in the houfe of his grandfather Anthony, firft earl of Shaftefbury, and chancellor of England, of whom we have fpoken in the preceding article; who was fond of him from his birth, and undertook the care of his education. He purfued almoft the fame method in teaching him the learned languages, as Montaigne's father did in teaching his fon Latin: that is, he placed a perfon about him who was fo thoroughly verfed in the Greek and Latin tongues, as to fpeak either of them with the greateft fluency. By this means lord Shaftefbury made fo great a progrefs, that he could read both thefe languages with eafe, when but 11 years old. He began his travels in 1686, and fpent a confiderable time in Italy, where he acquired a great knowledge in the polite arts. This knowledge is very vifible through all his writings: that of the "Art of Painting" is more particularly fo, from the treatife he compofed upon "The Judgement of Hercules." He made it his endeavour, while he was abroad, to improve himfelf as much as poffible in every accomplifhment; for which reafon he did not greatly affect the company of other Englifh gentlemen upon their travels: and he was remarkable for fpeaking French fo readily, and with fo good an accent, that in France he was often taken for a native.

Upon his return to England in 1689, he was offered a feat in parliament from fome of thofe boroughs where his family had an intereft; but he declined it, and purfued that ftrict courfe of ftudy, which he had propofed to himfelf, near five years. Then he was elected a burgefs for Pool; and, foon after his coming into parliament, had an opportunity of fhewing that fpirit of liberty, which he maintained to the end of his life, and by which he uniformly directed his conduct on all occafions. Upon the bringing in, and promoting "The act for granting counfel to prifoners in cafes of high treafon," which he confidered very important, he had prepared a fpeech in its behalf: but when he ftood up to fpeak it in the Houfe of Commons, he was fo intimidated, that he loft all memory, and was quite unable to proceed. The houfe, after giving him a little time to recover his confufion, called loudly for him to go on, when he proceeded to this effect: "If I, Sir," addreffing himfelf to the Speaker, "who rife only to give my opinion on the bill now depending, am fo confounded, that I am unable to exprefs the leaft of what I propofed to fay; what muft the condition of that man be, who, without any affiftance, is pleading for his life, and under apprehenfions of being deprived of it?" During this and other feffions, in which he continued in the Houfe of Commons, he perfevered in the fame way of acting, always heartily concurring in every motion for the further fecurity of liberty: but the bufinefs of attending regularly the Houfe of Commons, which in thofe active times fat long, in a few years fo impaired his health (and he was naturally of a weakly conftitution), that he was obliged to decline coming again into parliament, after its diffolution in 1698.

Being thus at liberty, he went to Holland, where he fpent his time in the converfation of Bayle, Le Clerc, and other learned and ingenious men, then refiding in that country, whofe acquaintance induced him to continue there above a twelvemonth. When he went to Holland, he concealed his name, as it is faid, for the fake of being lefs interrupted in his ftudies, pretending only to be a ftudent in phyfic, and in that character contracted an acquaintance with Bayle. A little before his return to England, being willing to be known to him by his real name, he contrived to have Bayle invited to dinner by a friend, where he was told he was to meet lord Afhley. Bayle accidentally calling upon lord Afhley that morning, was preffed by him to ftay; but excufed himfelf, faying, "I can by no means ftay, for I muft be punctual to an engagement, where I am to meet my lord Afhley." The next interview, as may be imagined, occafioned fome mirth; and their intimacy rather increafed than leffened after the difcovery, for they never ceafed correfponding till Bayle's death. During his abfence in Holland, an imperfect edition of his "Inquiry into Virtue" was publifhed at London; furreptitioufly taken from a rough draught, fketched when he was but 20 years of age. The perfon, who ferved him thus unhandfomely, was Toland; on whom he is faid to have conferred many favours. This treatife was afterwards completed by him, and publifhed in the fecond volume of the "Characteriftics."

Soon after he returned to England, he became earl of Shaftefbury: but did not attend the Houfe of Lords, till his friend lord Somers fent a meffenger to acquaint him with the bufinefs of the partition treaty, February 1700-1. On the acceffion of queen Anne, he retired to his ufual courfe of ftudying; and in

the beginning of the year after, viz. 1703, made a ſecond journey to Holland, and returned to England in the end of the year following. The French prophets, ſoon after, having by their enthuſiaſtic extravagances made a great diſturbance throughout the nation, there were different opinions as to the methods of ſuppreſſing them, and ſome adviſed a proſecution. But lord Shafteſbury, who abhorred any ſtep which looked like perſecution, apprehended that ſuch meaſures tended rather to inflame than to cure the diſeaſe: and this occaſioned his "Letter concerning Enthuſiaſm," which he publiſhed in 1708, and ſent to lord Somers, to whom he addreſſed it, though without the mention of either his own or lord Somers's name. January 1709, he publiſhed his "Moraliſt, a Philoſophical Rhapſody;" and, in May following, his "Senſus Communis, or an Eſſay upon the Freedom of Wit and Humour." The ſame year he married Mrs. Jane Ewer, youngeſt daughter of Thomas Ewer, Eſq. of Lee in Hertfordſhire; to whom he was related, and by whom he had an only ſon, Anthony, the fourth earl of Shafteſbury. In 1710, his "Soliloquy, or Advice to an Author," was printed. In 1711, finding his health ſtill declining, he was adviſed to leave England, and ſeek aſſiſtance from a warmer climate. He ſet out therefore for Italy in July 1711, and lived above a year after his arrival, dying at Naples, February 4, 1712-13.

The only pieces which he finiſhed, after he came to Naples, were "The Judgement of Hercules," and the "Letter concerning Deſign;" which laſt was firſt publiſhed in the edition of the "Characteriſtics," 1732. The reſt of his time he employed in ordering his writings for a more elegant edition. The ſeveral prints, then firſt interſperſed through the work, were all invented by himſelf, and deſigned under his immediate inſpection: and he was at the pains of drawing up a moſt accurate ſet of inſtructions for this purpoſe, which are ſtill extant in manuſcript. In the three volumes of the "Characteriſtics," he completed the whole of his writings which he intended ſhould be made public. The firſt edition was publiſhed in 1711; but the more complete and elegant edition, which has been the ſtandard of all editions ſince, was not publiſhed till 1713, immediately after his death. But though lord Shafteſbury intended nothing more for the public, yet, in 1716, ſome of his letters were printed under the title of "Several Letters written by a noble Lord to a young Man at the Univerſity:" and, in 1721, Toland publiſhed "Letters from the late earl of Shafteſbury to Robert Moleſworth, Eſq." Lord Shafteſbury is ſaid to have had an eſteem for ſuch of our divines, though he treated the order very ſeverely in general, as explained Chriſtianity moſt conformably to his own principles; and it was under his particular inſpection, and with a preface of his own writing, that a volume of Whichcot's ſermons was publiſhed in 1698, from copies, taken, as it is ſaid, in ſhort-hand, as they were delivered from the pulpit.

But his principal ſtudy was the writings of antiquity; and thoſe which he moſt admired, were the moral works of Xenophon, Horace, the "Enchiridion" of Epictetus, with Arrian's "Commentaries," and Marcus Antoninus. Every page of lord Shafteſbury's writings ſhew him to have been a zealous aſſertor of the civil, ſocial, and theiſtic ſyſtem; and hence the whole of his philoſophy ſeems to have been the inculcating theſe two principles, viz. that there is a providence, which adminiſters and conſults for the whole, to the abſolute excluſion of general evil and diſorder, and that man is made by that providence a political or ſocial animal, whoſe conſtitution can only find its true and natural end in the purſuit and exerciſe of the moral and ſocial virtues.

COOT, in ornithology. See Fulica.

COOTWICH (John), doctor of laws, was born at Utrecht, and ſpent great part of his time in travelling. He publiſhed in Latin, in 1619, an account of his journey from Jeruſalem and from Syria; which is very ſcarce and in high eſteem. The time of his death is uncertain.

COPAIBA, or *Balſam of* Copaiba, a liquid reſinous juice, flowing from inciſions made in the trunk of the copaifera balſamum. (See Balsam.) Pure balſam of copaiba diſſolves entirely in rectified ſpirit, eſpecially if the menſtruum be previouſly alkalized. Diſtilled with water, it yields a large quantity of a limpid eſſential oil; and in a ſtrong heat, without addition, a blue oil.

COPAIFERA, in botany: a genus of the monogynia order, belonging to the decandria claſs of plants; and in the natural method ranking under thoſe of which the order is doubtful. There is no calyx; there are four petals; the legumen ovate; one ſeed with an arillus or coat reſembling a berry. We know but of one ſpecies, the balſamum, being that which yields the copaiba balſam mentioned in the preceding article. This tree grows near a village called *Ayapel*, in the province of Antiochi, in the Spaniſh Weſt Indies, about ten days journey from Carthagena. There are great numbers of theſe trees in the woods about this village, which grow to the height of 30 or 60 feet. Some of theſe trees do not yield any of the balſam; thoſe which do, are diſtinguiſhed by a ridge which runs along their trunks. Theſe trees are wounded in the centre, and they place calabaſh ſhells, or ſome other veſſels, to the wounded part to receive the balſam, which will all flow out in a ſhort time. One of theſe trees will yield five or ſix gallons of balſam: but though they will thrive well after being tapped, yet they never afford any more balſam.

COPAL, improperly called *gum copal*, is a gum of the reſinous kind brought from New Spain, being the concrete juice of the rhus copallinum, a tree which grows in thoſe parts. It comes to us in irregular maſſes, ſome of which are tranſparent, and of different ſhades as to colour, from a light yellow to a deep brown. Some pieces are whitiſh and ſemitranſparent. To the ſmell it is more agreeable than frankincenſe; but hath neither the ſolubility in water common to gums, nor in ſpirits of wine common to reſins, at leaſt in any conſiderable degree. By theſe properties it reſembles amber; which has induced ſome to think it a mineral bitumen reſembling that ſubſtance. In diſtillation it yields an oil, which, like mineral petrolea, is indiſſoluble in ſpirit of wine. Copal itſelf is ſoluble in the eſſential oils, particularly in that of lavender, but not eaſily in the expreſſed oils. It may, however, be diſſolved in linſeed oil by digeſtion, with a heat very little leſs than is ſufficient to boil or decompoſe the oil. This ſolution, diluted with ſpirit of turpentine, forms a beautiful tranſparent varniſh, which, when properly applied, and ſlowly dried, is very hard and durable. This varniſh is applied to ſnuff-boxes, tea-boards and other utenſils.

COPARCENARY, the ſhare and quota of a coparcener.

COPARCENERS, from *con* and *particeps*, "partner;" or Parcener; ſuch as have equal portions in the inheritance of their anceſtor. Coparceners are ſo either by law or cuſtom. Coparceners by law, are the iſſue female; which, in default of a male heir, come equally to the lands of their anceſtor. Coparceners by cuſtom, are thoſe who, by ſome peculiar cuſtom of the country, challenge equal parts in ſuch lands; as in Kent, by the cuſtom of gavelkind. The crown of England is not ſubject to coparcenary.

COPE, an eccleſiaſtical ornament, uſually worn by chanters and ſubchanters, when they officiate in ſolemnity. It reaches from the ſhoulders to the feet. The ancients called it *pluviale*. The word is alſo uſed for the roof or covering of a houſe, &c.

Cope is alſo the name of an ancient cuſtom or tribute due to the king or lord of the ſoil, out of the lead mines in ſome part of Derbyſhire; of which Manlove ſaith thus:

Egreſs and regreſs to the king's highway
The miners have; and *lot* and *cope* they pay:
The thirteenth diſh of ore within their mine,
To the lord, for *lot*, they pay at meaſuring time:
Sixpence a load for *cope* the lord demands,
And that is paid to the *burghmaſter's* hand.

This word by doomſday-book, as Mr. Hagar hath interpreted it, ſignifies a hill; and *cope* is taken for the ſupreme cover, as the *cope of heaven.*

COPEL. See Cupel.

COPENHAGEN, the capital of Denmark, with a univerſity. It is the beſt built city of the North; for, although Peterſburg excels it in ſuperb edifices, yet, as Copenhagen contains no wooden houſes, it does not diſplay that ſtriking contraſt of meanneſs and magnificence, but exhibits a more uniform appearance. It owes its principal beauty to a dreadful fire in 1728, that deſtroyed five churches and 67 ſtreets, which have been ſince rebuilt in the modern ſtyle. The new part of the town, raiſed by Frederic V. is very beautiful: it conſiſts of an octagon, containing four uniform and elegant buildings of hewn ſtone, and of four broad ſtreets leading to it in oppoſite directions. In the middle of the area is an equeſtrian ſtatue of the king in bronze, as big as life. It was caſt by Saly, at the expence of the E. India Company, and coſt 80,000l. ſterling. The ſtreets are well paved, with a footway on each, but narrow and inconvenient for general uſe. The greateſt part of the buildings are of brick; and a few are of freeſtone. The palaces of the nobility are in general ſplendid, and ornamented in the Italian ſtyle of architecture. The palace erected by Chriſtian VI. is a large ſtructure; but its external appearance is more grand than elegant. The haven is always crowded with ſhips; and the ſtreets are interſected by broad canals, which bring the merchandiſe cloſe to the warehouſes that line the quays. The citadel is a regular fortification, with five baſtions, a double ditch full of water, and ſeveral advanced works. The city is about five miles in circumference, and is ſeated on the E. ſhore of the iſle of Zealand, 300 miles S. W. of Stockholm, and 500 N. E. of London. E. lon. 12. 40. N. lat. 55. 41. See Amak.

COPERNICAN, in general, ſomething belonging to Copernicus. Hence, Copernican *Syſtem* or *Hypotheſis*, denotes that ſyſtem of the world, wherein the ſun is ſuppoſed to reſt in the centre, and the planets, with the earth, to move in ellipſes round him. See Copernicus.

COPERNICUS (Nicolaus), an eminent aſtronomer, was born at Thorn in Pruſſia, Jan. 10, 1472. He was taught the Latin and Greek languages at home; and afterwards ſent to Cracovia, where he ſtudied philoſophy and phyſic. His genius in the mean time was naturally turned to mathematics, which he purſued through all its various branches. He ſet out for Italy when he was 23 years of age; but ſtaid at Bohemia ſome time, for the ſake of being with the celebrated aſtronomer of that place, Dominicus Maria; whoſe converſation, however, and company, he affected, not ſo much as a learner, as an aſſiſtant to him in making his obſervations. From thence he paſſed to Rome, where he was no ſooner arrived than he was conſidered as not inferior to the famous Regiomontanus; and acquired in ſhort ſo great a reputation, that he was choſen profeſſor of mathematics, which he taught for a long time with great applauſe. He alſo made ſome aſtronomical obſervations there about the year 1500. Returning to his own country ſome years after, he began to apply his vaſt knowledge in mathematics to correct the ſyſtem of aſtronomy which then prevailed. He ſet himſelf to collect all the books which had been written by philoſophers and aſtronomers, and to examine all the various hypotheſes they had invented for the ſolution of the celeſtial phenomena; to try if a more ſymmetrical order and conſtitution of the parts of the world could not be diſcovered, and a more juſt and exquiſite harmony in its motions eſtabliſhed, than what the aſtronomers of thoſe times ſo eaſily admitted. But of all their hypotheſes none pleaſed him ſo well as the Pythagorean, which made the ſun to be the centre of the ſyſtem, and ſuppoſed the earth to move not only round the ſun, but round its own axis alſo. He thought he diſcerned much beautiful order and proportion in this; and that all that embarraſſment and perplexity from epicycles and excentrics, which attended the Ptolemaic hypotheſes, would here be entirely removed.

This ſyſtem, then, he began to conſider, and to write upon, when he was about 35 years of age. He employed himſelf in contemplating the phenomena carefully; in making mathematical calculations; in examining the obſervations of the ancients, and in making new ones of his own; and after more than 20 years chiefly ſpent in this manner, he brought his ſcheme to perfection, and eſtabliſhed that ſyſtem of the world which goes by his name, and is univerſally received (ſee Astronomy). His ſyſtem, however, was then looked upon as a moſt dangerous hereſy: for which he was thrown into priſon by Pope Urban VIII. and not ſuffered to come out till he had recanted his opinion; that is, till he had renounced the teſtimony of his ſenſes. He died the 24th of May 1543, in the 70th year of his age.

Copernicus, the name of an aſtronomical inſtrument, invented by Mr. Whiſton, to exhibit the motion and phenomena of the planets, both primary and ſecondary. It is formed upon the Copernican ſyſtem, and for that reaſon called by his name.

COPHTI, Cophts, or Copti, a name given to the Chriſtians of Egypt, who are of the ſect of Jacobites. The critics are extremely divided about the origin and orthography of the word; ſome write it Cophti, others Cophtites, Cophitæ, Copts, &c. P. Sollier, a jeſuit, derives the word from *Jacobite*, retrenching the firſt ſyllable; whence, Cobite, Cobea, Copta, and Cophta.

The Copts have a patriarch who reſides at Cairo, but he takes his title from Alexandria: he has no archbiſhop under him, but 11 or 12 biſhops. The reſt of the clergy, whether ſecular or regular, is compoſed of the orders of St. Anthony, St. Paul, and St. Macarius, who have each their monaſteries. Beſides the orders of prieſts, deacons, and ſubdeacons, the Cophts have likewiſe archimandrites, the dignity whereof they confer with all the prayers and ceremonies of a ſtrict ordination. This makes a conſiderable difference among the prieſts; and beſides the rank and authority it gives them with regard to the religious, it comprehends the degree and functions of archprieſts. By a cuſtom of 600 years ſtanding, if a prieſt elected biſhop be not already archimandrite, that dignity muſt be conferred on him before epiſcopal ordination. The ſecond perſon among the clergy, after the patriarch, is the titular patriarch of Jeruſalem who alſo reſides at Cairo, becauſe of the Cophts at Jeruſalem; he is, in effect, little more than the biſhop of Cairo: only he goes to Jeruſalem every Eaſter, and viſits ſome other places in Paleſtine near Egypt, which own his juriſdiction. To him belongs the government of the Cophtic church, during the vacancy of the patriarchal ſee.

To be elected patriarch, it is neceſſary the perſon have lived all his life in continence: it is he confers the biſhoprics. To be elected biſhop, the perſon muſt be a celibate; or, if he has been married, it muſt not be above once. The prieſts and inferior miniſters are allowed to be married before ordination; but are not obliged to it, as Ludolphus erroneouſly obſerves. They have a great number of deacons, and even confer the dignity frequently on children. None but the loweſt rank among the people commence eccleſiaſtics; whence ariſes that exceſſive ignorance found among them; yet the reſpect of the laity towards the clergy is very extraordinary. Their office is longer than the Roman office, and never changes in any thing: they have three liturgies, which they vary occaſionally.

The monaftic life is in great efteem among the Cophts: to be admitted into it, there is always required the confent of the bifhop. The religious Cophts make a vow of perpetual chaftity; renounce the world, and live with great aufterity in deferts: they are obliged to fleep in their clothes and their girdle, on a mat ftretched on the ground; and to proftrate themfelves every evening 150 times, with their face and breaft on the ground. They are all, both men and women, of the loweft clafs of the people; and live on alms. The nunneries are properly hofpitals; and few enter but widows reduced to beggary.

F. Roderic reduces the errors and opinions of the Cophts to the following heads: 1. That they put away their wives, and efpoufe others while the firft are living. 2. That they have feven facraments, viz. baptifm, the euchariſt, confirmation, ordination, faith, fafting, and prayer. 3. That they deny the Holy Spirit to proceed from the Son. 4. That they only allow of three œcumenical councils; that of Nice, Conftantinople, and Ephefus. 5. That they only allow of one nature, will, and operation, in Jefus Chrift, after the union of the humanity with the divinity. For their errors in difcipline, they may be reduced, 1. To the practice of circumcifing their children before baptifm, which has obtained among them from the 12th century. 2. To their ordaining deacons at five years of age. 3. To their allowing of marriage in the fecond degree. 4. To their forbearing to eat blood: to which fome add their belief of a baptifm by fire, which they confer by applying a hot iron to the forehead or cheeks.—Others palliate thefe errors, and fhew that many of them are rather abufes of particular perfons than doctrines of the fect. This feems to be the cafe with regard to their polygamy, eating of blood, marrying in the fecond degree, and the baptifm of fire; for circumcifion, it is not practifed as a ceremony of religion, nor as of any divine appointment, but merely as a cuftom which they derive from the Ifhmaelites; and which, perhaps, may have had its origin from a view to health and decency in thofe hot countries.

COPHTIC, or Coptic, the language of the Cophts, the ancient language of the Egyptians, mixed with a great deal of Greek, the characters it is written in being all Greek. It has a form and conftruction peculiar to itfelf: it has no inflections of the nouns or verbs; but expreffes number, cafe, gender, perfon, mood, tenfe, and poffeffive pronouns, by letters and particles prefixed. The ancient Cophtic is now no longer found but in books; the language now ufed throughout the country is Arabic. The old Cophtic, which Kircher maintains to be a mother tongue, and independent of all others, had been much altered by the Greeks: for befides that it has borrowed all its characters from the Greek, with a very little variation, a great number of the words are pure Greek. Voffius, indeed, afferts, that there was no Cophtic language till after Egypt became fubject to the Arabs. The language, according to him, is a mixture of Greek and Arabic: the very name thereof not being in the world till after the Arabs were mafters of the country. But this, M. Simon obferves, proves nothing; except that what was anciently called *Egyptian*, has fince by the Arabs been called *Cophtic*, by a corruption of fpeech. There are, it is true, Arabic words in the Cophtic; yet this by no means proves but that there was a language before that time, either Cophtic or Egyptian. Pietro de la Valle obferves, that the Cophts have entirely loft their ancient tongue; that it is now no longer underftood among them; that they have nothing extant therein but fome facred books; and that they ftill fay mafs in it. All their other books have been tranflated into Arabic, which is their vulgar tongue; and this has occafioned the originals to be loft.

Cophtic *Bible*. See Bible.

Cophtic *Liturgies* are three; one attributed to Bafil, another to St. Gregory, and the third to Cyril: they are tranflated into Arabic for the ufe of the priefts and people.

COPIATA, under the weftern empire, a grave-digger. In the firft ages of the church there were clerks deftined for this employment. In the year 357, Conftantine made a law in favour of the priefts copiatæ, *i. e.* of thofe who had the care of interments; whereby he exempts them from the luftral contribution which all other traders paid. It was under him alfo that they firft began to be called *copiatæ*, q. d. clerks deftined for bodily labour, from κοπος, or κοπτω, *fcindo, cædo, ferio*, "I cut, beat," &c. Before that time they were called *decani* and *lecticarii*; perhaps becaufe they were divided by decads or tens, each whereof had a bier or litter for the carriage of the dead bodies. Their place among the clerks was the next in order before the cantors.

COPING *of a wall*, the top or cover of a wall made floping to carry off the water.

Coping *over*, in carpentry, a fort of hanging over not fquare to its upright, but bevelling on its under fide till it end in an edge.

COPIST, in diplomatic fcience, fignifies a tranfcriber or copier of deeds, books, &c.

COPPA, in law, a cop or cock of grafs, hay, or corn, divided into titheable portions; as the tenth cock, &c. This word in ftrictnefs denotes the gathering or laying up the corn in cops or heaps, as the method is for barley or oats, &c. not bound up, that it may be the more fairly and juftly tithed: and in Kent they ftill retain the word, a *cop* or *cap* of hay, ftraw, &c.

COPPER, the fineft of the imperfect metals, called by the alchemifts *Venus*, on account of its facility of uniting with a great number of different metallic fubftances. Its colour, when pure, is pale red, and its fpecific gravity from 8.7 to 9.3, which depends not only on its degree of purity, but alfo on its condenfation by hammering. The fpecific gravity of Japan copper is to water as 9000 to 1000; but that of the Swedifh kinds only as 8784 to 8843.—The colour, when clean, is very brilliant, but it is extremely liable to tarnifh. It has a difagreeable fmell, very perceptible on friction or on being heated: its tafte is ftyptic and naufeous. Its tenacity, ductility, and hardnefs, are very confiderable, and its elafticity fuperior to that of any other metal except fteel. From this laft quality maffes of the metal emit a loud and lafting found when ftruck; and this more efpecially when caft into a proper form, viz. fuch an one as may make the metal vibrate in the moft fimple manner poffible. Thus, if caft into the hollow form of a bell, without any cracks or imperfections, an uniform tone will be produced by it; or at leaft the tones produced by the ftroke will confift of a fingle predominant one, and of others that have an agreement with it. When broken by often bending backward and forward, it appears internally of a dull red colour, without any brightnefs, and of a fine granulated texture; not ill refembling, as Cramer obferves, fome kinds of earthen ware. It continues malleable in a red heat, and in this ftate extends much more eafy than when cold; but has not that valuable quality of iron, by which two pieces cohere together when heated to a great degree. In a heat far below ignition, the furface of a piece of polifhed copper becomes covered with various ranges of prifmatic colours; the red of each order being neareft to the end which has been moft heated. Reduced to a fine powder or even to filings, and thrown acrofs a flame, it produces blue or green colours, whence its ufe in fire-works. It requires a fierce heat to melt it; lefs, according to Mr. Wedgewood, than gold or filver; but more, according to fome other metallurgifts.—It is remarkably impatient of moifture when in a ftate of fufion; and the contact even of a very fmall quantity of water will caufe a vaft mafs of melted metal to be thrown about with incredible violence, to the imminent danger not only of the byftanders but

even of the ſtrongeſt furnaces and buildings. Effects of this kind are ſaid to have been produced by ſo ſlight a cauſe as the workmen ſpitting in a furnace full of melted copper. Copper is found in the bowels of the earth in the following ſtates:

I. *Native copper*, having the red colour, the malleability, and all the other properties of the metal. It is diſtinguiſhed, ſays Mr. Fourcroy, into two kinds; copper of the firſt formation, and copper of the ſecond formation, or cementation. The copper of the firſt formation is diſperſed in laminæ or fibres, in gangue almoſt always quartzoſe; ſome of its cryſtals reſemble a kind of vegetation, but other ſpecimens are in maſſes or grains. Copper of cementation is commonly in grains or ſuperficial laminæ, on ſtones or on iron: this laſt appears to have been depoſited in waters containing vitriol of copper which have been precipitated by iron. Native copper is found in many places of Europe; particularly in various parts of England, Scotland, and Wales; at St. Bell in Lyons; at Norberg in Sweden, and Newfol in Hungary. It is alſo to be met with in ſeveral parts of America. Mr. Kirwan ſays, it is met with either of its own peculiar colour, or blackiſh or grey; and that either in grains or in large ſhapeleſs ſolid lumps; in a foliated, capillary, or arboreſcent form, or cryſtallized in quadrangular pyramids, in or on clay, ſchiſtus, quartz, fluors, zeolytes, &c. He accounts for its origin, by ſuppoſing it to have been originally precipitated by iron from waters which held it in ſolution, which is the pureſt ſort; but in many caſes it could not have been produced in that manner; and then this ſort is never very pure, but mixed with gold, ſilver, or iron, or with ſulphur; which laſt combination is called *black copper*.

II. *Mineralized* by *fixed air*; of which there are ſeveral varieties. 1. *Red* copper, or hepatic ore of copper. This is known by its red duſky colour, ſimilar to that of the ſcales beat off from copper by hammering. It is ſeldom met with, and then is generally mixed with native copper and mountain green. Sometimes it is cryſtallized in octahedrons or ſilky fibres, and is called *flowers of copper*. Mr. Kirwan ſays, that it is ſometimes met with in a looſe form, and generally called *copper ochre*; but is uſually of a moderate hardneſs, though brittle; ſometimes cryſtallized and tranſparent, either in a capillary form, or in cubes, priſms, or pyramids: it effervesces with acids, and is found in England, Scotland, and Germany. According to Fontana, 100 parts of it contain 73 of copper, 26 of fixed air, and one of water. Mr. Kirwan diſtinguiſhes the hepatic ore as being of a brown colour. It "contains a variable proportion of iron or pyrites, and ſometimes ſulphurated copper; and hence affords from 20 to 50 *per cent.* of copper. It is often *irideſcent*," *i. e.* ſhowing the colours of the rainbow. 2. *Earthy* copper, mountain-green, green chryſocolla or malachite. The laſt, according to Mr. Kirwan, looks like green jaſper, but leſs hard, and does not ſtrike fire with ſteel, is of a radiated or equable texture, generally of an oval form, and the ſize of an egg, but ſometimes forming capillary filaments. Muſchenbroek fixes its ſpecific gravity from 3.5 to 3.994. It is ſometimes mixed with calcareous earth and gypſum. According to Mr. Fontana, 100 parts of the pureſt ſort contain 75 of copper, and 25 of aërial acid and water. *Mountain green* is generally found in a looſe and friable ſtate, rarely cryſtallized and indurated, often mixed with calcareous earth, iron, and ſome arſenic. An hundred parts of the pureſt kind contain 72 of copper, 22 of aërial acid, and 6 of water.

The *malachite*, according to Fourcroy, is frequently found in Siberia, compoſing beds, ſome of which repreſent nipples of various magnitudes. Some ſpecimens are compoſed of needles, converging towards a common centre. The grain of malachite is ſufficiently hard to take a fine poliſh, and is therefore formed into toys of different kinds; but as it is frequently porous and full of unequal cavities, the ſolid pieces of a certain ſize are reckoned valuable. The ſtrata in which it is found are often of different ſhades of green. The mountain grain is a true ochre of copper, of a more or leſs deep green, not heavy, and unequally diſtributed on its gangue: it appears to be combined with the cretaceous acid. There are two varieties beſides the malachite, viz. the ſimple mountain green, and that which is cryſtallized, or the ſilky copper ore of China. It is common in the Hartz, and likewiſe in China. It is very pure, and cryſtallized in long ſilky bundles of conſiderable ſolidity. To theſe three ſtates, ſays Fourcroy, we may add a beautiful green ſand, brought by M. Dombey from Peru, which appears to be a calx of this metal mixed with ſand, and containing a ſmall quantity of muriatic acid.

The third variety of this ſpecies is the *mountain-blue*, or blue chryſocolla. This, according to M. Fourcroy, is a calx of copper of a deep blue colour, ſometimes regularly formed in rhomboidal priſmatic cryſtals of a fine blue, in which caſe it is called azure of copper. "All theſe calces of copper (ſays he) appear to have been precipitated from vitriolic ſolutions of copper, by the intermedium of calcareous earths through which the waters have tranſuded. M. Sage conſiders theſe blue copper ores as combinations of copper with the volatile alkali; from which he affirms that they differ only in their degree of ſolubility; he likewiſe thinks that the malachite is produced from this blue, which he calls tranſparent azure copper ore; but moſt mineralogiſts are of a different opinion." Mr. Kirwan tells us, that 100 parts of this ore contain about 69 of copper, 29 of aërial acid, and 2 of water. Mr. Morveau, in the Memoirs of the Academy of Dijon for 1782, has ſhown, that the calces of copper are determined to a blue rather than a green colour, by a greater proportion of phlogiſton.

III. *Cupreous ſtones*. Theſe are the *turquoiſe* and *lapis armenus*. The former of theſe is improperly called a ſtone, being the tooth of an animal penetrated by the blue calx of copper. It loſes its colour when heated; is opaque, of a lamellar texture, and ſuſceptible of a fine poliſh; its ſpecific gravity from 2.5 to 2.908; ſome are of a deep blue, ſome more white, and become deeper when heated. They are found in Perſia and in Languedoc in France; the copper may be extracted from them by diſtilled vinegar. Reaumur informs us, Mem. Par. 1715, that nitrous acid will not diſſolve the Perſian turquoiſe, though it will that of France. The lapis armenus has calcareous earth or gypſum for its baſe; whence it ſometimes effervesces with acids and ſometimes not. It is uſed in painting, when ground to a fine powder, under the name of BICE. To theſe M. Fourcroy adds, "copper mineralized by the muriatic acid and united to clay."

IV. Copper *mineralized by ſulphur*, with ſcarce any iron, improperly called vitreous copper ore. This is of a deep violet grey, greeniſh brown, or liver colour; melting with a very gentle heat, ponderous, ſometimes flexible, and always yielding to the knife. When broken it appears of a bright golden colour. It is ſometimes found in ſhapeleſs maſſes, ſometimes regularly cryſtallized; is much more fuſible than pure copper, and has a ſpecific gravity from 4.81 to 5.338. It is found in mines of other copper ores, in lime-ſtone, ſpar, quartz, mica, and clay: it is the richeſt of all the copper ores; affording from 80 to 90 per cent. of copper, 10 or 12 of ſulphur, and a ſmall proportion of iron.

V. Copper *mineralized by ſulphur* with a *large proportion of iron*, azure copper ore, does not differ from the preceding but in the quantity of iron it contains, which ſometimes amounts to 50 per cent. It yields 50 or 60 pounds of copper *per* hundred, the reſt being ſulphur. The leſs iron this ore contains, the richer it is in copper; and it has by many been confounded with indurated mountain blue.

VI. Copper mineralized by ſulphur, with *much iron*, the

yellow copper ore, or yellow pyrites. The colour of this is yellow, or yellow mixed with red or green, or variegated like a pigeon's neck; it is inferior in hardneſs to the other pyrites, not readily giving fire with ſteel as they do. It is ſometimes found cryſtallized, and ſometimes in ſhapeleſs maſſes; its ſpecific gravity is about 4.16. It occurs both in ſeparate maſſes and embodied in ſtones, being the moſt common of all the copper ores. The cryſtallized kind affords leaſt metal, containing only from 4 to 8 *per cent.* the remainder being chiefly iron. It is generally reddiſh, and is in fact only a martial pyrites with a ſmall portion of copper: the greeniſh yellow contains moſt fulphur, and from 15 to 20 *per cent.* of copper; the pure yellow contains moſt copper, viz. from 20 to 30 *per cent.* "The cupreous pyrites (ſays M. Fourcroy) often preſent very brilliant blue or violet colours at their ſurface, which are produced by the decompoſition of their principles: they are then called *chatoyant* ores of copper, or ores reſembling the peacock's tail: they commonly contain a large quantity of ſulphur; a ſmall quantity of iron, and are not rich in copper; ſuch are the ores of Derbyſhire in England, ſome of thoſe of St. Bell in Lyons, and many ores of Alſatia, ſuch as thoſe of Caulenbach and Feldens."

VII. Copper united to *ſulphur, arſenic, iron,* and a ſmall quantity of *ſilver*. This is called arſenical or grey copper ore, and is of a white, grey, or brown colour; of moderate hardneſs, very brittle, ſometimes cryſtallized, and often of an indeterminate figure. It is very difficult of fuſion, and more ponderous than the former. It contains from 35 to 60 *per cent.* of copper; the brown is the richeſt in copper; the white or grey contains moſt arſenic; and if the ſilver it contains exceed 1 or 2 *per cent.* it is called grey ſilver ore. It is found embodied in all ſorts of ſtones, and mixed with other copper ores, as well as with the ores of other metals.

A great variety of ſulphurated copper ores is to be met with in the mines of Cornwall, viz. a whitiſh-grey ore cryſtallized in ſmall triangular and quadrangular pyramids, with truncated points, is found along with the ſolid copper ore at Poldice and Delcoth: but the richeſt are the ſolid grey ones found in various places; ſome of which may be cut with a knife like the ſoft vitreous ſilver ore. The moſt remarkable of the yellow ores is the ſtalactitical ore, of an hemiſpherical form, called *run-yellow-copper*, often variegated with different colours. A compact red glaſſy copper ore, covered with mountain green, or green copper, and with calciform copper of a vermilion red colour, is found in cryſtallized quartz, mixed with tender green mica. We alſo meet with an *olive-green coloured* copper ore which is arſenical, and cryſtallized into tender ſpiculæ of about three inches long, ſtanding up ſtraight, either ſingle or faſciculated, or radiated, found on the granitical mountain at Carrarach. Theſe cryſtals melt before the blow-pipe with an arſenical ſmoke, and afterwards melt, forming a button of a grey colour, which, on being melted again with borax, ſoon produces a very pure copper. Another kind of arſenical cupreous cryſtals are likewiſe met with in the form of green cubes run together, with ſmooth and ſhining ſurfaces, upon grey copper ore, in a maſs of cryſtallized compact quartz, with various cryſtals in itſelf; and greatly reſembling ſmall cubes of fluor.

VIII. Copper mineralized by *ſulphur and arſenic* with *zinc* and *iron*; brown or blandoſe copper ore. Mr. Monnet found this ore only at Catherineberg in Bohemia; it is brown, granulated, and very hard, and contains from 18 to 30 *per cent.* of copper. This kind of ore may be analyſed in the liquid way by ſolution in nitrous acid, and precipitation of the copper by iron. The iron and zinc are precipitated by the Pruſſian alkali; the precipitate is then calcinated and rediſſolved in nitrous acid, and the ſolution evaporated to dryneſs. The iron being thus dephlogiſticated, becomes inſoluble in the nitrous acid; but the calx of zinc is rediſſolved, and again precipitated by the Pruſſian alkali. An hundred grains of this precipitate are equivalent to 20 of zinc in its metallic ſtate; and 100 grains of dephlogiſticated iron are equivalent to 73^{1} of iron in its metallic ſtate.

IX. *Argillaceous ſchiſtoſe*, or ſlaty copper *ore*, ſeems to conſiſt of the vitreous copper ore intimately combined with ſchiſtus, and not barely diſperſed through it in viſible particles: it is of a brown or black colour, lamellar texture, and very heavy; affording from 6 to 10 *per cent.* of copper, and is of a difficult fuſion, unleſs limeſtone be added. It contains a little bitumen, calcareous earth, and iron.

X. *Bituminous copper ore* is a kind of pitcoal found in Sweden. It burns with little or no flame, but leaves aſhes from which copper is extracted.

XI. *Black copper ore,* of the colour of pitch. Mr. Gillert denominates it copper ore in ſcoriæ: it is a reſiduum of the decompoſition of the yellow and grey copper ores which contain neither ſulphur nor arſenic, and approaches to the ſtate of malachite; it has a black ſhining appearance like pitch.

XII. Copper united to ſulphur and arſenic containing antimony, or *antimonial copper ore*, is mentioned by Mr. Sage in his Elements of Mineralogy. It is grey and bright, in its fracture like antimony, and contains from 14 to 20 *per cent.* of metal.

XIII. Copper diſſolved by the vitriolic acid. In the year 1673, our countryman, Dr. Brown, viſited a famous copper-mine at Hern-grundt, about ſeven Engliſh miles from Newſol in the Upper Hungary; and he informs us, that there he ſaw two ſprings, called the *Old* and *New Ziment,* which turned iron to copper, as it is vulgarly ſaid. But the caſe is, that the iron is diſſolved by the vitriolic acid of this ſpring-water, and the copper is precipitated in its metallic form in the place of the iron. It has been the cuſtom in Germany for ſome centuries to collect the copper contained in theſe waters, by filling with them ſome pits made purpoſely for this operation. Old iron is thrown in, and, being diſſolved by the acid, is ſuſpended in the water, whilſt the copper is precipitated: the mud being raked out, is melted afterwards in a furnace, and a very fine copper is produced: from 100 tons of iron, 84 and ſometimes 90 tons of fine copper are thus produced.

But although this method of obtaining copper has been long practiſed in Germany, yet it is but of late years, ſays Biſhop Watſon (p. 238 of the firſt volume of his Eſſays), that any ſucceſsful attempts of this kind have been made either in England or Ireland. In this laſt, at leaſt, it was quite owing to an accident. There are very celebrated copper-mines at Arklow, in the county of Wicklow in Ireland; and from theſe mines iſſues a great quantity of water, ſtrongly impregnated with vitriol of copper. One of the workmen having accidentally left an iron ſhovel in this water, he found it ſome weeks after ſo incruſted with a coat of copper, that it was thought to be changed into copper. The proprietors of the mines, in purſuance of this hint, made proper pits and receptacles for the water; and have obtained, by means of ſoft iron bars put into them, ſuch quantities of copper, that theſe ſtreams are now of as much conſequence as the mines themſelves. One ton of iron produces near two tons of copper mud; and each ton of mud produces, when melted, 16 hundred weight of copper, which ſells for 10l. ſterling a ton more than the copper which is fluxed from the ore.

There is in the iſle of Angleſey, on the coaſt of North Wales, a mountain called *Paris,* which abounds in copper-ore, the bed of ore being above 40 feet in thickneſs. The leſſees of this mine annually raiſe from ſix to ſeven thouſand tons of merchantable ore, and daily employ above 40 furnaces in ſmelting it. This ore contains a great quantity of ſulphur, which muſt be ſeparated by roaſting before it can be fluxed into copper. The phlogiſton, with part of the vitriolic acid, is diſperſed into the

air by the force of the fire; another part of the acid attacks and diffolves fuch a quantity of the copper, that the water in which the roafted ore is wafhed (by means of old iron immerfed in it according to the German method) produces great quantities of fine copper, fo that the proprietors have there obtained in one year near 100 tons of the copper precipitated from this water. If this water was afterwards evaporated, it would yield green vitriol or vitriolated iron, at nearly the rate of 200 tons of vitriol for each hundred tons of iron at leaft; which, at the rate of 3l. fterling *per* ton, might perhaps produce very good profit to the undertakers, if any fhould fettle fuch a manufacture there.

Befides the celebrated copper-mines at Arklow in the county of Wicklow in Ireland, there are no lefs than feventeen different places in Britain in which copper-mines are found, as mentioned by Dr. Campbell in the 2d vol. p. 44. of his *Political Survey of Britain*. Thefe are Cardiganfhire, Chefhire, Cornwall, Cumberland, Derbyfhire, Devonfhire, Lancafhire, Ifle of Man, Northumberland, Shropfhire, Somerfetfhire, Staffordfhire, Yorkfhire, Wales, Warwickfhire, Weftmoreland, and North Britain: fome that are worked at this time give fuch large products of this metal, that the opening more copper-mines in this ifland would probably affect the copper trade of Europe in a very confiderable manner. The Ecton mine, in the eftate of the Duke of Devonfhire, on the frontiers of Derbyfhire, but properly fituated in the county of Stafford, produces at leaft 300 tons of copper *per annum*. That of the mountain called *Paris*, in the ifland of Anglefey, whofe bed of ore is about 40 feet in thicknefs, produces about 1500 tons of copper in the year; and the copper-mines of Cornwall produce no lefs than 4000 tons in the fame period. Mr. Jars, who vifited thefe mines in the year 1770, found, upon calculation, that the annual produce of thefe mines amounted to 140,000l. fterling; and M. H. Klaproth, in his Obfervations on the Foffils of Cornwall, publifhed in 1787, afferts that this account is not an exaggerated one.

Copper is purified with lefs difficulty than iron; and its goodnefs is judged of by the bright rednefs of its colour. The impurity of copper proceeds from the mixture of heterogeneous fubftances that are alloyed with it, on account of being naturally contained in the copper-ores. Iron and arfenic are the chief of thefe natural mixtures. The copper-ores of variegated colours, the white copper-ores, and generally thofe mineralized by fulphur, contain a greater proportion of iron; whilft the blue and green copper-ores commonly produce a purer metal, being free, for the moft part, of any confiderable ferruginous mixture. The great aim, therefore, of the metallurgift muft be directed to feparate thefe mixtures from the copper, beginning by the proper examination of the ore, and by afcertaining the proportion of fulphur that may be required to fcorify the quantity of iron there contained. The ore fhould always be roafted by a flow fire, in a clofe furnace, which contributes the beft towards fcorifying the ferruginous and heterogeneous mixtures; and the fame operation muft be repeated after the fecond and third fufion of the metal, till its grain becomes of an homogeneous fine texture. The mixture of fulphureous pyrites in the fufion of the metal contributes towards obtaining this object; if their quality be chofen according to the quantity of fulphur wanting. But in the fecond, third, and following operations, only pure fulphur fhould be added, to fcorify the remainder of the iron that is ftill intermixed with the copper. This fhould be done when the metal is already well fufed; covering it immediately with a proper quantity of charcoal, and feparating the fcória or drofs formed on the furface of the fufed metal.

The copper extracted from thofe mines near Newfol, in Upper Hungary, is faid to be ufually melted 14 times before it is fit for ufe. Thefe are the greateft copper-mines in all Hungary. There are, however, other mines, whofe copper requires far lefs fufing to be well purified. The above was the procefs of Mr. Delius, director of the mines of Bannat near Tamefware in Hungary, propofed by him to the imperial board of the Auftrian mines.

Pure copper allowed to cool flowly will form itfelf into regular cryftallizations, which the Abbé Mongaz defcribes as quadrangular pyramids, fometimes folid, and fometimes compofed of other fimilar fmall pyramids laterally adhering. When heated it becomes coloured on its furface, nearly in the fame manner as fteel; the colours are blue, yellow, and laftly violet; it does not melt but by a violent white heat, though much inferior to that which melts iron. When in a ftate of fufion it appears covered with a green flame, which the filings of the metal likewife produce when projected through flame; and hence are ufed in fire-works, as has been already remarked. The cryftallization of the metal above mentioned is beft perceived by fuffering the metal to cool flowly; and after the furface is become congealed, the fluid portion being poured off, the remaining folid part is found to be cryftallized in pyramids, which are more regular and large in proportion as the fufion has been more complete and the cooling more gradual. The pyramids, according to Fourcroy, are quadrangular, and appear to be formed of a great number of octahedrons inferted into one another. When heated with excefs of air, this metal burns at its furface, and is converted into a calx of a dark red colour, in proportion as it abforbs the bafe of the dephlogifticated part of the atmofphere. The calx may be eafily obtained by heating a ball of copper red-hot, the form of which caufes the calx to fcale off; and the fame effect takes place when red-hot copper is quenched in cold water; the feparation of the calx being promoted by the fudden contraction of the metal. This calx is called the fcales of copper, and may be further calcined till it becomes of a deep brown; after which, by violent heat, it may be melted into a blackifh or deep reddifh brown mafs. The fcoriæ may partly be reduced without any additional phlogifton; for the founders, who buy them of the copperfmiths, take no other trouble with them than that of throwing them into large crucibles on the melted copper, with which they incorporate by fufion; and the fame method is made ufe of to melt the filings. The calx of copper appears to poffefs fome faline properties, but its nature has not yet been afcertained.

Copper calcines when expofed to the air, and is converted into a green ruft or calx, which is in fome degree foluble in water, and communicates a tafte as well as pernicious qualities to it. It is remarkable, however, that this ruft does not corrode the internal parts like that of iron, but is confined to the furface; and thus, inftead of deftroying, contributes, for a long time at leaft, to the prefervation of the metal. This is particularly obfervable in the antique medals and ftatues, which are very well preferved under a covering of ruft. The antiquarians call this cruft *patina*, and put a high value upon the pieces of antiquity covered with it; but the Italians and others have got a method of imitating this cruft, and thus there is great danger of being deceived.

Copper, when taken into the human body, acts as a violent emetic, and has been generally accounted poifonous, though lately received with fome applaufe into the materia medica as a tonic. The pernicious qualities, however, and very difagreeable tafte which it certainly communicates on fome occafions, render it highly neceffary to obferve fome cautions in the ufe of this metal, of which fo many kitchen utenfils are made. Befides an exact attention to cleanlinefs, it is altogether improper to let any fluid remain in a copper veffel till it be cold; for copper is much more calcinable in the cold than when heated. Mr. Fourcroy explains this by fuppofing the calcination to be pro-

duced by water in a ſtate of extreme diviſion: as long, therefore, as the fluid is boiling and the veſſel hot, the aqueous vapour does not adhere to its ſurface; but when the veſſel is cold, the drops of water which adhere to its ſides calcine it, and reduce it to a green calx. The air and the cretaceous acid (fixed air), he ſays, alſo contribute greatly to this calcination; for by diſtilling the ruſt of copper fixed air has been obtained.

In order to prevent the pernicious effects of copper, the veſſels made of it are uſually covered with tin in the inſide. To tin copper-veſſels, they are firſt ſcraped clean and bright; after which they are rubbed with ſal ammoniac to clean them more perfectly. They are then heated and ſprinkled with powdered reſin, which prevents the ſurface of the copper from being calcined; after which the melted tin is poured on and ſpread about. It is, however, juſtly complained, that the tinning of copper veſſels is not ſufficient to defend them from the action of the air, moiſture, and ſaline ſubſtances; becauſe theſe veſſels, even when well tinned, are obſerved to be ſubject to ruſt. This might poſſibly be remedied by a thicker covering of tin; and a manufacture of this kind was ſome time ago eſtabliſhed at Edinburgh, though it does not appear to have been much encouraged; which, however, is no objection to the uſefulneſs of the invention. The method employed was to make the ſurface of the copper very rough with a machine contrived for that purpoſe, and the tin put upon it in this ſituation; after which the copper was hammered ſmooth as before. The very ſmall quantity of tin required to cover the ſurface of the copper in the uſual way is ſurpriſing; a veſſel of 9 inches in diameter and $3\frac{1}{4}$ inches in depth, being found to gain no more than 21 grains by this operation. It too frequently happens indeed, that the tin is alloyed with lead, even to the quantity of one-fourth of its weight; in which caſe the latter may exert its miſchievous influence, eſpecially as it is known that lead is eaſily ſoluble in fatty ſubſtances. A better method, therefore, ſeems to be that propoſed by M. Folie of Rouen, to uſe veſſels of forged iron covered over on the inſide with zinc, which indeed are now become pretty general.

Copper is alſo uſed in mixture with other metals, particularly tin and zinc, in enamel-painting, dyeing, &c. Mixed with tin in conſiderable quantity, it produces BELL-METAL; with a ſmaller proportion BRONZE; with zinc it forms BRASS, PINCHBECK, or SIMILOR, MANHEIM GOLD, &c. according to the proportion; it being always obſervable, that the compounds moſt nearly reſembling gold in colour have the leaſt ductility, and are moſt brittle. See thoſe articles, and p. 442 of the Treatiſe on CHEMISTRY.

With regard to the poiſonous qualities of copper when taken into the body, much leſs danger ſeems to ariſe than from thoſe of arſenic, on account of its eaſy ſolubility; nor indeed have we met with any well authenticated inſtance of a perſon who has died in conſequence of ſwallowing even verdigris itſelf. In one caſe, where an unlucky boy had ſwallowed ſome bits of this ſubſtance thrown out of a chemiſt's laboratory, the ſymptoms were only violent ſickneſs and vomiting, from which he recovered by drinking warm water largely; and probably nothing elſe would be requiſite in any caſe, though Mr. Fourcroy adviſes *emetics*, abundance of water, liver of ſulphur, alkalis, &c. The uſe of emetics in ſuch a caſe, however, ſeems altogether ſuperfluous; ſince verdigris, in the quantity of a grain or a grain and half, has been ordered by ſome medical writers in the caſe of poiſon ſwallowed otherwiſe, as an emetic the moſt quick in its operation of any that could be thought of.

COPPERAS, a name given to the factitious green vitriol. This ſubſtance is called by the College, in their new pharmacopœia, vitriolated iron; but according to the reviſed nomenclature of the chemiſts, *ſulphate* of iron. See CHEMISTRY.

COPPERPLATE. See ENGRAVING.

COPPICE, or COPSE, a little wood, conſiſting of underwoods, or ſuch as may be raiſed either by ſowing or planting.

COPULATION, the act of generation, or the congreſs of the male and female, otherwiſe called *coition*. See GENERATION.

COPY, in a law ſenſe, a tranſcript of a writing or inſtrument, made for the uſe and ſatisfaction of ſome of the parties concerned, or in order to preſerve the memory thereof.

COPY is alſo uſed for an imitation of any original work; particularly a painting, draught, figure, &c.

COPY, among printers, denotes the manuſcript or original of a book given to print from.

COPY-*Hold*, a tenure for which a tenant has nothing to ſhow but the copy of the rolls made by the ſteward of the lord's court. It is called a baſe tenure; becauſe the tenant holds the land at the will of the lord. However, it is not ſimply at the will of the lord, but according to the cuſtom of the manor by which ſuch eſtate is deſcendible, and the tenant's heirs may inherit it; and a copy-holder, ſo long as he does his ſervices, and does not break the cuſtom, cannot be ejected by the lord; and if he be, he ſhall have treſpaſs againſt him. See the articles TENURE and VILLENAGE.

COPY-*Holder*, one who is admitted tenant of lands or tenements within a manor, which time out of mind, by uſe and cuſtom of the manor, have been demiſable, and demiſed to ſuch as will take them in fee-ſimple or fee-tail, for life, years, or at will, according to the cuſtom of the manor by copy of court-roll; but is generally where the tenant has ſuch eſtate either in fee or for three lives.

COPY-*Right*, the right which an author may be ſuppoſed to have in his own original literary compoſitions; ſo that no other perſon, without his leave, may publiſh or make profit of the copies. When a man by the exertion of his rational powers has produced an original work, he has clearly a right to diſpoſe of that identical work as he pleaſes; and any attempt to take it from him, or vary the diſpoſition he has made of it, is an invaſion of his right of property. Now the identity of a literary compoſition conſiſts entirely in the ſentiment and the language; the ſame conceptions, clothed in the ſame words, muſt neceſſarily be the ſame compoſition: and whatever method be taken of conveying that compoſition to the ear, or to the eye of another, by recital, by writing, or by printing, in any number of copies, or at any period of time, it is always the identical work of the author which is ſo conveyed; and no other man (it has been thought) can have a right to convey or transfer it without his conſent, either tacitly or expreſsly given. This conſent may perhaps be tacitly given when an author permits his work to be publiſhed without any reſerve of right, and without ſtamping on it any marks of ownerſhip; it is then a preſent to the public, like the building of a church, or the laying out a new highway: but in caſe of a bargain for a ſingle impreſſion, or a total ſale or gift of the copy-right; in the one caſe the reverſion hath been thought to continue in the original proprietor; in the other the whole property, with its excluſive rights, to be perpetually transferred to the grantee. On the other hand, it is urged, that though the excluſive right of the manuſcript, and all which it contains, belongs undoubtedly to the owner before it is printed or publiſhed; yet from the inſtant of publication, the excluſive right of an author or his aſſigns to the ſole communication of his ideas immediately vaniſhes and evaporates; as being a right of too ſubtile and unſubſtantial a nature to become the ſubject of property at the common law, and only capable of being guarded by poſitive ſtatute and ſpecial proviſions of the magiſtrate.

The Roman law adjudged, that if one man wrote any thing, though ever ſo elegantly, on the paper or parchment of ano-

ther. the writing should belong to the original owner of the materials on which it was written: meaning certainly nothing more thereby than the mere mechanical operation of writing, for which it directed the scribe to receive a satisfaction; especially as, in works of genius and invention, such as a picture painted on another man's canvass, the same law gave the canvass to the painter. We find no other mention in the law of any property in the works of the understanding, though the sale of literary copies, for the purpose of recital or multiplication, is certainly as ancient as the times of Terence, Martial, and Statius. Neither with us in Britain hath there been (till very lately) any final determination upon the right of authors at the common law. It was determined in the case of *Miller v. Taylor* in *B. R. Pasch.* 9 Geo. III. 1769, that an exclusive copy-right in authors subsisted by the common law. But afterwards, in the case of *Donaldson v. Becket*, before the house of lords, which was finally determined 22d February, 1774, it was held, that no copy-right subsists in authors, after the expiration of the several terms created by the statute 8 Ann, c. 19. This statute declares, that the author and his assigns shall have the whole liberty of printing and reprinting his works for the term of 14 years, and no longer; and also protects that property by additional penalties and forfeitures; directing farther, that, if at the end of that term the author himself be living, the right shall then return to him for another term of the same duration.

COQUES (Gonzalo), an esteemed painter of portraits and conversations, was born at Antwerp in 1618, and was a disciple of the old David Ryckaert; under whose direction he applied himself diligently to cultivate those promising talents which he possessed; not only by practising the best rules administered to him by his instructor, but also by studying nature with singular attention. He was a great admirer of Vandyck; and fixing on the manner of that great artist as his model, had the happiness of so far succeeding, that next to him he was esteemed equal to any other painter of his time. He died in 1684.

COQUIMBO, a port-town of Chili, in South America, situated at the mouth of a river of the same name, which discharges itself into the Pacific ocean. W. long. 75. 10. N. lat. 30. 0.

COR CAROLI, in astronomy, an extraconstellated star in the northern hemisphere, situated between the *coma Berenices* and *ursa major*; so called by Dr. Halley in honour of king Charles.

COR-*Hydræ*, a fixed star of the first magnitude, in the constellation of hydra.

COR-*Leonis*, in astronomy, a fixed star of the first magnitude, in the constellation leo.

COR-*mille*, a noted plant, common in the highlands of Scotland. Its roots dried are the support of the highlanders in long journeys, amidst the barren hills destitute of the supports of life; and a small quantity, like the alimentary powders, will for a long time repel the attacks of hunger. Infused in liquor it is an agreeable beverage, and, like the Nepenthe of the Greeks, exhilarates the mind. From the similitude of sound in the name, it seems to be the same with chara, the root discovered by the soldiers of Cæsar at Dyrrachium, which steeped in milk was such a relief to the famished army. Or we may reasonably believe it to have been the Caledonian food described by Dio, of which the quantity of a bean would prevent both hunger and thirst; and this, says the historian, they have ready for all occasions.

CORACIAS, the ROLLER, in ornithology; a genus of birds of the order of picæ, the characters of which are: the bill is straight, bending towards the tip, with the edges cultrated: the nostrils are narrow and naked; the legs for the most part short; the toes placed three before and one behind, and divided to their origin. See Plate 81. This genus is not confined to one spot of the globe, as one or other of the different species may be met with in all the four quarters of it.

1. The *garrula*, or garrulous roller, is about the size of a jay; the bill black, and at the base beset with bristles, which do not cover the nostrils: the head, neck, breast and belly, are of a light blueish green; back and scapulars, reddish brown; coverts on the ridge of the wing, rich blue, beneath them pale green; upper part and tips of the quills dusky; the lower parts of a fine deep blue; rump of this last colour: tail forked, of a light blue; the outer feather tipped with black above, and beneath with deep blue, as is the case with such part of the quill feathers as are black above; the other tail-feathers are dull green: the legs are short, and of a dirty yellow. Mr. Pennant observes that these birds are frequent in several parts of Europe, in most parts of which it is a bird of passage. Mention is made of them in Sweden and Denmark on the one hand, and as far as Africa on the other; not that they are found in all the parts between, nor in the same plenty. Willughby tells us, that in Germany, Sicily, and Malta, they are so common as to be sold in the markets, and in poulterers' shops. Adanson says, that "it comes to reside for some months of the summer in some parts of Europe, and goes back to spend the remainder of the year in Senegal," having shot one on board the ship, on its passage, in April.. Frisch observes, that it makes its nests in woods, where there is birch; that it does not come to its colour till the second year; flies in troops in autumn; often seen in tilled grounds, with rooks and other birds, searching for worms, small seeds, and roots. Its flesh tastes like that of a turtle. It is said also sometimes to make the nest in holes in the ground, in one of which nests two eggs were found. The nest is generally filthy, from the young evacuating their excrements therein; whence by some it was said to make the nest of excrements. We are told in the British Zoology, that it has been twice shot in England, and is remarkable for making a chattering noise, whence its name.

2. The *blue-striped* roller is in length eight inches; the bill three quarters of an inch long, bent at the tip, and of a black colour: the irides are red; the general colour of the plumage deep blue-black, dashed with streaks of greenish blue; the tail and legs are black; it inhabits New Caledonia.

3. The *Chinese* roller is of the size of a jay: the bill and irides are red: the head, hind part of the neck, back, rump, and upper tail coverts, are green; through the eyes on each side is a black stripe: the under parts of the body, from chin to vent, are yellowish white, tinged with green; but the thighs are grey: the wing coverts are olive brown; quills the same, with a mixture of chesnut in some; and others, nearest the body, tipped with white: the tail is five inches in length, and wedge-shaped, the outer feathers shortening by degrees like those of a magpie; all of them are more or less green, verging to black near the ends; the tips of all are white: the legs and claws are of a pale red, and longer than in other rollers. It inhabits China, and is called at Canton *Sauta-hoang*. It is not very common.—There are 13 other species enumerated by ornithologists; though many of them are supposed to be only varieties.

CORACO-BRACHIALIS, in anatomy, the name of a muscle in the arm, serving to raise it upwards.

CORACOIDES, in anatomy, a small short process of the scapula. See ANATOMY, p. 116.

CORACOMANTES, in antiquity, persons who foretold events from their observations on crows.

CORALLINA, or CORAL, in zoology, a genus belonging to the order of vermes zoophyta. The trunk is radicated, jointed, and calcareous. The species are eight, distinguished by the form of their branches, and are found in the ocean adhering to stones, bones, shells, &c. The corals were formerly

believed to be vegetable fubftances hardened by the air; but are now known to be compofed of a congeries of animals, which are even endued with the faculty of moving fpontaneoufly. The iflands in the South-fea are moftly coral rocks covered over with earth. The little creatures, which have fcarce fenfation enough to diftinguifh them from plants, build up a rocky ftructure from the bottom of that fea, too deep to be meafured by human art, till it reaches the furface. Some of the coralline iflands appear to be of a much older date than others; particularly the Friendly Iflands: and it is probable that, as thefe fubmarine works are continually going on, new iflands may by that means frequently be produced.

M. de Peyffonnel of Marfeilles, in confequence of a feries of experiments and obfervations from about the year 1720 to 1750, feems to have been the firft who threw a proper light upon the nature and productions of coral and fimilar marine fubftances. Thofe bodies which the count de Marfigli imagined to be flowers, this ingenious naturalift difcovered to be infects inhabiting the coral; for upon taking branches of it out of the water, the flowers, which proceeded from a number of white points anfwering to the holes that pierced the bark, and the radiation of which refembled the flower of the olive-tree, entered into the bark, and difappeared; but upon being again reftored to the water, they were fome hours after perceptible. Thefe flowers fpread on white paper loft their tranfparency, and became red as they dried. The holes in the bark correfpond to fmall cavities upon the fubftance of the coral; and when the bark is removed, there may be feen an infinite quantity of little tubes connecting the bark with the inner fubftance, befides a great number of fmall glands adhering to them; and from thefe tubes and glands the milky juice of coral iffues forth: the holes in the bark are the openings through which the infects that form thefe fubftances for their habitation come forth; and thofe cavities which are partly in the bark, and partly in the fubftance, are the cells which they inhabit. The organs of the animal are contained in the tubes, and the glandules are the extremities of its feet, and the milky liquor is the blood and juice of the animal, which are more or lefs abundant in proportion to its health and vigour. When the infects are dead, they corrupt, and communicate to the water the fmell of putrid fifh. This juice or liquor runs along the furrows perceived upon the proper fubftance or body of coral, and ftopping by little and little becomes fixed and hard, and is changed into ftone; and being ftopped in the bark, caufes the coral to increafe proportionably and in every direction. In forming coral, and other marine productions of this clafs, the animal labours like thofe of the teftaceous kind, each according to his fpecies; and their productions vary according to their feveral forms, magnitudes, and colours.

The coral infect, or polype, M. Peyffonnel obferves, expands itfelf in water, and contracts itfelf in air, or when it is touched with the hand in water, or acid liquors are poured upon it: and he actually faw thefe infects move their claws or legs, and expand themfelves, when the fea-water containing coral was placed near the fire, and keep them in their expanded ftate when feparated from the coral in boiling water. Broken branches of coral have been obferved to faften themfelves to other branches, and have continued to grow; and this is the cafe when they are connected with detached pieces of rock and other fubftances, from which no nourifhment could be derived. The coral infects in their cells, not having been injured, continue their operations; and as they draw no nourifhment from the ftone of the coral, they are able to increafe in a detached and feparate ftate. Coral was found to be equally red in the fea as out of it; and it was more fhining when juft taken out of the water than even when it is polifhed; and the bark by being dried becomes fomewhat pale. M. Peyffonnel found that it grows in different directions, fometimes perpendicularly downwards, fometimes horizontally, and fometimes upwards; and in the caverns of the fea, open to every expofure.

This fyftem was little regarded, though firft communicated to the Academy of Sciences at Paris in 1727, till Mr. Trembley's difcovery of the frefh-water polype; but fince that time, it has been confirmed by the obfervations of M. Bernard de Juffieu on the fea-coafts of Normandy, and thofe of M. de Reaumur near Rochelle. M. Donati of Turin has alfo adopted the fame hypothefis, viz. that coral is a mafs of animals of the polype kind; and inftead of reprefenting the polype beds and cells which they contain as the work of polypes, he thinks it more juft to fay, that coral and other coralline bodies have the fame relation to the polypes united to them, that there is between the fhell of a fnail and the fnail itfelf, or the bones of an animal and the animal itfelf.

There are properly but three kinds of coral; red, white, and black: the black is the rareft, and moft efteemed; but the red was formerly in great vogue as a medicine. When coral is newly taken up out of the fea, the fmall protuberances on its furface are foft, and yield, on being preffed, a milky juice which effervefces with acids. The cortical part with which the coral is all over covered is not near fo compact as the internal, and may eafily be taken off whilft frefh; and from this part it is ufually freed before it comes to the market. The greateft coral trade is in Genoa and Leghorn.

CORAL Fishery. Red coral is found in the Mediterranean, on the fhores of Provence, from Cape de la Couronne to that of St. Tropez; about the ifles of Majorca and Minorca; on the fouth of Sicily; on the coaft of Africa; and, laftly, in the Ethiopic ocean, and about Cape Negro. The divers fay, that the little branches are found only in the caverns whofe fituation is parallel to the earth's furface, and open to the fouth. The manner of fifhing being nearly the fame wherever coral is found, it will fuffice to inftance the method ufed at the baftion of France, under the direction of the company eftablifhed at Marfeilles for that fifhery. Seven or eight men go in a boat commanded by the patron or proprietor; and when the net is thrown by the cafter, the reft work the veffel, and help to draw the net in. The net is compofed of two rafters of wood tied crofs-wife, with leads fixed to them: to thefe they faften a quantity of hemp twifted loofely round, and intermingled with fome large netting. This inftrument is let down where they think there is coral, and pulled up again when the coral is ftrongly entangled in the hemp and netting. For this purpofe, fix boats are fometimes required; and if in hauling in, the rope happens to break, the fifhermen run the hazard of being loft. Before the fifhers go to fea, they agree for the price of the coral, which is fometimes more, fometimes lefs, a pound; and they engage, on pain of corporal punifhment, that neither they nor their crew fhall embezzle any, but deliver the whole to the proprietors. When the fifhery is ended, which amounts one year with another to twenty-five quintals for each boat, it is divided into thirteen parts; of which the proprietor hath four, the cafters two, and the other fix men one each: the thirteenth belongs to the company for payment of the boat furnifhed them.

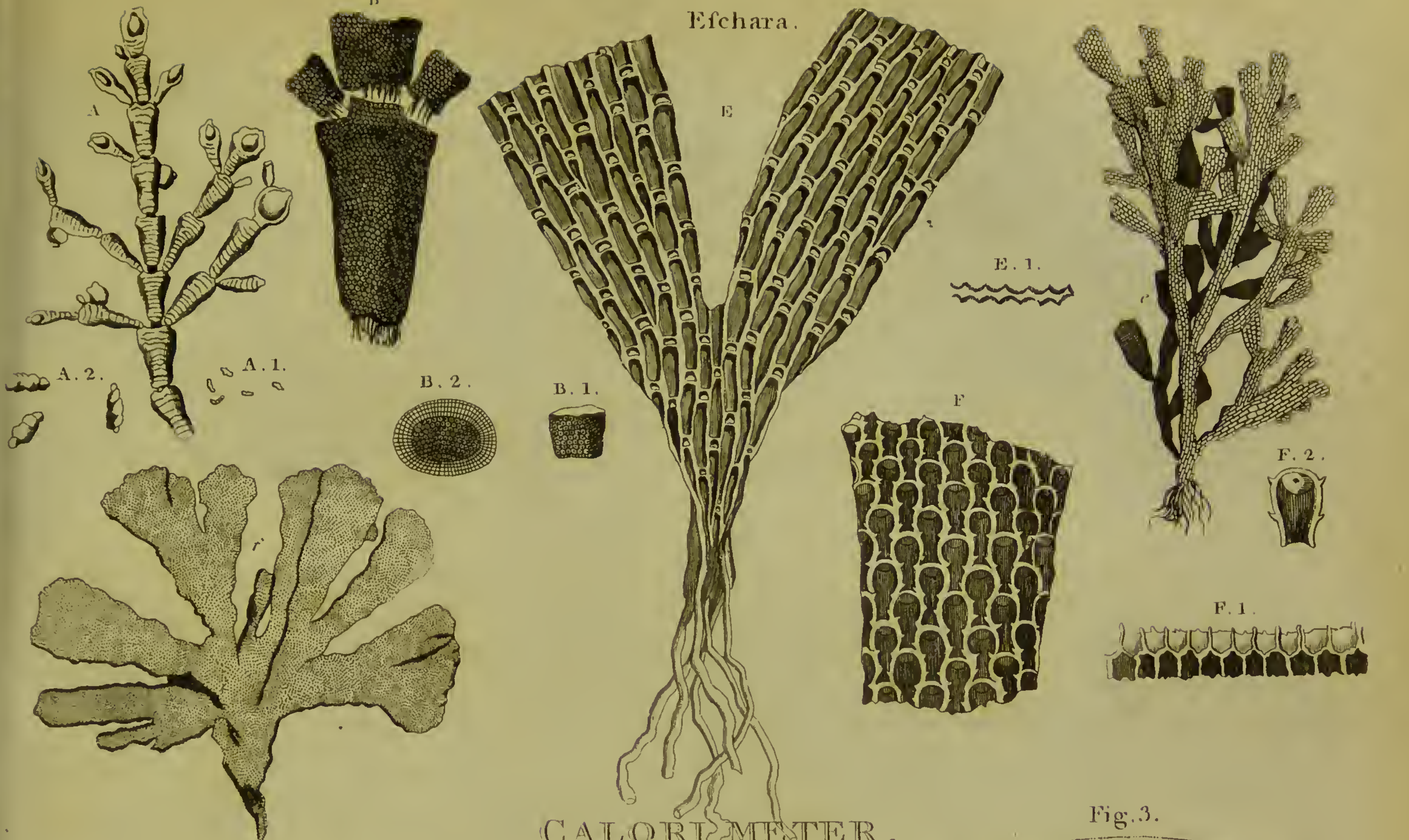
Coral-*Stone*, a name for a kind of a red and white agate which breaks in veins, and is found in Italy and fome parts of Saxony. That of Rochlitz in Saxony is the moft celebrated, and is found in globules which have a kind of cruft about them.

CORALLINES, in natural hiftory, were formerly reckoned a genus of plants, and Mr. Tournefort enumerates 36 fpecies of them; but in the Linnæan fyftem they belong to the clafs of zoophytes, and are defined by modern naturalifts to be fubmarine plant-like bodies, that confift of many flender finely

CORALLINES.


Fig. 1.
a
2
b
Vesiculated.
A
C
B
D
3
c
d
Tubular.
4
E
Articulated.
6
Celliferous.
5
F
G
H
f
7
C.
Keratophyta.
C.3.
C.1.
C.2.
8
D
Barlow sculp.

CORALLINES.



CALORIMETER.

divided and jointed branches, refembling fome fpecies of mofs; or animals growing in the form of plants, having their ftems fixed to other bodies: thefe ftems are compofed of capillary tubes, whofe extremities pafs through a calcareous cruft, and open into pores on the furface. The branches are often jointed, and always fubdivided into fmaller branches, which are either loofe and unconnected, or joined as if they were glued together. They are diftinguifhed from plants by their texture and hardnefs: they alfo yield in diftillation a confiderable quantity of volatile falt; and their fmell, in burning, refembles that of burnt horns and other animal fubftances. Many of the corallines feem to confift of a fingle tube, containing a fingle parent animal. Every branch emitted contains an offspring of this parent dependent upon it, and yet capable of producing its like in the emiffion of a new branch. Others confift of many fuch tubes united, rifing up together, and encircling the deferted tubes of their progenitors, whofe exuviæ become the fubftratum of a rifing generation. Mr. Ellis diftributes corallines into the *veficulated*, *tubular*, *celliferous*, and *articulated* kinds.

Veficulated corallines are diftinguifhed by their horny hollow ramifications: moft of them are furnifhed with little denticles on their branches, like leaves on moffes; and at certain feafons of the year they are furnifhed with fmall bodies like bladders, proceeding from their ftems and branches, and differing in form according to the different fpecies. Their colour, when dry, is of a yellowifh or pale brown, and their nature is elaftic. They are found adhering to rocks, fhells, and fucufes, by fmall root-like tubes: they recover their form in water, after having been dried; and when put into vinegar, they caufe no effervefcence. See plate 85. fig. 1. where *a* reprefents the *fea-tamarifk* in its natural fize, and A the denticles confiderably magnified. Fig. 2. *b*, B, are the *fea-cyprefs*; fig. 3. *c d*, CD, the fmall *climbing coralline* with well fhaped cups.

Tubular corallines, are compofed of a number of fimple tubes, growing up nearly together; or of fuch branched ones as have neither denticles nor veficles. Thefe are horny and elaftic like the former, and recover their original form in water. Some of them appear wrinkled like the wind-pipe, and others like the inteftines of fmall animals. See E. fig. 4.

Celliferous corallines are thofe which appear, when magnified, to be fine thin cells, the habitations of fmall animals connected together, and difpofed in a variety of elegant forms like branches. Thefe effervefce with acids. See fig. 5. F, f, with a part (G H) magnified.

Articulated corallines confift of fhort pieces of a ftony or cretaceous brittle matter, whofe furface is covered with pores or cells, which are joined by a tough, membranous, flexible fubftance, compofed of many fmall tubes of the like nature compacted together. The ftony part is foluble in vinegar, and the other part remains entire. Fig. 6. is the coralline of the fhops. It is fixed to rocks and fhells by ftony joints, which, as they rife, are united to others by extremely fine and flender tubes: thefe may be difcovered by a good eye, or a common magnifier. As the ftems extend themfelves, they become pennated by fide branches which come out oppofite to each other, and are joined in the fame manner; the joints of this fpecies are like the upper part of an inverted cone, but a little compreffed: the whole furface is covered over with very minute circular-fhaped cells like pores; fee B, and B 1, plate 86, where they are magnified. B 2, fhews a crofs fection highly magnified. If a branch of this coralline be put into vinegar, thefe cells are diffolved with the whole cretaceous furface; inftead of which there appear rows of minute ramifications, which feem to have communicated with each of thefe cells. Upon fome fpecimens of this coralline, we may obferve little fmall figures like feed-veffels, with which the branches frequently terminate: they are alfo found on the fides, as may be feen at A, where they are magnified. When a branch is rendered foft by being fteeped in vinegar, there may be fqueezed out from the little knobs at the ends and fides, fmall twifted figures, like thofe at A 1, which are magnified higher at A 2. We frequently find this coralline of different colours, as red, green, afh, and white; but all of it, by being expofed to the fun and air on the fhore, becomes white. Befides the above, Mr. Ellis enumerates other genera of marine productions; as the keratophyta efchara; fponges, and alcyonium; all which are the nefts or matrices of fea-animals. See POLYPE. The laft clafs of marine bodies is formed like fungi of various figures, and with different forts of covering; fome having a gritty, and fome a callous fkin, with a fpongy fubftance in the infide: other fpecies are of a flefhy fubftance.

CORALLODENDRON, in botany. See ERYTHRINA.

CORALLOIDES (FRUTICES.) See ESCHARA and KERATOPHYTA.

CORAN, or ALCORAN. See ALCORAN.

CORAX, in ornithology, the trivial name of a fpecies of CORVUS.

CORANICH, among the Scotch and Irifh, the cuftom of finging at funerals, anciently prevalent in thofe countries, and ftill practifed in feveral parts. Of this cuftom Mr. Pennant gives an account, having affifted at one in the fouth of Ireland, where it was performed in the fullnefs of horror. "The cries (fays he) are called by the Irifh the *ulogohne* and *hullulu*; two words very expreffive of the found uttered on thefe occafions; and being of Celtic ftock, etymologifts would fwear to be the origin of the ὀλολυγων of the Greeks and *ululatus* of the Latins. Virgil is very fond of ufing the laft whenever any of his females are diftreffed; as are others of the Roman poets, and generally on occafions fimilar to this. It was my fortune to arrive at a certain town in Kerry at the time that a perfon of fome diftinction departed this life; my curiofity led me to the houfe, where the funeral feemed conducted in the pureft claffical form. The *conclamatio* was fet up by the friends in the fame manner as Virgil defcribes that confequential of Dido's death. Immediately after this followed another ceremony, fully defcribed by Cambden in his account of the manners of the ancient Irifh; the earneft expoftulations and reproaches given to the deceafed for quitting this world, where fhe enjoyed fo many bleffings, fo good a hufband, and fuch fine children. But when the time approached for carrying out the corpfe, the cry was redoubled, "*Tremulis ululatibus æthera complent*;" a numerous band of females waiting in the outer court to attend the hearfe, and to pay in chorus the laft tribute of their voices. The habits of this forrowing train, and the neglect of their perfons were admirably fuited to the occafion; their robes were black and flowing, refembling the ancient Palla; their feet naked, and their hair long and difhevelled. The corpfe was carried flowly along the verge of a moft beautiful lake, the ululatus was continued, and the whole proceffion ended among the venerable ruins of an old abbey."

CORBAN, in Jewifh antiquity, were thofe offerings which had life, in oppofition to the *minchah*, or thofe which had not. It is derived from the word *karab*, which fignifies "to approach;" becaufe the victims were brought to the door of the tabernacle. The corbans were always looked upon as the moft facred offerings. The Jews are reproached with defeating, by means of the corban, the precept of the fifth commandment, which enjoins the refpect due to parents. For when a child had no mind to relieve the wants of his father or mother, he would fay to them, "It is a gift (*corban*) by whatfoever thou mighteft be profited by me;" i. e. "I have devoted that to God which you afk of me, and it is no longer mine to give."

CORBAN is alfo a ceremony which the Mahometans perform

at the foot of mount Ararat in Arabia, near Mecca. It consists in killing a great number of sheep, and distributing them among the poor.

CORBEILS, in fortification, little baskets about a foot and a half high, eight inches wide at the bottom and twelve at the top; which being filled with earth, are frequently set one against another upon the parapet or elsewhere, leaving certain portholes, from whence to fire upon the enemy under covert without being seen by them.

CORBEL, in architecture, the representation of a basket, sometimes seen on the heads of caryatides. The word is also used for the vase, or tambour, of the Corinthian column; so called from its resemblance of a basket, or because it was first formed on the model of one.

Corbel, or *Corbil*, is also used, in building, for a short piece of timber placed in a wall, with its end sticking out six or eight inches, as occasion serves, in manner of a shouldering-piece. The under part of the end thus sticking out is sometimes cut into the form of a boultin; sometimes of an ogee, and sometimes of a face, &c. according to the workman's fancy; the upper side being plain and flat.

Corbel is also used by some architects for a niche or hollow left in walls for images, figures or statues to stand in.

CORBET (Richard), bishop of Norwich, and an eminent poet, was born at Ewell in Surry, toward the latter end of the 16th century; and educated at Oxford, where he was esteemed one of the most celebrated wits of the university. He died in 1635. There have been several editions of his poems published under the title of *Poemata Stromata*.

CORBIE, a town of France, in the department of Somme and late province of Picardy, with a late celebrated Benedictine abbey, seated on the Somme, 10 miles E. of Amiens. E. long. 2. 38. N. lat. 49. 54.

CORCELET, in natural history, that part of the fly-class which is analogous in its situation to the breast in other animals. Many have called it the breast in these also, but improperly; because the breast of other animals is the seat of the lungs and trachea, but these organs are in the fly-class distributed through the whole body. The wings are affixed to this part in the fly-class; and there are some distinctions of great consequence in regard to the arrangement and distribution of those animals into genera. Some flies have a double corcelet, or one divided into two parts; and this is the case of the fly produced from the formica leo, which therefore does not carry its only distinction in the figure of its antennæ. One pair of the legs of this fly are attached to the first or anterior corcelet, which is also capable of moving on the other.

The corcelets of some flies are also much more elevated than those of others; and in some this elevation is carried so far, that the head is forced by it to be bent downward, and the creature is nearly made hump-backed by it. The great kind, and the *tipulæ*, furnish instances of this elevated and hump-backed *corcelet*. A series of flies of two wings are known by a very particular armament which they carry on the corcelet, usually called their *breast*. This consists of two long slender, sharp-pointed prickles, which are immoveable in their insertions, and seem meant as offensive or defensive weapons; but in what manner they are used is not easily to be determined. All these flies are produced from long water-worms with open and funnel-fashioned tails, or furnished with their aperture for respiration at the hinder extremity.

There are three known species of this sort of fly, with armed corcelets, which differ much in size, but are all produced of worms of this kind. The largest of these flies are produced from the largest and longest worm, and are sometimes longer than the bee. The smallest are produced of worms very small and slender, and are themselves extremely minute: and the third kind is of a middle size between these, and produced from a proportionably smaller worm than that of the first, and proportionably larger than that of the second species. All these species have their wings but little distinguishable at their first production from the shell; they appear indeed only like two slender filaments laid across their bodies: but they quickly show, that in this state they were only very nicely folded together; and soon expand, and shew their full extent and proportion.

When first produced from the shell, these flies are of a pale green colour. The under part of the belly, in many, continues green, but in the greater number it becomes of a pale dead brown. Some of them have the outside of their bodies of a deep brown, approaching to black, with lines of a dead brown between the commissures of the rings. The back in some others has only a blackish brown band, which runs straight down from the corcelet to the end of the body, the whole body beside being of a dead brown. The corcelet in these flies is brown, and the prickles are yellowish near their insertions, but nearly black at their points. They have three of the small glossy eyes disposed in the shape of a triangle on the back part of the head; and their reticular eyes are brown, and at some distance from one another.

CORCHORUS, in botany; a genus of the monogynia order, belonging to the polyandria class of plants; and in the natural method ranking under the 37th order, *Columneæ*. The corolla is pentapetalous; the calyx pentaphyllous and deciduous; and the capsule many-valved and many-celled. There are eight species; of which the most remarkable is the *olitorius*, an annual, and a native of Asia, Africa, and America. It rises with a round, striated, upright, branched, stalk, to near two feet, which is furnished with leaves differing in shape; some being oval, some cut off straight at their base, and others almost heart-shaped. They are of a deep green colour, and have a few teeth on the margins of their base, that end in bristly, reflexed, purplish filaments. The flowers come out at the sides of the branches opposite to the leaves. They stand singly on very short peduncles; are composed of five small yellow petals, and a great number of stamina surrounding an oblong germen, which becomes a long, rough, sharp-pointed capsule, opening in four parts, each filled with greenish angular seeds. This plant is sown by the Jews about Aleppo, and is therefore called *Jew's mallow*. The leaves are a favourite sallad among that people, and they boil and eat them with their meat.

CORCULUM, a diminutive from *cor*, "the heart," little heart; the essence of a seed, and principle of life of the future plant, attached to and contained within the lobes. It consists of two parts, termed by Linnæus Plumula and Rostellum. The former is the *radicula* of Grew and other naturalists. The corculum is in fact the embryo of the future vegetable; and is attached by two trunks of vessels to the lobes at their union. The first of its two parts mounts upward, and becomes the trunk. The other strikes into the ground, and is the rudiment of the root. The lobes and heart of the seed are distinctly visible in the bean, and other seeds of that class, especially after remaining some time in water or earth. The principle of life is seated either at the summit or base of the seed. From this circumstance are constructed the two first classes in Cæsalpinus's method, containing trees and shrubs only.

CORD, or Chord, an assemblage of several threads of hemp, cabled or twisted together by means of a wheel. See Cordage. The word comes from the Greek χορδη, which properly signifies an intestine or gut, of which cords may be made. See Chord.

Magical Cord, an instrument in great use among the Laplanders, and by them supposed to be endowed with extraordinary virtues. It is a cord or rope with three knots tied on it.

They uſe many magical rites and ceremonies in the tying of this cord; and, when thus prepared, it is ſuppoſed to have power over the winds; and they will ſell, by means of it, a good wind, or at leaſt the promiſe of one, to a ſhip. If they untie only one of theſe knots, a moderate gale ſucceeds; if two, it is much ſtronger; and if three, a ſtorm is ſure to follow.

Cord *of Wood*, a certain quantity of wood for burning, ſo called becauſe formerly meaſured with a cord. The dimenſions of a ſtatute cord of wood are eight feet long, four feet high, and four feet broad.

Cord-*Wood*, is new wood, and ſuch as, when brought by water, comes on board a veſſel, in oppoſition to that which is floated.

CORDAGE, a term uſed in general for all ſorts of cord, whether ſmall, middling, or great. See Rope. The naval cordage of the earlier ages was in all probability only thongs of leather. Theſe primitive ropes were retained by the Caledodians in the third century. The nations to the north of the Baltic had them in the ninth or tenth centuries: and the inhabitants of the weſtern iſles of Scotland make uſe of them at preſent; cutting the ſkin of a ſeal, or the raw and ſalted hide of a cow, into long pieces, and faſtening the plough to their horſes with them, or even twiſting them into ſtrong ropes of 20 or 30 fathoms length. But theſe, in the ſouth of our iſland, and on the continent, were early ſuperſeded by the uſe of iron chains. The very maritime and commercial nation of the Veneti, that were ſo intimately connected with the Belgæ of Britain, uſed iron chains for their cables in the days of Cæſar. But in the more diſtant and refined countries of the ſouth, both thongs and theſe had given place to the uſe of vegetable threads, and the arts of combining them into ſtrength. In this manner the Greeks appear to have uſed the common ruſhes of their country, and the Carthaginians the ſpartum or broom of Spain. And as all the cordage of the Romans was made of theſe materials at their laſt deſcent on our iſland, ſo the art of manufacturing them would be neceſſarily introduced with the Roman ſettlements among the Britons. Under the direction of Roman artiſts their thongs of leather would naturally be laid aſide, and the junci, or ruſhes of the plains, worked up into cordage. And what remarkably coincides with this opinion is, that the remains of old cables and ropes are ſtill diſtinguiſhed among the Britiſh ſailors by the name of *old junk*.

CORDATED, an appellation frequently given by naturaliſts to things ſomewhat reſembling a heart.

CORDED, in heraldry. A croſs corded, ſome authors take for a croſs wound or wrenched about with cords: others, with more probability, take it for a croſs made of two pieces of cord.

CORDELERAS, mountains of South America, otherwiſe called Andes.

CORDELIER, a Franciſcan, or religious of the order of St. Francis. The Cordeliers are clothed in thick grey cloth, with a little cowl, a chaperon, and cloak, of the ſame; having a girdle of rope or cord tied with three knots: whence the name. They are otherwiſe called *Minor Friars*, their original name. The denomination *Cordelier* is ſaid to have been firſt given them in the war of St. Louis againſt the infidels; wherein the Minor Friars having repulſed the barbarians, and that king having inquired their name, it was anſwered, they were people *cordeliez*, "tied with ropes." The Cordeliers are to a man profeſſed Scotiſts.

CORDIA, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 41ſt order, *Aſperifoliæ*. The corolla is funnel-ſhaped; the ſtyle dichotomous or divided into two threads, and each of theſe divided into other two. There are five ſpecies, of which the principal are the myxa and ſebeſtena. 1. The *myxa*, or Aſſyrian plum, grows wild in Aſſyria or Egypt, and alſo on the coaſt of Malabar. It riſes to the height of a middling plum-tree; and its branches are furniſhed with oval, woolly leaves, ſtanding without order. The flowers are produced in bunches; are white, and conſiſt of one tubular petal, and a like calyx, nearly of an equal length, and both are cut into five parts to their brims. In their centre are five very ſmall ſtamina, and one ſlender ſtyle crowned with an obtuſe ſtigma. The germen is roundiſh, and ſwells to a plum of the ſame form, and about the ſize of a damſon, of a dark brown colour, a ſweet taſte, and very glutinous. In ſome parts of Turky they cultivate this tree in great abundance, not only for the ſake of the fruit to eat, but to make birdlime of, which is a great article of trade in a town called *Seid*. 2. The *ſebeſtena*, or rough-leaved ſebeſten, grows naturally in both the Indies, and ſends forth ſeveral ſhrubby ſtalks eight or ten feet high. The young leaves are ſerrated, but the full grown ones are not. They are of an oblong oval form, rough, of a deep green on the upper ſide, and ſtand alternately on footſtalks. The flowers terminate the branches in large cluſters, are nearly of the ſhape and colour of thoſe of the marvel of Peru, and wear a moſt beautiful appearance. Each has five ſtamina and one bifid ſtyle. The plums are much of the ſhape of thoſe of the myxa, and are eaten in the ſame manner. The fruit of this tree is leſs valuable than the wood, a ſmall piece of which thrown upon a clear fire will perfume a room with a moſt agreeable odour.

CORDIAL, in medicine, whatever raiſes the ſpirits, and gives them a ſudden ſtrength and cheerfulneſs; as wine, ſpirits, the effluvia of flowers, fruit, and many other ſubſtances.

CORDON, in fortification, a row of ſtones, made round on the outſide, and ſet between the wall of the fortreſs which lies aſlope, and the parapet which ſtands perpendicular, after ſuch a manner, that this difference may not be offenſive to the eye; whence the cordons ſerve only as an ornament, ranging round about the place, being only uſed in fortifications of ſtone-work: for in thoſe made with earth the void ſpace is filled up with pointed ſtakes.

CORDOVA, an epiſcopal town of Andaluſia, in Spain, remarkable for its antiquity, and for having preſerved its ſplendour and riches through ſo many ages, it being well known to the Romans by the name of Corduba. It is ſeated on the Guadalquiver, over which is a magnificent ſtone bridge. The circumference is large, but it is not peopled in proportion to its extent, for there are a great many orchards and gardens within the walls. There are many ſuperb palaces, churches, and religious houſes, particularly the cathedral, which was a moſque, when the Moors poſſeſſed the town; for which reaſon it ſtill retains the name of Mezquita. The ſquare called the Plaza Major, is ſurrounded by fine houſes, under which are piazzas. The trade conſiſts in wine, ſilk, and Cordovan leather. In the neighbourhood are a vaſt number of orange and lemon trees. The beſt horſes in Spain come from hence. It is 75 miles N. E. of Seville, and 137 S. by W. of Madrid. W. lon. 4. 4. N. lat. 37. 52.

CORDUAN, a famous light-houſe of France, at the mouth of the river Gironde. W. long. 1. 9. N. lat. 45. 36.

CORDWAINERS, or Cordiners, the term whereby the ſtatutes denominate *ſhoemakers*. The word is formed from the French *cordonnier*, which Menage derives from *cordouan*, a kind of leather brought from Cordua, whereof they formerly made the upper leathers of their ſhoes. Others derive it from *corde*, "rope," becauſe anciently ſhoes were made of cords; as they ſtill are in ſome parts of Spain, under the name of *alpargates*. But the former etymology is better warranted: for, in effect, the French workmen who prepare the cordua's are ſtill called *cordouanniers*. In Paris, before the revolution, they had two pious ſocieties under the title of *freres cordonniers*. The produce of their ſhoes went into a common ſtock, to furniſh neceſ-

ſaries for their ſupport; and the reſt was diſtributed among the poor.

CORE A, a peninſula lying to the N. E. of China, between 99° and 109° E. lon. and 32° and 46° N. lat. The capital town is Hanching, where the king reſides. The people are well made, of a ſweet and tractable diſpoſition, fond of learning, muſic, and dancing; and, in general, reſemble the Chineſe. Their houſes are mean, being covered with thatch; and they have no beds, but lie on the floor. Their arms are croſs-bows and long ſabres. Their trade conſiſts in white paper, pencils, ginſeng, gold, ſilver, iron, yellow varniſh; fowls, whoſe tails are three feet long; horſes no more than three feet high; ſable-ſkins, caſtor, and mineral ſalt. In general, it is a fertile country, though abounding in mountains. They never bury their dead till three years after their deceaſe, but keep them in coffins for that time. It is tributary to China.

COREIA, in antiquity, a feſtival in honour of Proſerpine, named *Core*, Κορη, which in the Moloſſian dialect ſignifies a beautiful woman.

CORELLI (Arcangelo), a famous muſician of Italy, was born at Fuſignano, a town of Bologna, in 1563. His firſt inſtructor in muſic was Simonelli, a ſinger in the pope's chapel; but his genius leading him to prefer ſecular to eccleſiaſtical muſic, he afterwards became a diſciple of Baſſani, who excelled in that ſpecies of compoſition, which Corelli always delighted in, and made it the buſineſs of his life to cultivate. It is preſumed that he was taught the organ: nevertheleſs, he had an early propenſity to the violin, on which he made ſo great a proficiency, that ſome have not ſcrupled to pronounce him then the firſt performer on it in the world. About 1672 his curioſity led him to viſit Paris; but the jealous temper of Lully not brooking ſo formidable a rival, he ſoon returned to Rome. In 1680 he viſited Germany, was received by the princes there ſuitably to his merit; and, after about five years ſtay abroad, returned and ſettled at Rome.

While thus intent upon muſical purſuits at Rome, he fell under the patronage of cardinal Ottoboni; and is ſaid to have regulated the muſical academy held at the cardinal's palace every Monday afternoon. Here it was that Handel became acquainted with him; and in this academy a ſerenata of Handel, entitled, "Il Trionſo del Tempo," was performed: the overture to which was in a ſtyle ſo new and ſingular, that Corelli was confounded in his firſt attempt to play it. This ſerenata, tranſlated into Engliſh, and called "The Triumph of Time and Truth," was performed at London in 1751. The merits of Corelli, as a performer, were ſufficient to attract the patronage of the great, and to ſilence, as they did, all competition; but the remembrance of theſe is at this day abſorbed in the contemplation of his excellencies, as a muſician at large; as the author of new and original harmonies, and the father of a ſtyle not leſs noble and grand, than elegant and pathetic. He died at Rome in 1713, aged almoſt 60; and was buried in the church of the Rotunda, otherwiſe called the Pantheon; where, for many years after his deceaſe, he was commemorated by a ſolemn muſical performance, on the anniverſary of his death. He died poſſeſſed of about 6000l. which, with a large and valuable collection of pictures, of which he was paſſionately fond, he bequeathed to his friend and patron cardinal Ottoboni; who, however, while he reſerved the pictures to himſelf, had the generoſity to diſtribute the money among the relations of the teſtator.

COREOPSIS, TICKSEEDED SUNFLOWER: a genus of the polygamia fruſtanea order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is paleaceous: the pappus two-horned: the calyx erect and polyphyllous, ſurrounded with patent radiated leaflets at the baſe. There are 11 ſpecies, moſt of them herbaceous perennials. They are very flowery, and riſe from three to eight feet ſtature; terminated by cluſters of compound radiated flowers of a yellow colour. They have all perennial fibrous roots, and annual ſtalks, which riſe in the ſpring, flower from July to October, and decay to the root in November. The flowers are all ſhaped like ſun-flowers, but ſmaller, and are very ornamental. They are eaſily propagated by ſlipping, or dividing the roots in autumn, when the ſtalks decay; planting the ſlips at once where they are to remain; after which they will require no further trouble than to be kept free from weeds, and have the decayed ſtalks cut annually in autumn.

CORFE-CASTLE, a borough of Dorſetſhire, with a market on Thurſday. It is ſeated on a peninſula called Purbeck, on a river between two hills, on one of which ſtands the caſtle. It is 21 miles E. of Dorcheſter, and 120 W. by S. of London. W. lon. 2. 4. N. lat. 50. 36.

CORFU, an iſland of the Mediterranean, near the coaſt of Albania, ſubject to the Venetians, and the moſt important place they have in theſe parts, becauſe it commands the gulf of Venice; for which reaſon they have always here ſeveral gallies and other veſſels. The metropolitan church of the Greeks, in the capital, is very handſome. This iſland is defended by an impregnable caſtle. Here they make a great quantity of ſalt; and the country abounds with vineyards, lemons, and olives. The capital is of the ſame name, on the eaſt coaſt of the iſland. E. lon. 20. 0. N. lat. 39. 40.

CORIA, an epiſcopal town of Spain, in Leon, on the river Alagon; 120 miles S. W. of Madrid. W. lon. 5. 30. N. lat. 40. 0.

CORIANDRUM, CORIANDER; a genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The corolla is radiated; the petals inflexed-emarginated; the involucrum univerſal and monophyllous; the partial involucra halved; the fruit ſpherical. There are only two ſpecies, both of them herbaceous annuals, the leaves of which are uſeful for the kitchen, and the ſeeds for medicine. Both ſpecies have divided ſmall leaves, ſomewhat reſembling parſley: but there is but one ſpecies generally cultivated; namely, the *ſativum*. This hath a ſmall fibrous white root, crowned by many parted leaves, having broadiſh ſegments; and in the centre an upright, round, branchy ſtalk, two feet high, having all the branches terminated by umbels of flowers, which are ſucceeded by globular fruit. It is propagated by ſeed, which, when a good crop is wanted, ought to be ſown in March, either in drills a foot aſunder, or by broadcaſt, and then raked in. When the plants are an inch or two high, they ſhould be hoed to ſix or eight inches diſtance. The ſeeds, when freſh, have a ſtrong diſagreeable ſmell, which improves by drying, and becomes ſufficiently grateful: they are recommended as carminative and ſtomachic.

CORIARIA, the *Tanner's* or *myrtle-leafed* SUMACH; a genus of the decandria order, belonging to the diœcia claſs of plants; and in the natural method ranking under the 54th order *Miſcellaneæ*. The male calyx is pentaphyllous; the corolla pentapetalous, very like the calyx, and united with it; the antheræ bipartite. The female calyx is pentaphyllous; the corolla like that of the male; the ſtyles five, ſeeds five, covered with a like number of ſucculent petals, forming altogether the reſemblance of a berry. There are two ſpecies, the myrtifolia and the fœmina. They are both natives of the ſouth of France, but the former is moſt commonly cultivated in this country. It is a pretty ornamental plant, with a ſhrubby pithy brown ſtem, cloſely branching from the bottom, and forms a buſhy head three or four feet over, thickly garniſhed with oblong, pointed, bright green leaves, having ſmall ſpikes of whitiſh flowers at the ends of the branches. It is eaſily propagated by ſuckers from the root, in which it abounds plentifully, and may be taken off with fibres every autumn or winter. It may be al-

ſo propagated by layers in autumn, which will take root in a year. It is much uſed in the ſouth of France, where it naturally grows, for tanning of leather, whence its name of *tanner's ſumach*. It alſo dyes a beautiful black colour. The berries are dangerous, and when eaten generally occaſion vertigo or epilepſy. The old leaves have the ſame effect upon cattle that eat them, but the young leaves are innocent.

CORIDOR, or Corridor, in fortification, a road or way along the edge of the ditch, without-ſide; encompaſſing the whole fortification. The word comes from the Italian *coridore*, or the Spaniſh *coridor*. It is alſo called the *covert-way*; becauſe covered with a glacis, or eſplanade, ſerving it as a parapet. The coridor is about 20 yards broad.

Coridor is alſo uſed in architecture, for a gallery or long aiſle around a building, leading to ſeveral chambers at a diſtance from each other, ſometimes wholly incloſed, and ſometimes open on one ſide.

CORINTH, now called Corantho or Gerame, an ancient and celebrated town, in the Morea, with a Greek archbiſhop's ſee. It was one of the moſt important places in Greece, on account of its ſituation on the iſthmus into the Morea; its caſtle on the top of an almoſt inacceſſible rock; its harbours on the gulfs of Lepanto and Engina; its riches, and its architects, ſculptors, and painters, who were the moſt ſkilful in Greece. It once belonged to the Venetians, but the Turks finally became maſters of it in 1715. It is now greatly decayed; for the houſes are not contiguous, but intermixed with fields and gardens, which make it look like a village. The country about it abounds with corn, wine, and oil; and, from the caſtle, is one of the fineſt proſpects in the world, over the ſea to the E. and W. and a fertile country N. and S. The narroweſt part of the iſthmus is above ſix miles over; and on a mount there, called Oneius, were formerly celebrated the Iſthmian games. There are ſtill the ruins of a town upon it, and of the temples dedicated to the Sun, Pluto, Diana, Neptune, Ceres, and Bacchus. The inhabitants are chiefly Chriſtians, of the Greek church, who are allowed liberty of conſcience. It is 40 miles N. W. of Athens. E. lon. 23. 3. N. lat. 38. 14.

Corinth, the Iſthmus of, in the Morea, a neck of land which joins the Morea to Greece, and reaches from the gulf of Lepanto to that of Engina. Julius Cæſar, Caligula, and Nero, in vain attempted to cut a channel through it: they therefore built a wall acroſs it, called Hexamilium, becauſe it was ſix miles in length. This was demoliſhed by Amurath II. rebuilt by the Venetians, and levelled a ſecond time by Mahomet II.

CORINTHIAN, in general, denotes ſomething belonging to Corinth: thus we ſay, Corinthian braſs, Corinthian order, &c.

Corinthian *Braſs*. See Brass.

Corinthian *Order*, in architecture, the fourth order of architecture, according to Scamozzi; but M. Le Clerc makes it the fifth, being the moſt noble and delicate of all the other five. See Architecture.

CORIO (Bernardine), an hiſtorian, born of an illuſtrious family at Milan, in the year 1460. He was ſecretary of ſtate to that duchy; and the Duke of Lavis Storza appointed him to write the hiſtory of Milan. He died in 1500. The beſt edition of his hiſtory is that of 1503, in folio. It is printed in Italian, and is very ſcarce.

CORIOLANUS (C. Marcius), a famous Roman captain, took Corioli a town of the Volſci, whence he had his ſurname: at laſt, diſguſting the people, he was baniſhed Rome by the tribune Decius. He went to the Volſci, and perſuading them to take up arms againſt the Romans, they encamped within four miles of the city. He would not liſten to propoſals of peace till he was prevailed upon by his wife Veturia, and his mother Volumnia, who were followed by all the Roman ladies in tears. He was put to death by the Volſci as a traitor that had made them quit their conqueſt: upon which the Roman ladies went into mourning; and in the ſame place where his blood was ſpilled there was a temple conſecrated to feminine virtue.

CORIS, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking with thoſe of which the order is doubtful. The corolla is monopetalous and irregular; the calyx prickly; the capſule quinquevalved ſuperior. There is only one ſpecies, viz. the monſpelienſis, or blue maritime coris. There are two varieties of this plant, one with a red, and the other with a white flower; but theſe are only accidental, and ariſe from the ſame ſeeds. They grow wild about Montpelier, and in moſt places in the ſouth of France: they ſeldom grow above ſix inches high, and ſpread near the ſurface of the ground like heath; and in June, when they are full of flowers, make a very pretty appearance. They may be propagated by ſowing their ſeeds in a bed of freſh earth, and afterwards removing the young plants, ſome in pots, and others into a warm border. They generally bear out winter colds well enough, but ſevere froſts will ſometimes deſtroy them; for which reaſon it is proper to keep ſome of them in pots, which ſhould be put under a hot-bed frame in winter. As they ſeldom produce good ſeeds in this country, they may, in want of theſe, be propagated by ſlips and cuttings, which will take root if planted on a very gentle hot-bed, ſhaded from the ſun, and duly watered.

Coris is alſo uſed in the Eaſt-Indies for a kind of ſhells which paſs for money.

CORISPERMUM, ticksfed; a genus of the digynia order, belonging to the monandria claſs of plants; and in the natural method ranking under the 12th order, *Holoraceæ*. There is no calyx; two petals, and one oval naked ſeed. There are two ſpecies; but none of them are remarkable for their beauty or any other quality.

CORK, the bark of a tree of the ſame name, a ſpecies of Quercus. See Quercus. To take off the bark they make an inciſion from the top to the bottom of the tree, and at each extremity another round the tree, perpendicular to the firſt. When ſtripped from the tree, which does not therefore die, the bark is piled up in a pond or ditch, and loaded with heavy ſtones to flatten it, and reduce it into tables: hence it is taken to be dried; and when ſufficiently dry, put in bales for carriage. If care be not taken to ſtrip the bark, it ſplits and peels off itſelf; being puſhed up by another bark formed underneath. The bark of cork, as well as the acorn, though not now uſed in medicine, are both reputed aſtringents, after being burnt and powdered. But the chief purpoſe of the former is, to put into the ſoles of ſhoes, ſlippers, &c. and to ſtop bottles. The Spaniards burn it to make that kind of light black we call *Spaniſh black*, uſed by painters. The Egyptians made coffins of cork; which being lined with a reſinous compoſition, preſerved dead bodies uncorrupted. The Spaniards line their walls with it, which not only renders them very warm, but keeps out moiſture.

Foſſil-Cork, a name given to a kind of ſtone. It ſeems to be a ſpecies of amianthus, conſiſting of flexible fibres looſely interwoven, and ſomewhat reſembling vegetable cork. It is the lighteſt of all ſtones; by fire it is fuſible, and forms a black glaſs. It poſſeſſes the general qualities of amianthus. See that article.

Cork, a county of Ireland, in the province of Munſter, 80 miles in length, and 50 in breadth; bounded on the W. by Kerry and the ſea, on the N. by Limerick, and on the S. and S. E. by the ocean. It contains 232 pariſhes, and ſends 26 members to parliament. It is fertile and populous, and has two remarkable rivers, the Blackwater and Lee.

Cork, the capital of the county of Cork, in Ireland, with a biſhop's ſee. It is a neat, rich, and populous place, on the river Lee, where it has a commodious harbour. It ſurpaſſes all the

towns in Ireland for trade, except Dublin. It is 124 miles S. W. of Dublin. W. lon. 8. 23. N. lat. 51. 54.

Cork *Jacket*, a kind of waistcoat, composed of four pieces of cork, two for the breasts and two for the back; each pretty near, in length and breadth, to the quarters of a waistcoat without flaps; the whole is covered with coarse canvass, with two holes to put the arms through. There is a space left between the two back-pieces, and the same betwixt each back and breast-piece, that they may sit the easier to the body. Thus the waistcoat is only open before, and may be fastened on the wearer with strings, or, if it should be thought more secure, with buckles and leather straps. This waistcoat is the invention of Mr. Dubourg; but it has been improved by Dr. Wilkinson, of Woodford, who rendered it much more accommodating to the motions of the body in swimming, by cutting the cork into small pieces, and quilting them between two waistcoats of canvas. Even the most timorous with one of these jackets may safely venture into a rough sea. See Air-*Jacket, and* Bamboo-*Habit*.

CORMANDEL. See Coromandel.

COR-MASS, the name of a grand procession, said to have been established at Dunkirk during the dominion of Charles V. and renewed on St. John's day, the twenty-fourth of June. After the celebration of high mass, the procession, consisting of the several tradesmen of the town, began. Each person had a burning taper of wax in his hand: and after each company came a pageant, followed by the patron-saint, usually of solid silver, richly wrought and adorned. The companies were followed by music; and after the musicians, the friars in the habits of their order, the secular priests, and then the abbot magnificently adorned, and preceded by the host. Machines likewise of various fantastical forms and devices, and as variously accoutred, formed a part of the show on this occasion; which has been described as one of the most superb and magnificent in the world.

CORMORANT, a corruption of corvorant, in ornithology. See Pelicanus.

CORN, in rural affairs, the grain or seeds of plants separated from the spica or ear, and used for making bread, &c. Of these there are several species, as wheat, rye, barley, &c. Europe, in every part of it; Egypt, and some other cantons of Africa, particularly the coasts of Barbary; and many parts of America produce corn in abundance. Other countries have maize and rice in lieu of it; and some parts of America, both in the islands and continents, simple roots, such as potatoes and minioc. Egypt was anciently the most fertile of all other countries in corn; as appears both from sacred and profane history. It furnished a good part of the people subject to the Roman empire, and was called the *dry nurse of Rome and Italy*.

With regard to the first discovery and culture of corn, authors are much divided: the common opinion is, that in the first ages men lived on the spontaneous fruits of the earth; as acorns, and the nut or mast produced by the beech; which, they say, took its name *fagus*, from the Greek φαγω, *I eat*. It is added, that they had not either the use of corn, or the art of preparing or making it eatable. For the methods of cultivating grain, &c. see Husbandry.

Indian Corn or maize. See Zea.

Corn-*Crake*. See Rallus.

Corn-*Mill*, water-engine for grinding of corn. See Mechanics.

CORNS, in surgery, hard excrescences, consisting of indurations of the skin arising on the toes, and sometimes on the sides of the feet, where they are much exposed to the pressure of the shoes. By degrees they penetrate farther down between the muscular fibres, so as to occasion extreme pain. For a cure, it has been very properly recommended to soften them with plasters, and then to pull them out by the roots, which is very practicable when they are become soft enough. Some apply caustic, &c. and others a piece of raw beef, which acts in the same way as a plaster. But the best remedy is that which acts on the principle of taking off that *pressure* which produced them; and this is easily done by cutting, in a piece of the upper leather of a shoe, a round hole, just so large as to let the corn through and no more. This should afterwards be cut round on the outside so as to form a flat ring, which should be fixed steadily on the part with a piece of common adhesive plaster.

Corn, in farriery. See Farriery.

CORNAGE, an ancient tenure, the service whereof was to blow a horn when any invasion of the Scots was perceived. This tenure was very frequent in the northern counties near the Picts wall; but by stat. 12 Car. II. all tenures are converted into free and common socage. An old rental calls cornage, *newt-geldt*, q. d. *neat-geld*. Lord Coke says, in old books it is called *horn-geld*.

CORNARISTS, in ecclesiastical history, the disciples of Theodore Cornhert, an enthusiastic secretary of the states of Holland. He wrote at the same time against the Catholics, Lutherans, and Calvinists. He maintained that every religious communion needed reformation; but he added, that no person had a right to engage in accomplishing it, without a mission supported by miracles. He was also of opinion, that a person might be a good Christian without being a member of any visible church.

CORNARO (Lewis), a Venetian of noble extraction, memorable for having lived healthful and active to above 100 years of age by a rigid course of temperance. By the ill conduct of some of his relations he was deprived of the dignity of a noble Venetian; and seeing himself excluded from all employments under the republic, he settled at Padua. In his youth he was of a weak constitution; and by irregular indulgence reduced himself at about 40 years of age, to the brink of the grave, under the complication of disorders; at which extremity he was told that he had no other chance for his life, but by becoming sober and temperate. Being wise enough to adopt this wholsome counsel, he reduced himself to a regimen of which there are very few examples. He allowed himself no more than 12 ounces of food and 14 ounces of liquor each day; which became so habitual to him, that when he was above 70 years of age, the experiment of adding two ounces to each by the advice of his friends, had like to have proved fatal to him. At 83 he wrote a treatise which has been translated into English, and often printed, intitled, *Sure and certain Methods of attaining a Long and Healthful Life*; in which he relates his own story, and extols temperance to a degree of enthusiasm. At length the yolk of an egg became sufficient for a meal, and sometimes for two, until he died with much ease and composure in 1566. The writer of the Spectator, No. 195, confirms the fact from the authority of the Venetian ambassador at that time, who was a descendant of the Cornaro family.

CORNEA, in anatomy, the anterior transparent coat of the eye; so called from its substance resembling horn, in Latin *cornu*. See Anatomy, p. 210.

CORNEILLE (Peter), a celebrated French poet, was born at Rouen in the year 1606. He was brought up to the bar, which he attended for some little time; but formed with a genius too elevated for such a profession, and having no turn for business, he soon deserted it. An affair of gallantry occasioned his writing his first piece, intitled *Melite*; which had prodigious success. Encouraged by the applause of the public, he wrote the Cid, and the other tragedies that have immortalized his name. In his dramatic works he discovers a majesty, a strength and elevation of genius, scarce to be found in any other of the French poets; and, like our immortal Shakespeare, seems bet-

ter acquainted with nature than with the rules of critics. Corneille was received into the French academy in 1647, and died dean of that academy in 1684, aged 78. Befides his dramatic pieces, he wrote a tranflation, in French verfe, of the "Imitation of Jefus Chrift," &c. The beft edition of his works is that of 1682, in 4 vols. 12mo.

Corneille (Thomas), brother of the former, was a member of the French academy and of that of infcriptions. He difcovered in his youth a great inclination to poetry; and at length publifhed feveral dramatic pieces in 5 vols. 12mo. fome of which were applauded by the public, and acted with fuccefs. He alfo wrote, 1. A tranflation of Ovid's Metamorphofes, and fome of Ovid's Epiftles; 2. Remarks on Vauglas; 3. A Dictionary of Arts, 2 vols. folio; and, 4. An univerfal, geographical, and hiftorical Dictionary, in 3 vols. folio.

Corneille (Michael), a celebrated painter, was born at Paris in the year 1642; and was inftructed by his father, who was himfelf a painter of great merit. Having gained a prize at the academy, young Corneille obtained a penfion from Louis XIV. and was fent to Rome, where that prince had founded a fchool for young artifts of genius. Having ftudied there fome time, he gave up his penfion, and applied to the antique with great care. He is faid to have equalled Caracci in drawing, but in colouring he was deficient. Upon his return from Rome, he was chofen profeffor in the academy of Paris; and was employed by the above prince in all the great works he was carrying on at Verfailles and Trianon, where are ftill to be feen fome noble efforts of his genius.

CORNEL-tree, in botany. See Cornus.

CORNELIA, daughter of Scipio Africanus, was the mother of Tiberius and Caius Gracchus. She was courted by a king, but fhe preferred being the wife of a Roman citizen to that of a monarch. Her virtues have been defervedly commended, as well as the wholefome principles fhe inculcated in her two fons. When a Campanian lady made once a fhow of her jewels at Cornelia's houfe, and entreated her to favour her with a fight of her own, Cornelia produced her two fons, faying, "Thefe are the only jewels of which I can boaft."

Cornelia *Lex, de civitate*, was enacted, in the year of Rome 670, by L. Corn. Sylla. It confirmed the Sulpician law, and required that the citizens of the eight newly erected tribes fhould be divided among the 35 ancient tribes. Another, *de judiciis*, took place in 673; and was followed by many others.

CORNELIAN. See Carnelian.

CORNER, in a general fenfe, the fame with Angle.

CORNET, in the military art of the ancients, an inftrument much in the nature of a trumpet; which when it only founded, the enfigns were to march alone without the foldiers; whereas, when the trumpet only founded, the foldiers were to move without the enfigns. The cornets and buccinæ founded the charge and retreat; and the cornets and trumpets founded during the courfe of the battle. See plate 87.

Cornet, in modern military œconomy, denotes an officer in the cavalry who bears the enfign of a troop. The cornet is the third officer in the company, and commands in the abfence of the captain and lieutenant. He takes his title from his enfign, which is fquare; and is fuppofed to be called by that name from *cornu*, becaufe placed on the wings, which form a kind of points or horns of the army. Others derive the name from *coronet*; alleging, that it was the ancient cuftom for thefe officers to wear coronets or garlands on their heads.

CORNEUS, the name by which Linnæus calls a kind of tin-ore, found in black columns, with irregular fides, and terminating in prifms.

CORNICHE, Cornish, or Cornice, in architecture, the uppermoft member of the entablature of a column, as that which crowns the order. See Architecture, p. 284. Corniche is alfo ufed, in general, for all little projectures in mafonry or joinery, even where there are no columns, as the corniche of a chimney, beaufet, &c.

Corniche *Ring*, in a piece of ordnance, is that next from the muzzle-ring, backward.

CORNICULARIUS, in antiquity, an officer in the Roman army, whofe bufinefs was to aid and affift the military tribune in quality of a lieutenant. The *cornicularii* went the rounds in lieu of the tribune, vifited the watch, and were nearly what the aids-major are in the French army. The denomination *cornicularius* was given them from a little horn, called *corniculum*, which they ufed in giving orders to the foldiers: though Salmafius derives it from *corniculum*, the creft of an head-piece; it being an obfervation of Pliny, that they wore iron or brafs horns on their helmets; and that thefe were called *cornicula*. In the *Notitia Imperii* we find a kind of fecretary or regifter of the fame name. His bufinefs was to attend the judge, and enter down his fentiments and decifions. The critics derive the word, in this fenfe, from *corniculum*, a little horn to put ink in.

CORNISH diamond, a name given by many people to the cryftals found in digging the mines of tin in Cornwall. See Cornwall.

CORNIX, in ornithology, the trivial name of a fpecies of Corvus.

CORNU. See Horn.

Cornu *Ammonis*, in natural hiftory, a foffil fhell, called alfo *ferpent-ftone*, or *fnake-ftone*. Thefe are found of all fizes, from the breadth of a fixpence, to more than two feet in diameter; fome of them rounded, others greatly compreffed, and lodged in different ftrata of ftones and clays; fome again are fmooth, and others ridged in different manners, their ftriæ and ridges being either ftraight, irregularly crooked, or undulated. See Snake-*Stone*.

Cornu *Cervi*. See Hartshorn.

CORNUCOPIA, among the ancient poets, a horn out of which proceeded plenty of all things; by a particular privilege which Jupiter granted his nurfe, fuppofed to be the goat Amalthea. The fable is thus interpreted: That in Libya there is a little territory fhaped not unlike a bullock's horn, exceeding fertile, given by king Ammon to his daughter, Amalthea, whom the poets feign to have been Jupiter's nurfe. In architecture, and fculpture, the cornucopia, or horn of plenty, is reprefented under the figure of a large horn, out of which iffue fruits, flowers, &c. On medals, F. Joubert obferves, the cornucopia is given to all deities.

CORNUCOPIÆ, in botany: a genus of the digynia order, belonging to the triandria clafs of plants; and in the natural method ranking under the 4th order, *Gramina*. The involucrum is monophyllous, funnel-fhaped, crenated, and multiflorous: the calyx bivalved; the corolla one-valved.

CORNUS, Cornel-tree, Cornelian cherry, or Dogwood: a genus of the monogynia order, belonging to the tetrandria clafs of plants; and in the natural method ranking under the 47th other, *Stellatæ*. The involucrum is moft frequently tetraphyllous; the petals above the receptacle of the fruit four; the fruit itfelf a bilocular kernel. Of this genus there are five *fpecies*; the moft remarkable are the following. 1. The mafs or cornelian cherry-tree, hath an upright tree-ftem, rifing 20 feet high, branching and forming a large head, garnifhed with oblong leaves, and fmall umbels of yellowifh-green flowers at the fides and ends of the branches, appearing early in the fpring, and fucceeded by fmall, red, cherry-like, eatable, acid, fruit. 2. The fanguinea, bloody-twig, or common dogwood: hath an upright tree-ftem, branching 10 or 12 feet high, having blood-red fhoots, garnifhed with oblong pointed nervous leaves two inches long; and all the branches terminated by umbellate white flowers fucceeded by black berries: of

this there is a kind with variegated leaves. 3. The florida, or Virginian dog-wood, hath a tree-stem branching 12 or 15 feet high, and fine red shoots garnished with large heart-shaped leaves: and the branches terminated by umbellate white flowers, having a large involucrum succeeded by dark red berries. Of this species there are several varieties, chiefly distinguished by the colour of their berries, which are red, white, or blue. All the species may be *propagated* by seeds, which ought to be sown in autumn, otherwise they will lie a year in the ground. When the plants come up, they should be duly watered in dry weather, and kept clean from weeds. The following autumn they may be transplanted into the nursery; and having remained there two or three years, they may then be removed to the places where they are to remain. They may also be propagated by suckers, of which they produce great plenty, or by laying down the young branches.

CORNUTIA, in botany; a genus of the angiospermia order, belonging to the didynamia class of plants; and in the natural method ranking under the 40th order, *Personatæ*. The calyx is quinquedentated; the stamina larger than the corolla; the style very long; the berry monospermous. There is but one species, *viz.* the pyramidata, with a blue pyramidal flower, and hoary leaves. It grows plentifully in several of the islands of the West Indies, also at Campeachy, and at La Vera Cruz. It rises to the height of 10 or 12 feet, with rude branches, the leaves being placed opposite. The flowers are produced in spikes at the end of the branches, and are of a fine blue colour. They usually appear in autumn, and will sometimes remain in beauty for two months or more. It is propagated either by seeds or cuttings, and makes a fine appearance in the stove; but is too tender to bear the open air in this country.

CORNWALL, a county which forms the S. W. extremity of Great Britain. It is bounded on the E. by the river Tamar, which parts it from Devonshire; on the S. by the English Channel, and on the N. W. by St. George's Channel. Its length from E. to W. is ninety miles; its breadth next to Devonshire, is above fifty; but it soon contracts, and at St. Ives does not exceed five: it then spreads a little to the S. and S. W. and terminates in two points, one of which is called the Lizard, and the other the Land's End. It is in the diocese of Exeter, and contains nine hundreds, 27 market-towns, and 161 parishes; and it sends 44 members to parliament. The air is sharp and healthful to the natives; yet the vicinity of the sea exempts this county from hard frosts, and the snow never lies long on the ground. The same reason may be assigned for the frequent gusts of wind, which are very boisterous, and sometimes pernicious. The hills in the centre of the county, by attracting the clouds and vapours, create abundance of rainy and foggy weather; but the inhabitants are seldom troubled with infectious diseases. The seasons are somewhat different from those in other parts, the summer being more temperate; and as the autumnal fruits are later, their harvest is seldom ripe for laying up till near Michaelmas. The soil, as it is shallow, is not very fruitful, especially on the hilly parts. The vallies yield plenty of grass; and the lands near the sea, by being manured with sea-weed and sea-sand, produce corn. It has some plants which are either uncommon, or have never been found in other counties: among these is a sort of grain sown plentifully toward the farther end of the county, which is naked oats, called pill-corn, from its being naturally stripped of the husk; for which reason it is much esteemed. There are plenty of sea-herbs, as camphire, eringo, ros solis; and, what is peculiar to this county, the sweet-brier grows naturally here. No other county is so advantageously situated for carrying on fisheries; and the inhabitants avail themselves fully of their local advantages. It derives, however, its chief importance from the minerals which the earth contains. These consist of tin and copper: the mines of tin are numerous, and are, in general, very rich in ore: these have rendered this county famous in all ages. There has been sometimes found a small quantity of gold and silver, but not worthy of notice. With the metalline ores are intermixed large quantities of mundic and arsenic. Many sorts of stones are also found here, particularly moorstone, which is used both in buildings and for milstones: its natural composition is beautiful, consisting for the greatest part of a whitish granulated marble, variegated with a sort of black and yellow matter resembling tinsel and tinglass, shining agreeably in the sunbeams. This stone, therefore, while new, gives a glaring aspect to buildings; but though prodigiously hard at first, it soon changes its colour and consistence. When polished it appears much more splendid and beautiful than any of the marble kind, and makes the richest furniture, as tables, chimney-pieces, &c. but being exceedingly hard, the polishing is very expensive. The copper mines are also numerous and rich in ore. In many cavernous parts of the rocks are found transparent crystals; called Cornish diamonds, they being very brilliant when well polished. The principal rivers are the Tamar, Camel, and Fale. This county was one of the places to which the ancient Britons retreated, whose language they retained for a considerable time, but it is now quite extinct. The king's eldest son is born duke of Cornwall, and derives a revenue not only from lands appertaining to the duchy (which has an office in Somerset Place), but from the mines of tin and copper. He has under him an officer, called lord-warden of the Stannary Courts, whose jurisdiction extends over the mines and miners of Cornwall and Devonshire; and he appoints, in his privy council, the sheriff of the former county.

CORODY. See Revenue.

COROLLA, among botanists, the most conspicuous part of a flower, surrounding the organs of generation, and composed of one or more flower-leaves, most commonly called *petals*, to distinguish them from the leaves of the plant: according as there is one, two, or three of these petals, the corolla is said to be monopetalous, dipetalous, tripetalous, &c.

COROLLARY is a consequence drawn from something already advanced or demonstrated: thus, it being demonstrated that a triangle which has two equal sides, has also two angles equal; this corollary will follow, that a triangle which has three sides equal, has also its three angles equal.

COROLISTÆ, a name by which Linnæus distinguishes those systematic botanists who have arranged vegetables from the regularity, figure, number, and other circumstances, of the petals, or beautiful coloured leaves of the flower. The best systems of this kind are those of Rivinus and Tournefort. The former proceeds upon the regularity and number of the petals; the latter, with much more certainty, on their regularity and figure.

COROLLULA, a term used by botanists to express the little partial flowers which make up the compound ones.

COROMANDEL, the Coast of, the eastern coast of the peninsula of Hindoostan, extended between 10° and 16° N. lat. There is not a port for large ships on the whole coast, which is an even, low, sandy country; and, about Madras, the land rises so little, and so gradually from the sea, that the spectator is scarcely able to mark the distinction, till assisted by the appearance of the different objects which present themselves on the shore.

CORONA, among anatomists, denotes that edge of the glans penis where the preputium begins.

Corona, or *Halo,* in optics, a luminous circle surrounding the sun, the moon, the planets, or fixed stars. Sometimes these circles are white, and sometimes coloured like the rainbow. Sometimes one only is visible, and sometimes several concentric coronas make their appearance at the same time. Those which

have been feen about Sirius and Jupiter were never more than three, four, or five degrees in diameter; thofe which furround the moon are, alfo, fometimes no more than three or five degrees; but thefe, as well as thofe which furround the fun, are of very different magnitudes, *viz.* of 12° 0′, 22° 35′, 30° 0′, 38° 0′, 41° 2′, 45° 0′, 46° 24′, 47° 0′, and 90°, or even larger than this. Their diameters alfo fometimes vary during the time of obfervation, and the breadths both of the coloured and white circles are very different, *viz.* of 2, 4, or 7 degrees.

The colours of thefe coronas are more dilute than thofe of the rainbow; and they are in a different order, according to their fize. In thofe which Newton obferved in 1692, they were in the following order reckoned from the infide. In the innermoft were blue, white, and red; in the middle were purple, blue, green, yellow, and pale red; in the outermoft, pale blue and pale red. Mr. Huygens obferved red next the fun, and a pale blue outwards. Sometimes they are red on the infide and white on the outfide. M. Weidler obferved one that was yellow on the infide and white on the outfide. In France, one was obferved in 1683, the middle of which was white; after which followed a border of red; next to it was blue, then green, and the outermoft circle was a bright red. In 1728, one was feen of a pale red outwardly, then followed yellow, and then green, terminated by a white.

Thefe coronas are very frequent. In Holland, M. Mufchenbroeck fays, 50 may be feen in the day-time, almoft every year; but they are difficult to be obferved, except the eye be fo fituated, that not the body of the fun, but only the neighbouring parts of the heavens, can be feen. Mr. Middleton fays, that this phenomenon is very frequent in North America; for that there is generally one or two about the fun every week, and as many about the moon every month. Halos round the fun are very frequent in Ruffia. M. Æpinus fays, that from the 23d of April 1758, to the 20th of September, he himfelf had obferved no lefs than 26, and that he has fometimes feen twice as many in the fame fpace of time.

Coronas may be produced by placing a lighted candle in the midft of fteam in cold weather. Alfo, if glafs windows be breathed upon, and the flame of a candle be placed fome feet from it, while the fpectator is alfo at the diftance of fome feet from another part of a window, the flame will be furrounded with a coloured halo. And if a candle be placed behind a glafs receiver, when air is admitted into the vacuum within it, at a certain degree of denfity, the vapour with which it is loaded will make a coloured halo round the flame. This was obferved by Otto Guericke. In December 1756, M. Mufchenbroeck obferved, that when the glafs windows of his room were covered with a thin plate of ice on the infide, the moon appearing through it was furrounded with a large and varioufly coloured halo; and, opening the window, he found that it arofe entirely from that thin plate of ice, for none was feen except through it. Similar, in fome refpects, to the halo, was the remarkable appearance which M. Bouguer defcribes, as obferved by himfelf and his companions on the top of Mount Pichinca, in the Cordilleras. A fimilar curious appearance has alfo been defcribed by Dr. M'Feat in Scotland.

Defcartes obferves, that the halo never appears when it rains: from which he concludes that this phenomenon is occafioned by the refraction of light in the round particles of ice, which are then floating in the atmofphere; and though thefe particles are flat when they fall to the ground, he thought they muft be protuberant in the middle, before their defcent; and according to this protuberancy he imagined that the diameter of the halo would vary.—In treating of meteors, Gaffendi fuppofes that a halo is the fame thing with the rainbow, the rays of light being in both cafes twice refracted and once reflected within each drop of rain or vapour, and that all the difference there is between them arifes from their different fituation with refpect to the obferver. For, whereas, when the fun is behind the fpectator, and confequently the rainbow before him, his eye is in the centre of the circle; when he views the halo, with his face towards the fun, his eye is in the circumference of the circle; fo that, according to the known principles of geometry, the angle under which the object appears in this cafe muft be half of what it is in the other. Though this writer fays a great deal upon the fubject, and endeavours to give reafons why the colours of the halo are in a different order to thofe of the rainbow, he does not defcribe the progrefs of the rays of light from the fun to the eye of the fpectator when a halo is formed by them, and he gives no figures to explain his ideas.

Dechales, alfo, endeavours to fhow that the generation of the halo is fimilar to that of the rainbow. If, fays he, a fphere of glafs or cryftal, AB, (Plate 87, fig. 1.) full of water, be placed in the beams of the fun fhining from C, there will not only be two circles of coloured light on the fide next the fun, and which conftitute the two rainbows; but there will alfo be another on the part oppofite to the fun, the rays belonging to which meeting at E, afterwards diverge, and from the coloured circle G, as will be vifible, if the light that is tranfmitted through the globe be received on a piece of white paper. The colours alfo will appear to an eye placed in any part of the furface of the cone FEG. Meafuring the angle FEH, he found it to be 23 degrees. They were only the extreme rays of this cone that were coloured like thofe of the rainbow. This experiment he thought fufficiently illuftrated the generation of the halo; fo that whenever the texture of the clouds is fuch, as not entirely to intercept the rays of the fun or moon, and yet have fome degree of denfity, there will always be an halo round them, the colours of the rainbow appearing in thofe drops which are 23 degrees diftant from the fun or moon. If the fun be at A, fig. 2, and the fpectator at B, the halo will be the circle DFE, DBE being 46 degrees, or twice 23.

The reafon why the colours of the halo are more dilute than thofe of the rainbow, he fays, is owing principally to their being formed not in large drops of rain, but in very fmall vapour; for if the drops of water were large, the cloud would be fo thick, that the rays of the fun could not be regularly tranfmitted through them; and, on the other hand, he had obferved, that when the rainbow is formed by very thin vapours, the colours hardly appear. As for thofe circles of colours which are fometimes feen round candles, it was his opinion that they are owing to nothing but moifture on the eye of the obferver; for that he could never produce this appearance by means of vapour only, if he wiped his eyes carefully; and he had obferved, that fuch circles are vifible to fome perfons and not to others, and to the fame perfons at one time and not at another.

The moft confiderable of all the theories refpecting halos, and that which has met with the moft favourable and the longeft reception, is that of Mr. Huygens. Sir Ifaac Newton mentions it with refpect, and Dr. Smith, in his Complete Syftem of Optics, does not fo much as hint at any other. The occafion of Mr. Huygens publifhing his thoughts on this fubject, was the appearance of a halo at Paris, on the 12th of May 1667, of which he gave an account in a paper read at the Royal Academy in that city, which was afterwards tranflated, and publifhed in the Englifh Philofophical Tranfactions, and which may be feen in Lowthorp's Abridgment, vol. ii. p. 189. But this article contains nothing more than the heads of a difcourfe, which he afterwards compofed, but never quite finifhed, on this fubject; and which has been tranflated, with fome additions, by Dr. Smith, from whom the following account is chiefly extracted. Our philofopher had been firft engaged to think particularly upon this fubject, by the appearance of five funs at

Warfaw, in 1658; prefently after which, he fays, he hit upon the true caufe of halos, and not long after, of that of mock funs alfo.

To prepare the way for the following obfervations, it muft be remarked, that if we can conceive any kind of bodies in the atmofphere, which, according to the known laws of optics, will, either by means of reflection or refraction, produce the appearance in queftion, when nothing elfe can be found that will do it, we muft acquiefce in the hypothefis, and fuppofe fuch bodies to exift, even though we cannot give a fatisfactory account of their generation. Now, two fuch bodies are affumed by Mr. Huygens; one of them a round ball, opaque in the centre, but covered with a tranfparent fhell; and the other is a cylinder, of a fimilar compofition. By the help of the former he endeavours to account for halos, and by the latter for thofe appearances which are called mock funs. Thofe bodies which Mr. Huygens requires, in order to explain thefe phenomena, are not, however, a mere affumption; for fome fuch, though of a larger fize than his purpofe requires, have been actually found, confifting of fnow within and ice without. They are particularly mentioned by Defcartes.

The balls with the opaque kernel, which he fuppofed to have been the caufe of them, he imagines not to exceed the fize of a turnip-feed; but, in order to illuftrate this hypothefis, he gives a figure of one, of a larger fize, in ABCDEF, (fig. 3.) reprefenting the kernel of fnow in the middle of it. If the rays of light, coming from *a*, *b*, fall upon the fide *c*, *d*, it is manifeft they will be fo refracted at *c*, and *d*, as to bend inwards; and many of them will ftrike upon the kernel EF. Others, however, as GA and HD, will only touch the fides of the kernel; and being again refracted at B and C, will emerge in the lines BK, CK, croffing each other in the point K, whofe neareft diftance from the globule is fomewhat lefs than its apparent diameter. If, therefore, BK (fig. 4) and CK be produced towards M and L, it is evident, that no light can reach the eye placed within the angle LKM, but may fall upon it when placed out of that angle, or rather the cone reprefented by it.

For the fame reafon, every other of thefe globules will have a fhadow behind it, in which the light of the fun will not be perceived. If the eye be at N, and that be conceived to be the vertex of a cone, the fides of which NR, NQ, are parallel to the fides of the former cone KL, KM, it is evident that none of the globules within the cone QNR can fend any rays of the fun to the eye at N. But any other globule out of this cone, as X, may fend thofe rays, which are more refracted than XZ, to the eye; fo that this will appear enlightened, while thofe within the cone will appear obfcure. It is evident from this, that a certain area, or fpace, quite round the fun, muft appear dark; and that the fpace next to this area will appear luminous, and more fo in thofe parts that are neareft to the obfcure area; becaufe, he fays, it may eafily be demonftrated, that thefe globules which are neareft to the cone QNR exhibit the largeft image of the fun. It is plain, alfo, that a corona ought to be produced in the fame manner, whatever be the fun's altitude, becaufe of the fpherical figure of the globules.

To verify this hypothefis, our philofopher advifes us to expofe to the fun a thin glafs bubble, filled with water, and having fome opaque fubftance in the centre of it; and he fays we fhall find, that we fhall not be able to fee the fun through it, unlefs at a certain diftance from a place oppofite to the centre of it; but as foon as we do perceive the light, the image of the fun will immediately appear the brighteft, and coloured red, for the fame reafon as in the rainbow.

Thefe coronas, he fays, often appear about the moon; but the colours are fo weak as to appear only white. Such white coronas he had alfo feen about the fun, when the fpace within them appeared fcarce darker than that without. This he fuppofes to happen when there are but few of thefe globules in the atmofphere; for the more plentiful they are, the more lively the colours of the halo appear; at the fame time alfo the area within the corona will be the darker. The apparent diameter of the corona, which is generally about 45 degrees, depends upon the fize of the dark kernel; for the larger it is with refpect to the whole globule, the larger will be the dark cone behind it. The globules that form thefe halos, Mr. Huygens fuppofes to have confifted of foft fnow, and to have been rounded by continual agitation in the air, and thawed on their outfides by the heat of the fun. To make the diameter of the halo 45 degrees, he demonftrates that the femidiameter of the globule muft be to the femidiameter of the kernel of fnow very nearly as 1000 to 480; and that to make a corona of 100 degrees, it muft be as 1000 to 680.

Mr. Weidler, in his Commentary on Parhelia, publifhed at Wirtemburgh in 1733, obferves that it is very improbable that fuch globules as Mr. Huygens's hypothefis requires, with nuclei of fuch a precife proportion, fhould exift; and if there were fuch bodies, he thinks they would be too fmall to produce the effects afcribed to them. Befides, he obferves that appearances exactly fimilar to halos are not uncommon, where fluid vapours alone are concerned; as when a candle is placed behind the fteam of boiling water in frofty weather, or in the midft of the vapour iffuing copioufly from a bath, or behind a receiver when the air is fo much rarefied as to be incapable of fupporting the water it contains. The rays of the fun twice reflected and twice refracted within fmall drops of water are fufficient, he fays, without any opaque kernel, to produce all the appearances of the halos that have the red light towards the fun, as may be proved by experiment. That the diameter of the halos is generally half of that of the rainbow, he accounts for as Gaffendi did before him.

M. Mariotte accounts for the formation of the fmall coronas by the tranfmiffion of light through aqueous vapours, where it fuffers two refractions, without any intermediate reflection. He fhows that light which comes to the eye, after being refracted in this manner, will be chiefly that which falls upon the drop nearly perpendicular; becaufe more rays fall upon any given quantity of furface in that fituation, fewer of them are reflected with fmall degrees of obliquity, and they are not fo much fcattered after refraction. The red will always be outermoft in thefe coronas, as confifting of rays which fuffer the leaft refraction. And whereas he had feen, when the clouds were driven brifkly by the wind, halos round the moon, varying frequently in their diameter, being fometimes of two, fometimes of three, and fometimes of four degrees; fometimes alfo being coloured, fometimes only white, and fometimes difappearing entirely; he concluded that all thefe variations arofe from the different thicknefs of the clouds, through which fometimes more and fometimes lefs light was tranfmitted. He fuppofed, alfo, that the light which formed them might fometimes be reflected, and at other times refracted. As to thofe coronas which confift of two orders of colours, he imagined that they were produced by fmall pieces of fnow, which, when they begin to diffolve, form figures which are a little convex towards their extremities. Sometimes, alfo, the fnow will be melted in different fhapes; and in this cafe the colours of feveral halos will be intermixed and confufed; and fuch, he fays, he had fometimes obferved round the fun.

M. Mariotte then proceeds to explain the larger coronas, namely thofe that are about 45 degrees in diameter: and for this purpofe he has recourfe to equiangular prifms of ice, in a certain pofition with refpect to the fun; and he takes pains to trace the progrefs of the rays of light for this purpofe: but this hypothefis is very improbable. In fome cafes he thought that

Fig. 1.

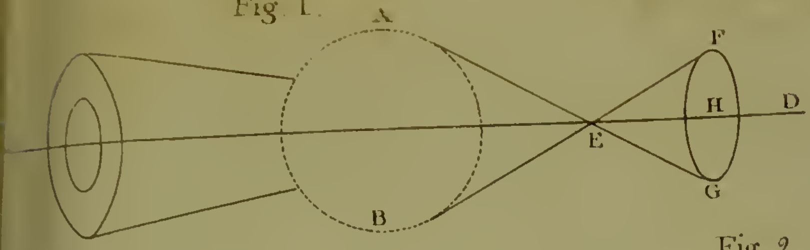


Fig. 2.

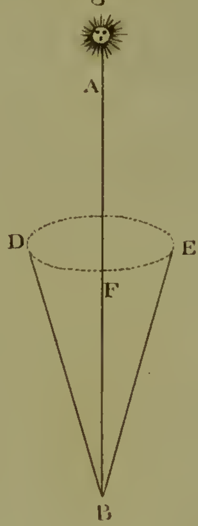


Fig. 3.

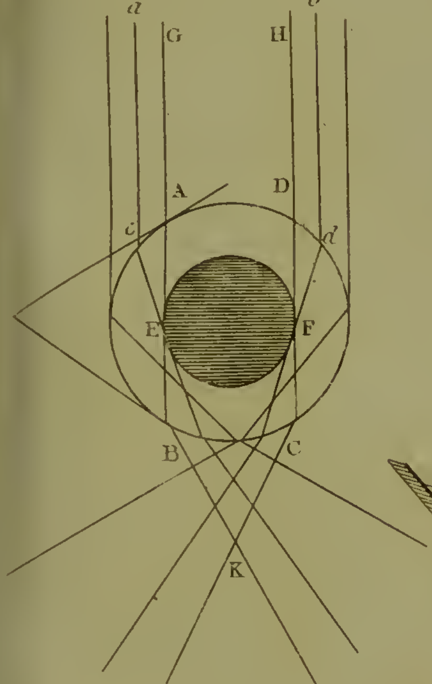
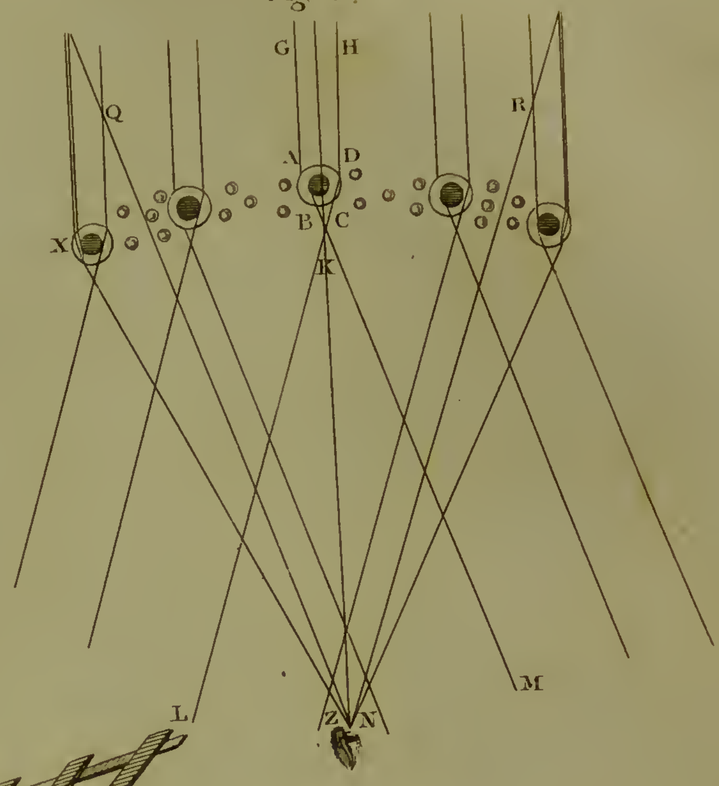


Fig. 4.



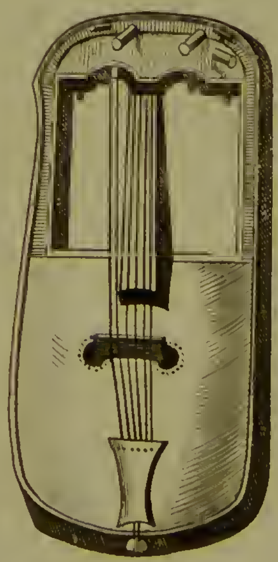
Cradle

Cromlech

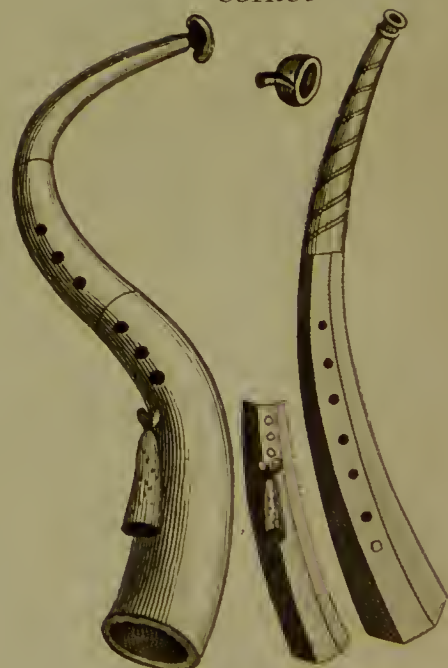
Crowfoot

Creeper

Crowth

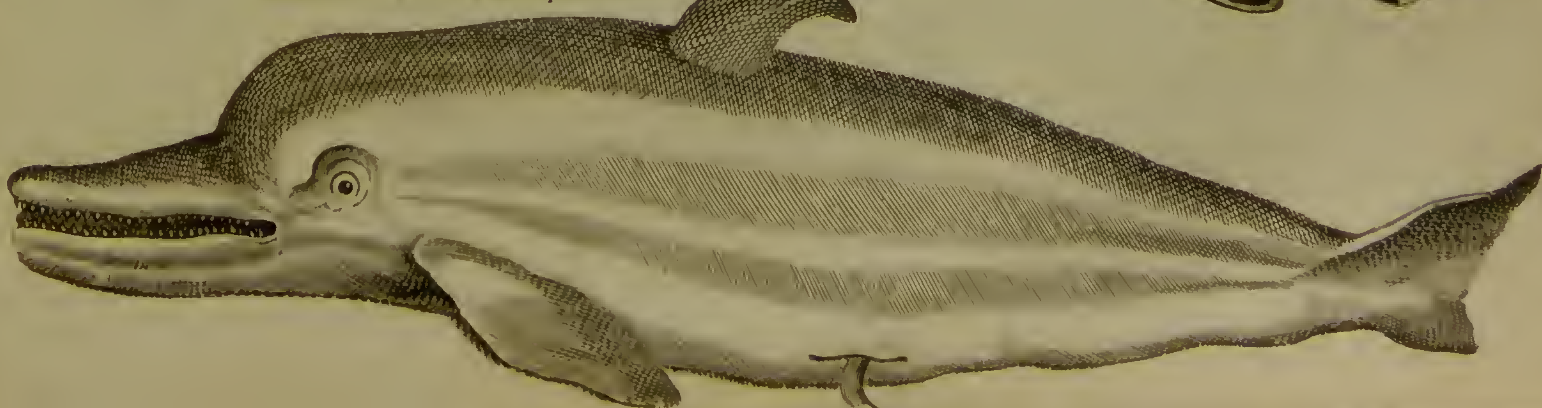


Cornet



Cicadæ

DELPHINUS *the* Dolphin.



these larger coronas were caused by hail-stones, of a pyramidal figure; because after two or three of them had been seen about the sun, there fell the same day several such pyramidal hail-stones. M. Mariotte explains parhelia by the help of the same suppositions. See PARHELIA.

Sir Isaac Newton does not appear to have given any particular attention to the subject of halos, but he has hinted at his sentiments concerning them occasionally; by which we perceive that he considered the larger and less variable appearances of this kind as produced according to the common laws of refraction, but that the less and more variable appearances depend upon the same cause with the colours of thin plates.

CORONA, among botanists, the name given by some to the circumference or margin of a radiated compound flower. It corresponds to the radius of Linnæus; and is exemplified in the flat, tongue-shaped petals which occupy the margin of the daisy or sun-flower.

CORONA *Australis*, or *Meridionalis*, Southern Crown, a constellation of the southern hemisphere, whose stars in Ptolemy's catalogue are 13, in the British catalogue 12.

CORONA *Borealis*, the Northern Crown, or Garland, in astronomy, a constellation of the northern hemisphere, whose stars in Ptolemy's catalogue are eight, in Tycho's as many, and in Mr. Flamstead's 21.

CORONA *Imperialis*, in conchology, a name given by some authors to a kind of voluta, differing from the other shells of that family, by having its head ornamented with a number of points, forming a sort of crown. See VOLUTA.

CORONAL SUTURE, in anatomy, the first suture of the skull. See ANATOMY, page 163.

CORONALE OS, the same with the os frontis. See ANATOMY, *ibid.*

CORONARY VESSELS, in anatomy, certain vessels which furnish the substance of the heart with blood. Thus the CORONARY *Arteries*, are two arteries springing out of the aorta, before it leaves the pericardium. CORONARY *Vein*, is a vein diffused over the exterior surface of the heart. See ANATOMY, page 195.

Stomachic CORONARY, a vein inserted into the trunk of the splenic vein, which, by uniting with the mesenteric, forms the vena porta. See ANATOMY, page 195.

CORONARIÆ, in botany, the 10th order of plants in Linnæus's Fragments of a natural method. Under this name, instead of the more obvious one *liliaceæ*, Linnæus collects a great number of genera, most of which furnish very beautiful garden-flowers, viz. albuca, cyanella, fritillaria, helonias, hyacinthus, hypoxis, lilium, melanthium, ornithogalum, scilla, tulipa, agave, aletris, aloe, anthericum, asphodelus, bromelia, burmannia, hemerocallis, polianthes, tillandsia, veratrum, yucca.

CORONATION, the ceremony of investing with a crown, particularly applied to the crowning of kings, upon their succeeding to the sovereignty. See KING.

CORONELLI (Vincent), a famous geographer, born at Venice. His skill in the mathematics having brought him to the knowledge of the count d'Estrees, his eminence employed him in making globes for Louis XIV. With this view Coronelli spent some time at Paris, and left a great number of globes there, which are esteemed. In 1685 he was made cosmographer to the republic of Venice; and four years after, public professor of geography. He founded an academy of cosmography at Venice; and died in that city in 1718. He published above 400 geographical charts, an abridgement of cosmography, several books on geography, and other works.

CORONER, *coronator*, an ancient officer in England, so called because he hath principally to do with pleas of the crown, or such wherein the king is more immediately concerned. And in this light, the lord chief justice of the king's bench is the principal coroner in the kingdom; and may, if he pleases, exercise the jurisdiction of a coroner in any part of the realm. But there are also particular coroners for every county of England; usually four, but sometimes six, and sometimes more. This officer is of equal authority with the sheriff; and was ordained, together with him, to keep the peace when the earls gave up the wardship of the counties.

He is chosen by all the freeholders of the county court; and by the statute of Westminster 1. it was enacted, that none but lawful and discreet knights should be chosen: but it seems now sufficient if a man have lands enough to be made a knight, whether he be really knighted or not: for the coroner ought to have an estate sufficient to maintain the dignity of his office, and answer any fines that may be made upon him for his misbehaviour; and, if he hath not enough to answer, his fine shall be levied on the county, as a punishment for electing an insufficient officer. Now, indeed, through the culpable neglect of gentlemen of property, this office has been suffered to fall into disrepute, and get into low and indigent hands; so that although formerly no coroners would be paid for serving their country, and they were by the aforesaid statute of Westminster 1. expressly forbidden to take a reward under pain of great forfeiture to the king; yet for many years past they have only desired to be chosen for the sake of their perquisites; being allowed fees for their attendance by the statute 3 Hen. VII. c. 1. which Sir Edward Coke complains of heavily, though since his time those fees have been much enlarged.

The coroner is chosen for life; but may be removed, either by being made sheriff or chosen verderor, which are offices incompatible with the other; and by the statute 25 Geo. II. c. 29. extortion, neglect, or misbehaviour, are also made causes of removal. The office and power of a coroner are also, like those of the sheriff, either judicial or ministerial; but principally judicial. This is in a great measure ascertained by statute 4 Edw. I. *De officio coronatoris*; and consists, first, in enquiring, when any person is slain, or dies suddenly, or in prison, concerning the manner of his death. And this must be *super visum corporis*; for if the body is not found, the coroner cannot sit. He must also sit at the very place where the death happened. And his enquiry is made by a jury from four, five, or six of the neighbouring towns, over whom he is to preside. If any be found guilty by this inquest of murder, he is to commit to prison for farther trial, and is also to enquire concerning their lands, goods, and chattels, which are forfeited thereby; but whether it be murder or not, he must enquire whether any deodand has accrued to the king, or the lord of the franchise, by this death; and must certify the whole of this inquisition to the court of king's bench, or the next assizes. Another branch of his office is to enquire concerning shipwrecks; and certify whether wreck or not, and who is in possession of the goods. Concerning treasure-trove, he is also to enquire concerning the finders, and where it is, and whether any one be suspected of having found and concealed a treasure; "and that may well be perceived (saith the old statute of Edw. I.), where one liveth riotously, haunting taverns, and hath done so of long time;" whereupon he might be attached and held to bail upon this suspicion only. The ministerial office of the coroner is only as the sheriff's substitute. For when just exception can be taken to the sheriff, for suspicion of partiality (as that he is interested in the suit, or of kindred to either plaintiff or defendant), the process must then be awarded to the coroner, instead of the sheriff, for execution of the king's writs.

CORONET. See CROWN.

CORONET, of a horse, the lowest part of the pastern, which runs round the coffin, and is distinguished by the hair joining and covering the upper part of the hoof.

CORONILLA, *jointed podded* Colutea; a genus of the decandria order, belonging to the diadelphia clafs of plants; and in the natural method ranking under the 32d order, *Papilionaceae*. The calyx is bilabiated, with two fegments above coalited; the vexillum fcarce any longer than the alæ; the legumen much contracted between the feeds. To this genus Linnæus alfo joins the emerus, or fcorpion fena; though Mr. Miller makes it a diftinct fpecies. There are 11 fpecies, all of them plants of confiderable beauty, with very bright yellow flowers. All of them, however, are rather too tender for this climate, except the emerus. This fpecies rifes with a fhrubby ftem, branching numeroufly fix or eight feet high, clofely garnifhed with winged leaves of three pair of lobes, terminated by an odd one; and, at the fides of the branches, numerous long flower-ftalks, each fupporting two or three large yellow flowers of the papilionaceous kind, fucceeded by longifh pods; it is eafily propagated by feeds, and likewife by layers or cuttings. The leaves of this plant are efteemed laxative, and ufed as a fubftitute for common fena in fome parts of Europe. A dye is procured by fermentation from the leaves, like that of indigo.

CORONOID, and Condyloid, proceffes. See Anatomy, page 164.

CORPORA cavernosa, in anatomy, fpongious bodies of the penis. See Anatomy, page 208.

Corpora *Pyramidalia*, in anatomy, are two protuberances of the under part of the *cerebellum*, about an inch long; fo called from their refemblance to a pyramid.

Corpora *Striata*. See Anatomy, page 203.

CORPORAL, an inferior officer under a ferjeant, in a company of foot, who has charge over one of the divifions, places and relieves fentinels, and keeps good order in the corps de garde: he alfo receives the word from the inferior rounds, which pafs by his corps de garde. This officer carries a fufee, and is commonly an old foldier: there are generally three corporals in each company.

Corporal *of a Ship of War*, an officer under the mafter at arms, employed to teach the officers the exercife of fmall arms, or of mufketry; to attend at the gang-way, on entering ports, and obferve that no fpirituous liquors are brought into the fhip, unlefs by exprefs leave from the officers. He is alfo to extinguifh the fire and candles at eight o'clock in winter and nine in fummer, when the evening gun is fired; and to walk frequently down in the lower decks in his watch, to fee that there are no lights but fuch as are under the charge of proper fentinels.

Corporal, *Corporale*, is alfo an ancient church-term, fignifying the facred linen fpread under the chalice in the euchariſt and mafs, to receive the fragments of the bread, if any chance to fall. Some fay, it was pope Eufebius who firft enjoined the ufe of the corporal; others afcribe it to St. Sylvefter. It was the cuftom to carry corporals, with fome folemnity, to fires, and to heave them againft the flames, in order to extinguifh them. Philip de Comines fays, the pope made Louis XI. a prefent of the corporale whereon my lord St. Peter fung mafs.

CORPORATION, a body politic or incorporate, fo called becaufe the perfons or members are joined into one body, and are qualified to take, grant, &c. Of corporations there is a great variety fubfifting, for the advancement of religion, of learning, and of commerce; in order to preferve entire and for ever thofe rights and immunities, which, if they were granted only to thofe individuals of which the body corporate is compofed, would upon their death be utterly loft and extinct. To fhow the advantages of thefe incorporations, let us confider the cafe of a college in either of our univerfities, founded *ad ftudendum et orandum*, for the encouragement and fupport of religion and learning. If this was a mere voluntary affembly, the individuals which compofe it might indeed read, pray, ftudy, and perform fcholaftic exercifes together, fo long as they could agree to do fo: but they could neither frame, nor receive, any laws or rules for their conduct; none at leaft which would have any binding force, for want of a coercive power to create a fufficient obligation. Neither could they be capable of retaining any privileges or immunities: for, if fuch privileges be attacked, which of all this unconnected affembly has the right or ability to defend them? And, when they are difperfed by death or otherwife, how fhall they transfer thefe advantages to another fet of ftudents, equally unconnected as themfelves? So alfo, with regard to holding eftates or other property, if land be granted for the purpofes of religion or learning to 20 individuals not incorporated, there is no legal way of continuing the property to any other perfons for the fame purpofes, but by endlefs conveyances from one to the other, as often as the hands are changed. But when they are confolidated and united into a corporation, they and their fucceffors are then confidered as one perfon in law: as one perfon, they have one will, which is collected from the fenfe of the majority of the individuals: this one will may eftablifh rules and orders for the regulation of the whole, which are a fort of municipal laws of this little republic; or rules and ftatutes may be prefcribed to it at its creation, which are then in the place of natural laws: the privileges and immunities, the eftates and poffeffions of the corporation, when once vefted in them, will be for ever vefted, without any new conveyance to new fucceffions; for all the individual members that have exifted from the foundation to the prefent time, or that fhall ever hereafter exift, are but one perfon in law, a perfon that never dies: in like manner as the river Thames is ftill the fame river, though the parts which compofe it are changing every inftant.

The honour of originally inventing thefe political conftitutions entirely belongs to the Romans. They were introduced, as Plutarch fays, by Numa; who finding, upon his acceffion, the city torn to pieces by the two rival factions of Sabines and Romans, thought it a prudent and politic meafure to fubdivide thefe two into many fmaller ones, by inftituting feparate focieties of every manual trade and profeffion. They were afterwards much confidered by the civil law, in which they were called *univerfitates*, as forming one whole out of many individuals; or *collegia*, from being gathered together: they were adopted alfo by the canon law, for the maintenance of ecclefiaftical difcipline; and from them our fpiritual corporations are derived. But our laws have confiderably refined and improved upon the invention, according to the ufual genius of the Englifh nation; particularly with regard to fole corporations, confifting of one perfon only, of which the Roman lawyers had no notion; their maxim being that, *Tres faciunt collegium*: though they held, that if a corporation, originally confifting of three perfons, be reduced to one, *Si univerfitas ad unum redit*, it may ftill fubfift as a corporation, *Et ftet nomen univerfitatis*.

As to the feveral forts of corporations, the firft divifion of them is into *aggregate* and *fole*. Corporations aggregate confift of many perfons united together into one fociety, and are kept up by a perpetual fucceffion of members, fo as to continue for ever: of which kind are the mayor and commonalty of a city, the head and fellows of a college, the dean and chapter of a cathedral church. Corporations fole confift of one perfon only and his fucceffors, in fome particular ftation, who are incorporated by law, in order to give them fome legal capacities and advantages, particularly that of perpetuity, which in their natural perfons they could not have had. In this fenfe the king is a fole corporation; fo is a bifhop; fo are fome deans and prebendaries, diftinct from their feveral chapters; and fo is every parfon and vicar. And the neceffity, or at leaft ufe, of this inftitution will be very apparent, if we confider the cafe of a parfon of a church. At the original endowment of parifh-churches, the freehold of the church, the church-yard, the par-

fonage-houfe, the glebe, and the tithes of the parifh, were vefted in the then parfon by the bounty of the donor, as a temporal recompenfe to him for his fpiritual care of the inhabitants, and with intent that the fame emoluments fhould ever afterwards continue as a recompenfe for the fame care. But how was this to be effected? The freehold was vefted in the parfon; and, if we fuppofe it vefted in his natural capacity, on his death it might defcend to his heir, and would be liable to his debts and incumbrances: or at beft the heir might be compellable, at fome trouble and expence, to convey thefe rights to the fucceeding incumbent. The law therefore has wifely ordained, that the parfon, *quatenus* parfon, fhall never die, any more than the king; by making him and his fucceffors a corporation. By which means all the original rights of the parfonage are preferved entire to the fucceffor: for the prefent incumbent, and his predeceffor who lived feven centuries ago, are in law one and the fame perfon; and what was given to the one was given to the other alfo.

Another divifion of corporations, either fole or aggregate, is into *ecclefiaftical* and *lay*. Ecclefiaftical corporations are where the members that compofe it are entirely fpiritual perfons; fuch as bifhops; certain deans and prebendaries; all archdeacons, parfons, and vicars; which are fole corporations: deans and chapters at prefent, and formerly prior and convent, abbot and monks, and the like, bodies aggregate. Thefe are erected for the furtherance of religion, and perpetuating the rights of the church.—Lay corporations are of two forts, *civil* and *eleemofynary*. The civil are fuch as are erected for a variety of temporal purpofes. The king, for inftance, is made a corporation, to prevent in general the poffibility of an *interregnum* or vacancy of the throne, and to preferve the poffeffions of the crown entire; for, immediately upon the demife of one king, his fucceffor is in full poffeffion of the regal rights and dignity. Other lay corporations are erected for the good government of a town or particular diftrict, as a mayor and commonalty, bailiff and burgeffes, or the like: fome for the advancement and regulation of manufactures and commerce; as the trading companies of London and other towns: and fome for the better carrying on of divers fpecial purpofes; as church-wardens, for confervation of the goods of the parifh; the college of phyficians and company of furgeons in London, for the improvement of the medical fcience; the royal fociety for the advancement of natural knowledge; and the fociety of antiquarians for promoting the ftudy of antiquities. The eleemofynary fort are fuch as are conftituted for the perpetual diftribution of the free alms, or bounty of the founder of them to fuch perfons as he has directed. Of this kind are all hofpitals for the maintenance of the poor, fick, and impotent; and all colleges, both *in* our univerfities and *out* of them: which colleges are founded for two purpofes: 1. For the promotion of piety and learning by proper regulations and ordinances. 2. For imparting affiftance to the members of thofe bodies, in order to enable them to profecute their devotion with greater eafe and affiduity. And all thefe eleemofynary corporations are, ftrictly fpeaking, lay, and not ecclefiaftical, even though compofed of ecclefiaftical perfons, and although they in fome things partake of the nature, privileges, and reftrictions of ecclefiaftical bodies. How corporations in general may be created; what are their powers, capacities, and incapacities; and how they may be diffolved, are queftions confidered at large by Judge Blackftone in his Commentaries.

Corporation *Act*, is that which prevents any perfon from being legally elected into any office relating to the government of any city or corporation, unlefs, within a twelvemonth before, he has received the facrament of the Lord's Supper according to the rites of the church of England; and which enjoins him to take the oaths of allegiance and fupremacy when he takes the oath of office; otherwife his election is void.

CORPOREAL, thofe qualities which denominate a body. See Incorporeal.

CORPOREITY, the quality of that which is corporeal, or its body; or that which conftitutes or denominates it fuch. The corporeity of God was the capital error of the Anthropomorphites. Some authors reproach Tertullian with admitting a corporeity in the Deity; but it is manifeft, by *body* he means no more than *fubftance*. The Mahometans reproach the Samaritans at this day, with a belief of the corporeity of God. Many of the ancients believed the corporeity of angels.

CORPSE, a dead body. If any one, in taking up a dead body, fteals the fhrowd, or other apparel, it will be felony. Stealing only the corpfe itfelf is not felony; but it is punifhable as a mifdemeanor by indictment at common law.

CORPS, in architecture, is a term borrowed from the French, fignifying any part that projects or advances beyond the naked front of a wall; and which ferves as a ground for fome decoration or ornament.

Corps *de Battaille*, is the main body of an army drawn up for battle,

Corps *de Garde*, a poft in an army, fometimes under covert, fometimes in the open air, to receive a body of foldiery, who are relieved from time to time, and are to watch in their turns, for the fecurity of a quarter, a camp, a ftation, &c. The word is alfo ufed for the fentinels who watch therein. It is ufual to have, befide the great, a little corps de garde, at a good diftance before the lines; to be the more readily advertifed of the approach of the enemy.

CORPULENCY, the ftate of a perfon too much loaded with flefh or fat. Corpulency is not only a difeafe of itfelf, in which cafe it is ufually called *obefity*, but is alfo the occafion of other difeafes, particularly the apoplexy. It was held infamous among the ancient Lacedæmonians. Sennertus mentions a man that weighed 600 pounds, and a maid 36 years of age who weighed 450. Mr. Bright of Malden, who died at the age of 29 years in 1750, weighed 616 pounds. Chiapin Vitelli, Marquis of Cerona, a noted Spanifh general in his time, from an exceffive corpulency, is faid to have reduced himfelf by drinking of vinegar to fuch a degree of leannefs, that he could fold his fkin feveral times round him. From one to four drachms of Caftile foap, taken at bed-time, is ftrongly recommended with a view of reducing corpulency by Dr. Flemyng.

CORPUS, in anatomy, is applied to feveral parts of the animal ftructure; as *corpus callofum, corpus cavernofum, corpus fpongiofum*, &c.

Corpus is alfo ufed in matters of learning, for feveral works of the fame nature collected and bound together. Gratian made a collection of the canons of the church, called *corpus canonum*. The *corpus* of the civil law is compofed of the digeft, code, and inftitutes. We have alfo a *corpus* of the Greek poets; and another of the Latin poets.

Corpus *Chrifti*, a feftival of the church of England, kept on the next Thurfday after Trinity Sunday, inftituted in honour of the eucharift; to which alfo one of the colleges of Oxford is dedicated.

CORPUSCLE, in phyfics, a minute particle, or phyfical atom, being fuch as a natural body is made up of. By this word is not meant the elementary particles, nor the hypoftatical principles of chemifts; but fuch particles, whether of a fimple or compound nature, whofe parts will not be diffolved nor diffipated by ordinary degrees of heat.

CORPUSCULAR philosophy, is that way of philofophifing which endeavours to explain things, and to account for the phenomena of nature, by the motion, figure, reft, pofition, &c. of the corpufcles, or the minute particles of matter. Mr. Boyle fums up the chief principles of the corpufcular hypothefis, which then flourifhed under the mechanical philofophy, in thefe particulars: 1. They fuppofe that there is but one catholic

or univerſal matter, which is an extended, impenetrable, and diviſible ſubſtance common to all bodies, and capable of all forms. 2. That this matter, in order to form the vaſt variety of natural bodies, muſt have motion in ſome or all its aſſignable parts; and that this motion was given to matter by God the Creator of all things, and has all manner of direction and tendencies. 3. Matter muſt alſo be actually divided into parts, and each of theſe primitive particles, fragments, or atoms of matter, muſt have its proper magnitude or ſize, as alſo its peculiar figure or ſhape. 4. They ſuppoſe alſo, that theſe differently ſized and ſhaped particles may have as different orders and poſitions, whereof great variety may ariſe in the compoſition of bodies.

CORRECTION, in printing, the act of retrenching the faults in a work; or the reading which the corrector gives the firſt proofs, to point out and amend the faults, to be rectified by the compoſitor. The corrections are placed on the margin of each page, right againſt the line where the faults are found. There are different characters uſed to expreſs different corrections, as ₰, *dele*, for any thing to be effaced or left out. When any thing is to be inſerted, the place is marked in the line with a caret ^, and the inſertion added in the margin. When a word, ſyllable, &c. is to be altered, it is eraſed out of the proof, and that to be put in its room written in the margin; always obſerving, if there be ſeveral miſtakes in the ſame line, that the corrections in the margin be ſeparated by little bars, or ſtrokes, | . If a ſpace be omitted, its place is marked with a caret, and the margin with ※ . If a ſpace be wrong placed, as in the middle of a word, the two parts are connected with a curve, and the ſame character put in the margin. If a letter be inverted, it is expreſſed on the margin ꝯ. If any thing be tranſpoſed, it is marked thus: *The ſhorteſt* |*are the*| *follies*| *beſt*; for *the ſhorteſt follies are the beſt*; and in the margin is added *trſ.* in a circle. If Roman characters are to be changed for Italic, or *vice verſa*, a line is drawn under them thus, and *Roman* or *Italic* added in the margin; if to capitals, a double line. If a word or ſentence is entirely omitted, the place is marked with a caret, and in the margin is inſerted the word *out*. If the letters of a word ſtand too far aſunder, a line is drawn under them, and in the margin is put a crooked line or hook, thus ‿.

CORRECTOR, in general, denotes ſomething that mends the faults or bad qualities of other things.

CORRECTOR *of the Staple*, a clerk belonging to the ſtaple, whoſe buſineſs is to write down and record the bargains that merchants make there.

CORRECTOR, in medicine or pharmacy, an ingredient in a compoſition, which guards againſt or abates the force of ſome other.

CORREGIDOR, the name of an officer of juſtice in Spain, and countries ſubject to the Spaniſh government. He is the chief judge of a town or province.

CORREGIO. See ALLEGRI.

CORRELATIVE, ſomething oppoſed to another in a certain relation. Thus father and ſon are correlatives. Light and darkneſs, motion and reſt, are correlative and oppoſite terms.

CORRIGIOLA, in botany; a genus of the trigynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 54th order, *Miſcellaneæ*. The calyx is pentaphyllous; the petals five; and one three-cornered ſeed.

CORROBORANTS, or CORROBORATIVE *Medicines*. See STRENGTHENERS.

CORROSION, in a general ſenſe, the action of gnawing away, by degrees, the continuity of the parts of bodies.

CORROSION, in chemiſtry, an action of bodies, by means of proper menſtruums, that produces new combinations, and a change of their form, without converting them to a ſtate of fluidity.

CORROSIVE SUBLIMATE MERCURY, a preparation of quickſilver with the muriatic acid; now called *Hydrargyrus muriatus*.

CORROSIVES, in ſurgery, are the medicines which corrode whatever part of the body they are applied to. Such are burnt alum, red precipitate, &c. &c.

CORRUGATOR MUSCLE. See ANATOMY, *Table of the Muſcles*.

CORRUPTICOLÆ, a ſect who roſe out of the Monophyſites in Egypt about the year 519, under their chief Severus, the pretended patriarch of Alexandria. Their diſtinguiſhing doctrine, whence they derived their name, was, that the body of Jeſus Chriſt was *corruptible*; that the fathers had owned it; and that to deny it was to deny the truth of our Saviour's paſſion. On the other hand, Julian of Halicarnaſſus, another Eutychian, a refugee, as well as Severus, in Alexandria, maintained that the body of Jeſus Chriſt had been always incorruptible; that to ſay it was corruptible, was to make a diſtinction between Jeſus Chriſt and the Word, and by conſequence to make two natures in Jeſus Chriſt. The people of Alexandria were divided between the two opinions; and the partiſans of Severus were called *corrupticolæ*, q. d. worſhippers of ſomething *corruptible*: ſometimes they were denominated *corruptibiles*; and the adherents of Julian *incorruptibiles* or *phantaſiaſtæ*. The clergy and ſecular powers favoured the firſt; the monks and the people the latter.

CORRUPTION, the deſtruction, extinction, or at leaſt ceſſation for a time, of the proper mode of exiſtence of any natural body. See PUTREFACTION.

CORRUPTION *of Blood*, in law, one of the conſequences of an attainder, acting both upwards and downwards; ſo that an attainted perſon can neither inherit lands or other hereditaments from his anceſtors, nor retain thoſe he is already in poſſeſſion of, nor tranſmit them by deſcent to any heir; but the ſame ſhall eſcheat to the lord of the fee, ſubject to the king's ſuperior right of forfeiture; and the perſon attainted ſhall alſo obſtruct all deſcents to his poſterity, wherever they are obliged to derive a title through him to a remoter anceſtor. See ATTAINDER.

This is one of thoſe notions, ſays Blackſtone, which our laws have adopted from the feudal conſtitutions, at the time of the Norman conqueſt; as appears from its being unknown in thoſe tenures which are indiſputably Saxon, or Gavel kind: wherein, though by treaſon, according to the ancient Saxon laws, the land is forfeited to the king, yet no corruption of blood, no impediment of deſcent, enſues; and on judgment of mere felony, no eſcheat accrues to the lord. But, by the law of England, derived as above, a man's blood is ſo univerſally corrupted by attainder, that his ſons can neither inherit to him nor to any other anceſtor, at leaſt on the part of their attainted father.

This corruption of blood cannot be abſolutely removed but by authority of parliament. The king may excuſe the public puniſhment of an offender; but cannot aboliſh the private right which has accrued, or may accrue, to individuals as a conſequence of the criminal's attainder. He may remit a forfeiture in which the intereſt of the crown is alone concerned; but he cannot wipe away the corruption of blood; for therein a third perſon hath an intereſt, the lord who claims by eſcheat. If therefore a man hath a ſon, and is attainted, and afterwards pardoned by the king: this ſon can never inherit to his father, or father's anceſtors; becauſe his paternal blood, being once thoroughly corrupted by his father's attainder, muſt continue ſo; but if the ſon had been born after the pardon, he might inherit; becauſe, by the pardon, the father is made a new

man, and may convey new inheritable blood to his after-born children.

This corruption of blood, thus arifing from feudal principles, but perhaps extended farther than even thefe principles will warrant, has been long looked upon as a peculiar hardfhip: becaufe the oppreffive parts of the feudal tenures being now in general abolifhed, it feems unreafonable to referve one of their moft inequitable confequences; namely, that the children fhould not only be reduced to prefent poverty (which, however fevere, is fufficiently juftified upon reafons of public policy), but alfo be laid under future difficulties of inheritance, on account of the guilt of their anceftors. And therefore in moft (if not all) of the new felonies created by parliament fince the reign of Henry VIII. it is declared that they fhall not extend to any corruption of blood: and by the ftatute 7 Anne c. 21. (the operation of which is poftponed by the ftatute 17 Geo. I. c. 39.) it is enacted, that after the death of the late pretender and his fons, no attainder for treafon fhall extend to the difinheriting any heir, nor to the prejudice of any perfon, other than the offender himfelf; which provifions have indeed carried the remedy farther than was required by the hardfhip above complained of; which is only the future obftruction of defcents, where the pedigree happens to be deduced through the blood of an attainted anceftor.

CORSAIR, a pirate or perfon who fcours the feas, efpecially the Mediterranean, with a veffel armed for war, without commiffion from any prince or power, to plunder merchant veffels. The word comes from the Italian *corfare*, of *corfo*, or *à curfibus*, by reafon of their courfes, or excurfions.—The name is commonly given to the piratical cruifers of Barbary, who had their rife about the beginning of the 16th century. A *corfair* is diftinguifhed from a *privateer* in this, that the latter does it under a commiffion, and only attacks the veffels of thofe at war with the ftate whence his commiffion is derived. The punifhment of a corfair is to be hanged, without remiffion; whereas privateers are to be treated as prifoners of war. All corfair veffels are good prizes.

CORSELET, a little cuirafs: or, according to others, an armour or coat made to cover the whole body, anciently worn by the pike-men, ufually placed in the front and flanks of the battle, for the better refifting the enemy's affaults, and guarding the foldiers placed behind them.

CORSNED, or MORSEL of EXECRATION, a fpecies of trial or purgation anciently in ufe among us, and which probably arofe from an abufe of revelation in the dark ages of fuperftition. It confifted of a piece of cheefe or bread, about an ounce in weight, which was confecrated with a form of exorcifm; defiring of the Almighty that it might caufe convulfions and palenefs, and find no paffage if the man was really guilty; but might turn to health and nourifhment if he was innocent; as the water of jealoufy among the Jews was, by God's fpecial appointment, to caufe the belly to fwell, and the thigh to rot, if the woman was guilty of adultery. This corfned was then given to the fufpected perfon, who at the fame time alfo received the holy facrament: if indeed the corfned was not, as fome have fufpected, the facramental bread itfelf; till the fubfequent invention of tranfubftantiation preferved it from profane ufes with a more profound refpect than formerly. Our hiftorians affure us, that Godwin, Earl of Kent, in the reign of King Edward the Confeffor, abjuring the death of the king's brother, at laft appealed to his corfned, "per *buccellam deglutiendam abjuravit*," which ftuck in his throat and killed him. This cuftom has been long fince gradually abolifhed, though the remembrance of it ftill fubfifts in certain phrafes of abjuration retained among the common people: as, "I will take the facrament upon it; May this morfel be my laft!" and the like.

CORT (Cornelius), a celebrated engraver, was born at Hoorn in Holland in 1536. After having learned the firft principles of drawing and engraving, he went to Italy to complete his ftudies, and vifited all the places famous for the works of the great mafters. At Venice he was courteoufly received by Titian; and engraved feveral plates from the pictures of that admirable painter. He at laft fettled at Rome, where he died in 1578, aged 42. According to Bafan, he was "the beft engraver with the burin or graver only, that Holland ever produced. We find in his prints," adds he, "correctnefs of drawing, and an exquifite tafte." He praifes alfo the tafte and lightnefs of touch with which he engraved landfcapes, and that without the affiftance of the point. It is no fmall honour to this artift, that Agoftino Carracci was his fcholar, and imitated his ftyle of engraving rather than that of any other mafter. His engravings are very numerous (151 according to Abbé Marolles), and by no means fcarce.

CORTES *of* SPAIN, a term purely Spanifh, fignifying the *courts*, i. e. the ftates, or affembly of the ftates, at Madrid.

CORTES, or CORTEZ, (Ferdinand), a Spanifh general, famous for the conqueft of Mexico, and other victories over the natives of South America; but infamous for the cruelties he committed upon the vanquifhed, without regard to rank, age, or fex. It probably was on this account he was but coolly received on his return to Europe by his royal mafter Charles le Quint: it is even afferted that the emperor afked him who he was? to which Cortez replied; "I am the man who gave you more provinces than your anceftors have left you towns." He died in 1554, aged 63.

CORTEX, in botany, the rind or coarfe outer bark of plants. See the article BARK.

CORTEX *Peruvianus*. See *Peruvian* BARK.

CORTEX *Winteranus*. See WINTERA.

CORTONA (Pietro da). See BERRETINI.

CORTONA, a very ancient town of Italy, mentioned by many of the Roman hiftorians. It was originally called *Corton*, and lay to the northward of the lake Thrafymenus. It ftill retains the name of Cortona. E. long. 13. 0. N. lat. 53. 15.

CORTONESE (Pietro Paolo). See GOBBO.

CORTUSA, BEAR'S-EAR SANICLE; a genus of the monogynia order, belonging to the pentandria clafs of plants, and in the natural method ranking under the 21ft order *Precia*. The corolla is wheel-fhaped, with its throat like an elevated ring; the capfule unilocular, oval, and quinquevalved at the top. There are two fpecies, both of them very low, flowery, herbaceous perennials, crowned by umbels of monopetalous, wheel-fhaped flowers, of a fine red colour. They are natives of mountainous rocky parts abroad, fo muft have a dry lean foil; or they may be kept in pots of dry fandy earth placed in the fhade, and in the fummer muft be duly watered; and their propagation here is by flipping the roots in October.

CORUNNA, or GROYNE, a port-town of Gallicia in Spain, fituated on a fine bay of the Atlantic ocean, about 32 miles north of Compoftella. W. long. 9. 0. N. lat. 43. 0.

CORUS, OMER, HOMER, or CHOMER, in the Jewifh antiquities, a meafure containing 10 baths or 75 gallons and five pints, as a meafure for things liquid, and 32 pecks and 1 pint as a meafure for things dry. The *corus* or *omer* was moft commonly a meafure for things dry; and the greateft that was ufed among the Jews. It contained, according to the rabbins, 10 ephas or 30 fata or feahs. *Corus* is the moft ufual term in the hiftorical writers, and *omer* or *chomer* among the prophets. CORUS is alfo ufed in fome of our old writers for eight bufhels, or a quarter; *decem* coros *tritici*, *five decem quarteria*.

CORUSCATION, a glittering or gleam of light iffuing from any thing. It is chiefly ufed for the electrical fluid when rendered vifible, or for a flafh of lightning darting from the

clouds. There are methods of producing artificial corufcations, or fparkling fiery meteors, which will be vifible not only in the dark but in the day time.

CORVORANT, formerly written CORMORANT. See PELICANUS.

CORVUS, the RAVEN or CROW kind, in ornithology; a genus of birds of the order of picæ, the diftinguifhing characteriftics of which are thefe: the beak is convex and cultrated; the noftrils are covered with briftly feathers; the tongue is forked and cartilaginous; and the feet are of the walking kind. The fpecies are 19, the moft remarkable of which are:

1. The *corax*, or raven of Englifh authors, weighs three pounds, and is about two feet two inches in length; the colour is black, finely gloffed with a rich blue, the belly excepted, which is of a dufky colour. They are very docile birds, and may be trained up to fowling like hawks: to fetch and carry like fpaniels; they may be taught to fpeak like parrots; and, what is moft extraordinary of all, they may be taught to imitate the human voice in finging. They have a great propenfity to pilfer, often hiding things of value to the great lofs of the owner, without ufe to themfelves. They frequent the neighbourhood of great towns, where they are ufeful in devouring the carcafes and filth which would otherwife prove a nuifance. They, however, alfo deftroy many living animals; fuch as rabbits, young ducks, and chickens, and not unfrequently lambs which have been dropped in a weak ftate. In clear weather they fly in pairs to a great height, making a deep loud noife, different from the common croaking. Their fcent is remarkably good; and they are very long lived. The raven makes her neft early in the fpring, laying 5 or 6 eggs, of a pale blueifh-green colour fpotted with brown.

2. The *corone*, or carrion-crow, in the form of its body agrees with the raven; alfo in its food, which is carrion and other filth. It will alfo eat grain and infects; and like the raven will pick out the eyes of animals; whence it was formerly diftinguifhed from the rook, which feeds entirely on grain and infects, by the name of the *gor*, or *gor-crow*. Virgil fays that its croaking foreboded rain; "*Tum* cornix *plena pluviam vocat improba voce*." It was alfo thought a bird of bad omen, efpecially if it happened to be feen on the left hand: "*Sæpe finiftra cava prædixit ab ilice* cornix." England breeds more of this kind of birds than any other country in Europe. In the 24th of Henry VIII. they were grown fo numerous, and thought to be fo prejudicial to the farmer, that they were confidered as an evil worthy of parliamentary redrefs; an act was paffed for their deftruction, in which rooks and choughs were included. Every hamlet was to provide crow-nets for 10 years; and all the inhabitants were obliged at certain times to affemble during that fpace to confult of the proper means for extirpating them. But though the crow abounds thus in Britain, it is fo rare in Sweden, that Linnæus fpeaks of it only as a bird that he once knew killed there. It lays the fame number of eggs as the raven, and of the fame colour: immediately after deferting their young, they go in pairs. Both thefe birds are often found white or pied; an accident that befals black birds more frequently than any others. Mr. Pennant fays, he has obferved one entirely of a pale brown colour, not only in its plumage, but even in its bill and feet. The crow weighs about 20 ounces. Its length is 18 inches; its breadth two feet two inches.

3. The *frugilegus*, or rook, is the corvus of Virgil; no other fpecies of this kind being gregarious. It differs not greatly in its form from the carrion-crow: the moft remarkable difference is in the noftrils and root of the bill; which parts in the crow are well clothed with feathers, but in the rook are bare, or covered only with fome briftly hairs. This arifes from its thrufting the bill into the earth continually, after the various worms and erucæ of infects, on which it feeds: for it does not live on carrion, like the laft fpecies of ravens. Befides infects, it alfo feeds on all forts of grain, to fome inconvenience perhaps to the hufbandman, but no doubt doubly repaid by the good done to him in extirpating the maggot of the chafer-beetle, which in fome feafons deftroys whole crops of corn by feeding on the roots. The rook is a gregarious bird, fometimes being feen in immenfe flocks, fo as almoft to darken the air. Thefe flights they regularly perform morning and evening, except in breeding-time, when the daily attendance of both male and female is required for the ufe of incubation, or feeding the young; for it is obferved that they do both by turns. As thefe birds are apt to form themfelves in focieties, fuch places as they frequent during the breeding-time are called *rookeries*; and they generally choofe a large clump of the talleft trees for this purpofe; but make fo great a litter, and fuch a perpetual chatter, that nothing but habit and a length of time can reconcile one to the noife. The eggs are like thofe of crows, but lefs, and the fpots larger. They begin to build in March, and after the breeding-feafon forfake their neft trees, going to rooft elfewhere, but have been obferved to return to them in Auguft: in October they repair their nefts. In Britain they remain the whole year; yet we are told that both in France and Silefia they are birds of paffage. Whether they migrate or not in Sweden, we are not told; but Linnæus talks of their building there. The young birds are accounted good eating, efpecially if fkinned and put in a pie.

4. The *cornix*, or Royfton crow, pretty much refembles the rook, feeding on infects, and flying together in great flocks. In England it is a bird of paffage, vifiting that kingdom in the beginning of winter, and leaving it with the woodcocks. In the maritime parts they feed on crabs and fhell-fifh. They are very common in Scotland; in many parts of the Highlands, and in all the Hebrides, Orkneys, and Shetland, it is the only fpecies of genuine crow; the carrion and rook being unknown there. It breeds and continues in thofe parts the whole year round. In the Highlands, they breed indifferently in all kinds of trees: lay fix eggs, have a fhriller note than the common crows; are much more mifchievous; pick out the eyes of lambs, and even of horfes when entangled in bogs. They are, therefore, in many places profcribed, and rewards given for killing them. For want of other food thefe birds will eat cranberries or other mountain berries.

5. The *dauricus*, or white breafted crow, is in length about 12 inches: (See Plate 81.) the bill is black; the head and throat are black, gloffed with blue; the neck and breaft white; the reft of the body, wings, and tail, blue black: the legs of a lead colour: the claws black. The fpecimen figured by Buffon came from Senegal; but is by no means confined to that quarter. Pallas defcribes the fame fpecies, which he fays came early in the fpring in great flights from China, and the fouthern Monguls country, into the parts about the lake Baikal, but moft frequent about the towns and villages on the river Lena, in which part the jackdaws and Royfton crows are very feldom feen. It is faid they are likewife found in vaft numbers in the ifland of Johann, where they live chiefly on infects and fruits, and make their nefts in trees.

6. The *monedula*, or jack-daw, weighs nine ounces; the length thirteen inches, the breadth twenty-eight. The head is large in proportion to its body; which, Mr. Willughby fays, argues him to be ingenious and crafty. The irides are white: the breaft and belly are of a dufky hue inclining to afh-colour: the reft of the plumage is black, flightly gloffed with blue: the claws very ftrong and hooked. It is a docile and loquacious bird. Jack-daws breed in fteeples, old caftles, and in high rocks, laying five or fix eggs. Sometimes they have been known to breed in hollow-trees near a rookery, and join thofe birds in their foraging parties. In fome parts of Hampfhire, they make

their nefts in rabbit holes: they alfo build in the interftices between the upright and tranfum ftones of Stonehenge; a proof of the prodigious height of that ftupendous antiquity, for their nefts are placed beyond the reach of the fhepherd boys, who are always idling about this fpot. They are gregarious birds; and feed on infects, grain, and feeds—Thefe birds are frequently brought up tame: they have a practice of hiding that part of their food which they cannot eat; and often, along with it, they fecrete fmall valuables, thereby fometimes occafioning injurious fufpicions of theft in fervants or others not guilty.

7. The *glandarius*, or jay, is one of the moft beautiful of Britifh birds. The weight is between fix and feven ounces: the length 13 inches. The forehead is white ftreaked with black; the head is covered with very long feathers, which it can erect at pleafure into the form of a creft: the whole neck, back, breaft, and belly, are of a faint purple dafhed with grey; the covert-feathers of the wings are of the fame colour. The firft quill-feather is black: the exterior webs of the nine next are afh-coloured; the interior webs dufky; the fix next are black, but the lower fides of their exterior webs are white tinged with blue; the two next wholly black; the laft of a fine bay colour tipt with black. The leffer coverts are of a light bay: the greater covert feathers moft beautifully barred with a lively blue, black, and white: the reft are black: the rump is white. The tail confifts of twelve black feathers. The feet are of a pale brown; the claws large and hooked.—Jays build chiefly in woods, making their neft of fticks, fibres of roots, and tender twigs; and lay five or fix eggs, of the fize of a pigeon's, cinereous olive, marked with pale brown. The young keep with the old ones till the next pairing time in fpring; when they choofe each his mate to produce their future progeny. In general they feed on acorns, nuts, feeds, and fruits of all kinds; but will fometimes deftroy young chickens and eggs, and will alfo take away birds that have been caught in a trap or entangled with birdlime. They are often kept in cages, and will talk pretty well; but then lofe all that beauty fo confpicuous in the wild ftate.

8. The *caryocatactes*, or nutcracker, is fomewhat lefs than the jack-daw: the bill is ftrong, ftraight, and black: the colour of the whole head and neck, breaft and body, of a rufty brown: the crown of the head and rump are plain; the other parts marked with triangular white fpots: the wings are black; the coverts fpotted in the fame manner as the body: the tail is rounded at the end, black tipt with white: the vent-feathers are white; the legs dufky. We find thefe birds fcattered in many parts of Europe, but no where fo plenty as in Germany; they are found alfo in Sweden and Denmark, where they frequent the mountainous parts. Sometimes they come in vaft flocks into France, efpecially Burgundy. They vifit England very feldom; are alfo found in North-America, but not near the fea-coafts. One has been brought from Kamtfchatka by the late voyagers.

9. The *pica*, or magpie, is in length above 18 inches, and weighs 8 or 9 ounces. The bill is black: the irides are hazle: the fcapulars, and all the under parts from the breaft, are white; the reft of the plumage, wings, and tail, black, gloffed with green, purple, and blue, in different lights; the eleven firft quills are white in the middle on the inner web, leffening by degrees as they advance inwards: the tail is very cuneiform, the two middle feathers being near 11 inches in length, and the outmoft only 5 inches and a half: the legs are black. We can form no judgment of the colours of this bird, from thofe dirty mutilated fpecimens which we fee expofed daily in a wicker cage at every ftall. It is only in a ftate of nature that they can be found; and whoever views them in this ftate, will find them very beautiful. In manners it approaches the crow, feeding almoft on every thing in turn, both animal and vegetable; and like that, will kill young ducks and chickens, and fuck the eggs. It builds its neft with art, making a thorny cover at top, leaving a hole in the fide for admittance: lays fix or feven pale greenifh eggs, thickly fpotted with black. It is a crafty bird in every ftate, and, if brought up young, becomes exceedingly familiar, and will talk a great many fentences, as well as imitate every noife within hearing, like a parrot, but not near fo plain.

10. The *graculus*, or red-legged crow, is but thinly fcattered over the northern world: no mention is made of it by any of the Faunifts; nor do we find it in other parts of Europe, except Britain and the Alps. It is produced in the ifland of Canadia in Afia; and it vifits Egypt towards the end of the inundation of the Nile. Except in Egypt, it affects mountainous and rocky places; builds its neft in high clifs or ruined towers; and lays four or five eggs, white fpotted with a dirty yellow. It feeds on infects, and alfo on new-fown corn. They commonly fly high, make a fhriller noife than the jack-daw, and may be taught to fpeak. It is a very tender bird, and unable to bear very fevere weather; is of an elegant, flender make; active, reftlefs, and thieving; much taken with glitter, and fo meddling as not to be trufted where things of confequence lie. It is very apt to catch up bits of lighted fticks; fo that there are inftances of houfes being fet on fire by its means; on which account Cambden calls it *incendiaria avis*. It is found in Cornwall, Flintfhire, Caernarvonfhire, and Anglefea, in the rocky clifs along the fhores. It is alfo found in Scotland as far as Strathnavern, and in fome of the Hebrides. Its colour is wholly black, beautifully gloffed over with blue and purple: the legs and bill are of a bright orange colour inclining to red: the tongue is almoft as long as the bill, and a little cloven: the claws are large, hooked, and black.

11. The *criftatus*, or blue jay, is much fmaller than the common jay. The bill is black and above an inch long: the head is crefted and blue: a ftreak on each fide of the head and throat are of a blueifh white, and there is a fpot of the fame over the eye: the hind part of the neck and back is blue: the wings and tail the fame; all the feathers of the laft, except the two middle ones, tipped with white; the feathers of both it and the wings elegantly barred with black, and the greater coverts and fecond quills tipped with white: the breaft is of a bloffom colour: the belly and under tail coverts white: the legs are dufky brown: the tail is nearly as long as the reft of the bird. The colours of the female are lefs bright than thofe of the male. This fpecies is faid to be peculiar to North-America, but not feen farther north than the town of Albany.

12. The *canadenfis* is in length 9 inches, and weighs two ounces. The bill is blackifh, and not quite an inch long: the irides are black: the fore-head and throat are of a dirty yellow white; the hind-head and fides of a blackifh brown: the upper parts of the body are brown: beneath, pale afh, paleft on the breaft: the quills and tail are brown, tipped with white: tail is a little wedged: the legs and claws are blackifh. Thefe birds inhabit Canada; and are frequent near Hudfon's Bay, where they are called *Whifkijohn* and *Whifkijack*. They breed early in the fpring; build in pine trees; and have two, rarely three young at a time. The eggs are blue. They are not gregarious. Their food is black mofs, worms, and flefh. They are very bold pilfering birds, ftealing from the traveller even falt meat; and devouring often the bait from the traps fet for the martins, as foon as the perfons who fet them turn their backs. They lay up ftores for winter; at which time they are feldom feen unlefs near habitations. They do not bear confinement well. What natural note they have, we are not told; but they are faid to act the mocking bird, in imitating that of others.—There are near 30 other fpecies.

Corvus, *Raven*, in aftronomy; a conftellation of the fouthern hemifphere whofe ftars in Ptolemy's Catalogue are 7; in Tycho's as many; in the Britannic Catalogue 9.

Corvus, in Roman antiquity, a military engine, or rather

gallery, moveable at pleaſure by means of pullies; chiefly uſed in boarding the enemy's ſhips to cover the men. The conſtruction of the corvus was as follows: They erected on the prow of their veſſels a round piece of timber of about a foot and an half diameter, and about 12 feet long: on the top of which they had a block or pulley. Round this piece of timber they laid a ſtage or platform of boards, four feet broad, and about 18 feet long, which was well framed and faſtened with iron. The entrance was long-ways, and it was moved about on the above-mentioned upright piece of timber as on a ſpindle, and could be hoiſted up within ſix feet of the top: about this was a ſort of parapet knee-high, which was defended with upright bars of iron ſharpened at the end, and towards the top there was a ring, by the help of which and a pulley or tackle, they raiſed or lowered the engine at pleaſure. With this moveable gallery they boarded the enemy's veſſels (when they did not oppoſe ſide to ſide,) ſometimes on their bow and ſometimes on their ſtern, as occaſion beſt ſerved. When they had grappled the enemy with theſe iron ſpikes, if they happened to ſwing broadſide to broadſide, then they entered from all parts; but in caſe they attacked them on the bow, they entered two and two by the help of this machine, the foremoſt defending the foreparts, and thoſe that followed the flanks, keeping the boſs of their bucklers level with the top of the parapet.

CORYBANTES, in antiquity, prieſts of Cybele, who danced and capered to the ſound of flutes and drums. See CROTALUM. Catullus, in his poem called *Atys*, gives a beautiful deſcription of them, repreſenting them as madmen. Accordingly Maximus Tyrius ſays, that thoſe poſſeſſed with the ſpirit of Corybantes, as ſoon as they heard the ſound of a flute, were ſeized with an enthuſiaſm, and loſt the uſe of their reaſon. And hence the Greeks uſe the word κορυβαντειν, *to corobantize*, to ſignify a perſon's being tranſported or poſſeſſed with a devil. See ENTHUSIASM. Some ſay that the Corybantes were all eunuchs; and that it is on this account Catullus, in his Atys, always uſes feminine epithets and relatives in ſpeaking of them.

CORYBANTICA, a feſtival held in Crete, in memory of the Corybantes, who educated Jupiter when he was concealed in that iſland from his father Saturn, who would have devoured him.

CORYCEUM, in antiquity, that part of the gymnaſium where people undreſſed. It was otherwiſe called *apodyterion*.

CORYCOMACHIA, among the ancients, was a ſort of exerciſe in which they puſhed forwards a ball, ſuſpended from the ceiling, and at its return either caught it with their hands, or ſuffered it to meet their body. Oribaſius informs us it was recommended for extenuating too groſs bodies.

CORYDALES, in botany, an order of plants in the *Fragmenta Methodi Naturalis* of Linnæus, containing the following genera, *viz.* epimedium, hypecoum, leontice, melianthus, pinguicula, and utricularia.

CORYDALES, in botany. See FUMARIA.

CORYLUS, the HAZLE; a genus of the polyandria order, belonging to the monœcia claſs of plants; and in the natural method ranking under the 50th order, *Amentaceæ*. The male calyx is monophyllous, ſcale-like, trifid, and uniflorous; there is no corolla; the ſtamina eight in number: The female calyx diphyllous and lacerated; no corolla; two ſtyles; and an egg-ſhaped nut. Mr. Miller reckons three ſpecies, though other botaniſts make only two. They are all of the large ſhrub kind, hardy and deciduous; and have ſeveral varieties valuable for their nuts, as alſo for their variety in large wilderneſſes and ſhrubbery works. They will proſper in almoſt any ſoil or ſituation, and turn out to good account when growing in coppices to cut as underwood, and as poles for various uſes, as hoops, ſpars, hurdles, handles to huſbandry implements, walking-ſticks, fiſhing-rods, &c. for which purpoſes they may be cut every 5th, 7th, or 8th year, according to the purpoſes for which they are deſigned. The beſt method of propagating them is by layers, though they may alſo be raiſed from the nuts.

The kernels of the fruit have a mild, farinaceous, oily taſte, agreeable to moſt palates. Squirrels and mice are fond of them, as well as ſome birds, ſuch as jays, nutcrackers, &c. A kind of chocolate has been prepared from them, and there are inſtances of their having been formed into bread. The oil expreſſed from them is little inferior to the oil of almonds; and is uſed by painters; and by chemiſts, for receiving and retaining odours.

Evelyn tells us, that no plant is more proper for thickening of copſes than the hazle, for which he directs the following expeditious method: Take a pole of hazle (aſh or poplar may alſo be uſed), of twenty or thirty feet in length, the heads a little lopped in the ground, giving it a chop near the ground to make it ſuccumb; this faſtened to the earth with a hook or two, and covered with ſome freſh mould at a competent depth (as gardeners lay their carnations), will produce a great number of ſuckers, and thicken and furniſh a copſe ſpeedily.

CORYMBIFERÆ, in botany, the name of an order or diviſion of the compound flowers adopted by Linnæus after Ray and Vaillant, in the former editions of his Fragments of a Natural Method. This title in the later editions is changed for *Diſcoideæ*, another name borrowed from Ray's Method, but uſed in a ſomewhat different ſenſe.

CORYMBIUM, in antiquity, an ornament of hair worn by the women. Its form was that of a corymbus.

CORYMBIUM, in botany; a genus of the monogamia order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The calyx is diphyllous, uniflorous, and priſmatical; the corolla monopetalous and regular; there is one woolly ſeed below each floret.

CORYMBUS, properly ſignifies a cluſter of ivy berries. Among botaniſts, it is a mode of flowering in which the leſſer or partial flower-ſtalks are produced along the common ſtalk on both ſides; and though of unequal lengths, riſe to the ſame height, ſo as to form a flat and even ſurface at the top. See BOTANY, *Gloſſary*; and plate 56, fig. 2.

CORYNOCARPUS, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants. The calyx is a pentaphyllous perianthium; the corolla conſiſts of five roundiſh, erect, and hollow petals; the ſtamina five ſubulated filaments ariſing from the baſe of the petals; the antheræ are erect and oblong; the pericarpium a monoſpermous, turbinat-clavated nut.

CORYPHA, MOUNTAIN PALM, or *Umbrella Tree*, in botany; a genus of the order of *Palmæ*, belonging to the monœcia claſs of plants. The corolla is tripetalous; the ſtamina ſix, with one piſtil; the fruit a monoſpermous plum. There is only one ſpecies, the umbracula, a native of the Weſt-Indies, where it is called *codda pana*. It riſes to a conſiderable height, and produces at the top many large palmated, plaited leaves, the lobes of which are very long, and are placed regularly round the end of a long ſpiny footſtalk, in a manner repreſenting a large umbrella. The flowers are produced on a branched ſpadix, from a compound ſpatha or ſheath; they are hermaphrodite, and each conſiſts of one petal, divided into three oval parts, and contains ſix awl-ſhaped ſtamina, ſurrounding a ſhort ſlender ſtyle, crowned with a ſimple ſtigma. The germen is nearly round, and becomes a large globular fruit of one cell, including a large round ſtone. Theſe plums having a pleaſant flavour are held in eſteem by the Indians.

CORYPHÆNA, in ichthyology, a genus belonging to the order of thoracici. The head is declined and truncated; the branchioſtege membrane has ſix rays; and the back-fin runs the whole length of the back. There are twelve ſpecies, moſt of them natives of foreign ſeas. The moſt remarkable are the blue and parrot fiſhes, deſcribed by Mr. Cateſby.—The head of the

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firſt is of an odd ſtructure, reſembling that of the ſpermaceti whale: the mouth is ſmall, each mandible armed with a ſingle row of even teeth, ſo cloſely joined that they ſeem entire bones; the iris of the eye is red. On the back is a long pliant fin, ſomewhat indented on the edge; behind the gills are two fins, one under the abdomen and another behind the anus. The tail is forked; and the whole fiſh entirely blue. They are taken on the coaſts of the Bahama Iſlands, and in moſt of the ſeas between the tropics. The parrot-fiſh hath a large mouth, paved as it were with blunt teeth, cloſely connected after the manner of the lupus marinus. The body is covered with large green ſcales; the eyes are red and yellow; the upper part of the head brown, the lower part and the gills blue, bordered with a duſky red; a ſtreak of red extends from the throat behind the gills, at the upper end of which is a bright yellow ſpot. The fins are five in number, one extending almoſt the length of the back, of a bay or cinnamon colour; there are two behind the gills, blended with black, green, and purpliſh colours, with the upper edge verged with blue: under the abdomen is another red fin verged with blue: under the anus extends another long narrow green fin, with a liſt of red through the middle of it: at the baſis of the tail on each ſide is a large yellow ſpot. The tail is large, forked and green, with a curved red line running through the middle parallel to the curve, and ending in two points. This fiſh is more eſteemed for beauty than the delicacy of its taſte. They are taken on the coaſts of Hiſpaniola, Cuba, and the Bahama Iſlands.

CORYPHÆUS, in the ancient tragedy, was the chief or leader of the company that compoſed the chorus (See CHORUS). The word is formed from the Greek κορυνη, "tip of the head." The coryphæus ſpoke for all the reſt, whenever the chorus took part in the action, in quality of a perſon of the drama, during the courſe of the acts. Hence coryphæus had paſſed into a general name for the chief or principal of any company, corporation, ſect, opinion, &c. Thus Euſtatius of Antioch is called the *coryphæus* of the council of Nice; and Cicero calls Zeno the *coryphæus* of the ſtoics.

CORYZA, in medicine, a catarrh, or inflammation of the mucous membrane of the noſe. See MEDICINE.

CORZOLA, or CURSCOLA, an iſland in the gulph of Venice, divided from Raguſa in Dalmatia by a narrow ſtrait. E. long. 18. 0. N. lat. 42. 35.

COS, the WHETSTONE, in natural hiſtory, a genus of vitreſcent ſtones, conſiſting of fragments of an indeterminate figure, ſub-opaque, and granulated. Of this genus there are ſeveral ſpecies, ſome conſiſting of rougher, and others of ſmoother, or even of altogether impalpable particles; and uſed not only for whet-ſtones, but alſo for mill-ſtones, and other ſuch purpoſes.

COS TURCICA, *Turkey-ſtone*, a ſpecies of ſtones of the garnet kind, belonging to the ſiliceous claſs. It is of a dull white, and often of an unequal colour; ſome parts appearing more compact than others. Its ſpecific gravity is 2598: it ſtrikes fire with ſteel, and efferveſces with acids. Mr. Kirwan found that 100 parts of it contain 25 of mild calcareous earth, and no iron. Cronſtedt is of opinion that there are probably two ſorts of ſtones known by this name, as that deſcribed by Wallerius neither gives fire with ſteel nor efferveſces with acids. It is uſed as a whetſtone; and thoſe of the fineſt grain are the beſt hones for the moſt delicate cutting tools, and even for razors, lancets, &c.

COSCINOMANCY, the art of divination by means of a ſieve. The word comes from κοσκινον, *cribrum*, "a ſieve;" and μαντεια, *divination*. The ſieve being ſuſpended, after rehearſing a formula of words, it is taken between two fingers only; and the names of the parties ſuſpected repeated: he at whoſe name the ſieve turns, trembles, or ſhakes, is reputed guilty of the evil in queſtion. This muſt be a very ancient practice: Theocritus, in his third Idyllion, mentions a woman very ſkilful in it. It was ſometimes alſo practiſed by ſuſpending the ſieve by a thread, or fixing it to the points of a pair of ſheers, giving it room to turn, and naming, as before, the parties ſuſpected; in which laſt manner *coſcinomancy* is ſtill practiſed in ſome parts of England. It appears from Theocritus, that it was not only uſed to find out perſons unknown, but alſo to diſcover the ſecrets of thoſe that were known.

CO-SECANT, in geometry, the ſecant of an arch which is the complement of another to 90°. See GEOMETRY.

COSENAGE, in law, a writ that lies where the treſail, that is, the tritavus, the father of the beſail, or great grandfather, being ſeized in fee at his death of certain lands or tenements, dies; a ſtranger enters, and abates; then ſhall this heir have this writ of coſenage; the form of which ſee in Fitz. Nat. Br. fol. 221.

COSENING, in law, an offence whereby any thing is done deceitfully, in or out of contracts, which cannot be fitly termed by any eſpecial name. In the civil law it is called *ſtellionatus*. See STELLIONATE.

COSENZA, the capital of the Hither Calabria, in the kingdom of Naples. E. long. 16. 35. N. lat. 39. 15. It is an archbiſhop's ſee.

COSHERING, in the feudal cuſtoms, a kind of right of the lords to lie and feaſt themſelves and their followers at their tenants' houſes. The word *coſhering* may perhaps be derived from the old Engliſh word *coſhe*, a cot or cottage.

CO-SINE, in trigonometry, the ſine of an arch which is the complement of another to 90°. See GEOMETRY.

COSMETIC, any preparation which renders the ſkin ſoft and white, or helps to beautify and improve the complexion; as cold creams, pearl powder, ceruſs, biſmuth, &c.

COSMICAL, a term in aſtronomy, expreſſing one of the poetical riſings of a ſtar: thus a ſtar is ſaid to riſe coſmically when it riſes with the ſun, or with that point of the ecliptic in which the ſun is at that time: and the coſmical ſetting is when a ſtar ſets in the weſt at the ſame time that the ſun riſes in the eaſt.

COSMOGONY, in phyſics, ſignifies the ſcience of the formation of the univerſe. It is formed of κοσμος *the world*, and γινομαι *I am born*. In our conjectures about the formation of the world, there are two principles which we ought never to loſe ſight of. 1. That of the *creation*; for certainly matter could not give itſelf exiſtence; but muſt have received it. 2. That of a *Supreme Intelligence* directing this creation, and the arrangement of the parts of matter, in conſequence of which this world was formed. See CREATION and EARTH.

COSMOGRAPHY, the deſcription of the world; or the art which teaches the conſtruction, figure, diſpoſition, and relation of all the parts of the world, with the manner of repreſenting them on a plane. The word comes form κοσμος *world*, and γραφω *I deſcribe*. Coſmography conſiſts chiefly of two parts. *Aſtronomy*, which ſhows the ſtructure of the heavens, and the diſpoſition of the ſtars; and *Geography*, which ſhows thoſe of the earth.

COSMOLABE, from κοσμος *world*, and λαμβανω *I take*, an ancient mathematical inſtrument, ſerving to meaſure diſtances, both in the heavens and on earth. The *Coſmolabe* is in great meaſure the ſame with the aſtrolabe. It is alſo called *pentacoſm*, or the *univerſal inſtrument*, by L. Morgard, in a treatiſe written expreſsly upon it, printed in 1712.

COSMOLOGY, from κοσμος *world*, and λογος *diſcourſe*, the ſcience of the world in general. This Wolfius calls *general*, or *tranſcendental coſmology*, and has written a treatiſe on the ſubject, wherein he endeavours to explain how the world ariſes from ſimple ſubſtances; and treats of the general principles of the modifications of material things, of the elements of bodies, of the laws of motion, of the perfection of the world, and of the order and courſe of nature.

COSMOPOLITE, or COSMOPOLITAN, a term fometimes ufed to fignify a perfon who has no fixed living or place of abode, or a man who is a ftranger nowhere. The word comes from the Greek κοςμος *world*, and πολις *city*.—One of the ancient philofophers being interrogated what countryman he was? anfwered, he was a *cofmopolite*, i. e. an inhabitant or citizen of the world.

COSSACKS, a people inhabiting the confines of Poland, Ruffia, Tartary, and Turkey. They are divided into feveral branches, the Kofakki-fa-Parovi, the Kofakki-Donfki, and the Uralian Coffacks. Thefe are the wildeft of them all, though they dwell in large villages, along the banks of the Ural, near its fall into the Cafpian Sea. They live on hufbandry, fifhing, and their cattle; but rob their neighbours as often as they have opportunity. In winter they keep at home; but in fummer they rove in boats on the Cafpian Sea, to attack the veffels failing thereon. Their religion is a mixture of Paganifm, Mahometanifm, and Chriftianity. Their only town is Uralfk. The banks of the rivers are exceedingly fertile, and produce all the neceffaries of life. Thefe people are large and well-made, have blue eyes, brown hair, and aquiline nofes; the women are handfome, well-fhaped, and complaifant to ftrangers. The country which the Coffacks now inhabit, is called the Ukraine, and is one continued fertile plain, which produces corn, pulfe, tobacco and honey. The paftures are fo good, that their cattle are the largeft in Europe. Their towns are built of wood, after the manner of the Ruffians. The Kofakki-Donfki dwell on both fides of the Don, are under the protection of Ruffia, and profefs the fame religion. See URAL, URALIAN COSSACKS, and URALSK.

Uralian COSSACKS, a people that inhabit the Ruffian province of Orenburg, in Afia, on the fouth fide of the river Ural. Thefe Coffacks are defcended from thofe of the Don: they are a very valiant race. They profefs the Greek religion; but there is a kind of diffenters from the eftablifhed religion, whom the Ruffians called *Rofkolniki*, or Separatifts, and who ftyle themfelves *Staroverfki*, or Old Believers. They confider the fervice of the eftablifhed church as profane and facrilegious, and have their own priefts and ceremonies. The Uralian Coffacks are all enthufiafts for the ancient ritual, and prize their beards almoft equal to their lives. A Ruffian officer having ordered a number of Coffack recruits to be publicly fhaved in the town of Gaitfk, in 1771, this wanton infult incited an infurrection, which was fuppreffed for a time; but in 1773, that daring impoftor, Pugatchef, having affumed the name and perfon of Peter III. appeared among them, and taking advantage of this circumftance, and of their religious prejudices, roufed them once more to open rebellion. This being at laft effectually fuppreffed by the defeat and execution of the impoftor, in order to extinguifh all remembrance of this rebellion, the river Yaik was called Ural; the Yaik Coffacks were denominated Uralian Coffacks; and the town of Yaitfk, Uralfk. The Uralian Coffacks enjoy the right of fifhing on the coaft of the Cafpian Sea, for 47 miles on each fide of the river Ural. Their principal fifhery is for fturgeons and beluga, whofe roe fupplies large quanties of caviare; and the fifh, which are chiefly falted and dried, afford a confiderable article of confumption in the Ruffian empire. In confequence of thefe fifheries, thefe Coffacks are very rich.

COSSE DE GENISTE, an order of knighthood inftituted in 1234, by Louis IX. king of France at his marriage with Margaret of Provence. The motto on the collar of this order was, *Exaltat humilis*.

COSSET, among farmers, a colt, calf or lamb, brought up by hand without the dam.

COSTA (Chriftopher), a celebrated botanift of the 16th century, was born in Africa, of a Portuguefe father, and went into Afia to perfect himfelf in the knowledge of fimples, where he was taken prifoner, but found means to make his efcape, and after feveral voyages, practifed phyfic at Bourgos. He wrote, 1. A Treatife on Indian drugs and medicines. 2. His Voyages to the Indies.. 3. A book in praife of Women; and other works.

COSTAL, an appellation given by anatomifts to feveral parts belonging to the fides: thus we meet with coftal (or *inter*-coftal) mufcles, vertebræ, &c.

COSTANZO (Angelo di), an Italian hiftorian and poet, lord of Catalupo, was born in 1507, of a noble and ancient family of Naples, and died about 1591. He wrote, 1. A Hiftory of Naples, from 1250 to 1489; the beft edition of which is that of Aquila, in 1582, in folio, very fcarce. 2. Italian poems, which are efteemed, and have had feveral editions.

COSTA-RICCA, a province of North America in New Spain, and in the audience of Guatimala, bounded on the north-eaft by the northern ocean, on the fouth-weft by the fouth-fea, on the north-weft by Nicaragua, and on the fouth-eaft by Veragua. The foil is not very fertile, though there is plenty of cattle. Carthage is the capital town.

COSTIVENESS, a preternatural detention of the fæces, with an unufual drynefs and hardnefs thereof, and thence a fuppreffion of their evacuation The cure is to be effected by fmall dofes of any purgative medicine.

COSTMARY, the Englifh name of a fpecies of tanfey. See TANACETUM.

COSTS, in law, imply the expences of a fuit recovered by the plaintiff, together with damages. Cofts were not allowed by the common law, the amercement of the vanquifhed party being his only punifhment; but they are given by ftatute. Cofts are allowed in chancery for failing to make anfwer to a bill exhibited, or making an infufficient anfwer: and if a firft anfwer be certified by a mafter to be infufficient, the defendant is to pay 40s; 3l. for a fecond infufficient anfwer; 4l. for a third, &c. But if the anfwer be reported good, the plaintiff fhall pay the defendant 40s. cofts.

COSTUME, a rule or precept in painting, by which the artift is enjoined to make every perfon and thing fuftain its proper character, and not only obferve the ftory, but the circumftances, the fcene of action, the country or place, and take care that the habits, arms, manners, proportions, and the like, exactly correfpond.

COSTUS, in botany; a genus of the monogynia order, belonging to the monandria clafs of plants; and in the natural method ranking under the eighth order, *Scitamineæ*. The corolla is interior, inflated, and ringent, with the under lip trifid. There is but one fpecies, viz. the arabicus, a native of the Indies. The root was formerly in fome efteem as an attenuant, and ferviceable in venereal complaints; but it is now rarely prefcribed or met with in the fhops.

COTA (Rodriguez), a Spanifh poet in the 16th century, was the author of the *Tragi-comedia de Califto y Meliba*, which has been tranflated into Latin by Gafpar Barthius, and into French by James de Lavardin. The Spaniards fet a great value on this performance.

CO-TANGENT, the tangent of an arch which is the complement of another to 90°. See GEOMETRY.

COTBUS, a ftrong town of Germany, in Lower Lufatia; fubject to the king of Pruffia. It is feated on the river Spree, 60 miles S. by E. of Berlin. Here are a great number of French proteftants, who have introduced their manufactures; and it is noted for excellent beer, pitch, and the cultivation of flax. E. lon. 14. 12. N. lat. 51. 36.

COTE, a term ufed in courfing, to exprefs the advantage one greyhound has over another when he runs by the fide of it, and, putting before it, gives the hare a turn. See COURSING.

COTE-*Gare*, a kind of refufe wool, fo clung or clotted together that it cannot be pulled afunder. By 13 Rich. II. ftat. 1. c. 9. it is provided, that neither denizen or foreigner make any other refufe of wools but cote-gare and villein. So the printed ftatute has it; but in the parliament-roll of that year it is called *codland*, and *villein*. *Cot*, or *cote*, fignifies as much as cottage in many places, and was fo ufed by the Saxons, according to Verftegan.

COTERELLUS: *Cotarius*, and *coterellus*, according to Spelman and Du Frefne, are fervile tenants; but in Doomfday and other ancient MSS. there appears a diftinction, as well in tenure and quality as in their name: for the cotarius hath a free foccage tenure, and paid a ftated firm or rent in provifions or money, with fome occafional cuftomary fervices; whereas the coterellus feems to have held in mere villenage, and his perfon, iffue, and goods were difpofable at the pleafure of the lord.

COTERIE, a term adopted from the French trading affociations or partnerfhips, where each perfon advances his quota of ftock and receives his proportion of gain; and which retains its original meaning when applied to little affemblies or companies affociated for mirth and good humour, where each one furnifhes his quota of pleafantry. Here they coin new words not underftood elfewhere, but which become fafhionable for others to ufe; and thofe are thought ridiculous who are ignorant of them. It has been ufed of late to fignify a club of ladies.

COTESWOLD, a hilly plain, with feveral fheep cotes, and fheep feeding. It comes from the Saxon *cote*, i. e. *cafa* a cottage, and *wold* a place where there is no wood.

COTHURNUS, BUSKIN, a very high fhoe or patten raifed on foals of cork, worn by the ancient actors in tragedy to make them appear taller and more like the heroes they reprefented; moft of whom were fuppofed to be giants. It covered the greateft part of the leg, and was tied beneath the knee. Æfchylus is faid to have invented the cothurnus. See BUSKIN.

COTICE, or COTISE, in heraldry, is the fourth part of the bend; which with us is feldom or ever borne but in couples, with a bend between them: whence probably the name; from the French *coté* fide; they being borne, as it were, a-fide of the bend.—A bend thus bordered is faid to be *cotifed*, *cotice*. He bears fable on a bend cotifed argent three cinquefoils.

COTIGNIAC, a town of France in the department of Var and late province of Provence, on the river Argens. It is famous for fweetmeats.

COTILLION, the name of a well known brifk dance, in which eight perfons are employed. The term is French, and fignifies an under petticoat.

COTT, a particular fort of bed frame, fufpended from the beams of a fhip for the officers to fleep in between the decks. This contrivance is much more convenient at fea than either the hammocks or fixed cabbins; being a large piece of canvafs fewed into the form of a cheft, about fix feet long, and one foot deep, and from two to three feet wide. It is extended by a fquare wooden frame with a canvas bottom, equal to its length and breadth, to retain it in an horizontal pofition.

COTTAGE, *Cottagium*, is properly a little houfe for habitation, without lands belonging to it; ftat. 4 Edw. I. But by a later ftatute, 31 Eliz. c. 7. no man may build a cottage unlefs he lay four acres of land thereto; unlefs it be in market-towns or cities, or within a mile of the fea, or for the habitation of labourers in mines, failors, forefters, fhepherds, &c. and cottages erected by order of juftices of peace for poor impotent people are excepted out of the ftatute. The four acres of land to make it a cottage within the law are to be freehold, and land of inheritance; and four acres holden by copy, or for life or lives, or for any number of years, will not be fufficient to make a lawful cottage.

COTTON, in commerce, a foft downy fubftance found on the goffypium, or cotton-tree. See GOSSYPIUM. Cotton is feparated from the feeds of the plant by a mill, and then fpun and prepared for all forts of fine work, as ftockings, waiftcoats, quilts, &c. With it they likewife make callico and muflin; and fometimes it is mixed with wool, fometimes with filk, and even with gold itfelf. The fineft fort comes from Bengal and the coaft of Coromandel. Cotton makes a very confiderable article in commerce, and is diftinguifhed into cotton-wool and cotton-thread. The firft is brought moftly from the Weft India Iflands, and Smyrna: the moft efteemed is white, long, and foft. Thofe who buy it in bales fhould fee that it has not been wet; moifture being very prejudicial to it.

Of cotton-thread, that of Damas, called *cotton d'ounce*, and that of Jerufalem, called *bazas*, have been the moft efteemed; as alfo that of the Weft Indian iflands. But with the help of the machines now in general ufe in Britain, we are able to fpin it of almoft any degree of finenefs. Cotton of Siam is a kind of filky cotton in the Antilles, fo called becaufe the grain was brought from Siam. It is of an extraordinary finenefs, even furpaffing filk in foftnefs. They make hofe of it there preferable to filk for their luftre and beauty. They fell at from 10 to 12 and 15 crowns a pair, but there are very few made unlefs for curiofity.

The manner of *packing* COTTON as practifed in the Antilles is thus: The bags are made of coarfe cloth, of which they take three ells and a half each; the breadth is one ell three inches. When the bag has been well foaked in water, they hang it up, extending the mouth of it to crofs pieces of timber nailed to pofts fixed in the ground feven or eight feet high. He who packs it goes into the bag, which is fix feet nine inches deep, or thereabouts, and preffes down the cotton, which another throws in, with hands and feet; obferving to tread it equally every where, and putting in but little at a time. The beft time of packing is in rainy, moift weather, provided the cotton be under cover. The bag fhould contain from 300 to 320 pounds. The tare abated in the Antilles is three in the hundred. Cotton being a production applicable to a great variety of manufactures, it cannot be too much cultivated in all our own plantations that will admit of it.

COTTON-*Spinning*, the art or procefs of reducing cotton-wool into yarn or thread.

The moft fimple method for this purpofe, and the only one in ufe for a long time in this country, was by the hand upon the well-known domeftic machine called a *one thread-wheel*. But as the demand for cotton-goods began to increafe, other inventions were thought of for expediting this part of the manufacture. About 50 years ago, one Paul and others of London contrived an engine for a more eafy and expeditious method of fpinning cotton, and for which they obtained a patent; but the undertaking did not prove fuccefsful. Some years thereafter, various machines were conftructed by different perfons for facilitating the fpinning of cotton; but without producing any very material or lafting advantage. At length, about the year 1767, Mr. James Hargrave, a weaver in the neighbourhood of Blackburn in Lancafhire, conftructed a machine by which a great number of threads (from 20 to 80) might be fpun at once, and for which he obtained his Majefty's letters-patent. This machine is called a *Jenny*, and is the beft contrivance for fpinning *woof* or *fhute* that has hitherto appeared. It is now commonly conftructed for 84 threads; and with it one perfon can fpin 100 Englifh hanks in the day, each hank containing 840 yards.

Carding of COTTON, as a preparation for fpinning, ufed formerly to be performed by the hand, with a fingle pair of cards, upon the knee: but this being a tedious method, ill fuited to the rapid operations of the new fpinning machines, other methods were contrived for affording a quicker and more ade-

quate fupply. The firft improvement for this purpofe was likewife made by Mr. Hargrave; and confifted in applying two or three cards to the fame board, and fixing them to a ftool or ftock; whence they obtained the name of *ftock-cards*. With thefe, one woman could perform two or three times as much work as fhe could do before in the common way. A ftill more expeditious method of carding, however, by what are commonly called *cylinder-cards*, was foon afterwards invented, and is that which is now moft commonly practifed: but as feveral perfons lay claim to this invention, it is not eafy to determine to whom in particular the merit of it is due.

The next and moft capital improvements which this branch of manufacture received were from Mr. Arkwright, a native of Lancafhire, now Sir Richard Arkwright of Cromford in Derbyfhire. He firft brought forward his new method of fpinning cotton in 1768, for which he obtained a patent in 1769; he afterwards, in 1775, obtained a patent for engines which he had conftructed to prepare the materials for fpinning: though one of thefe patents, being challenged at law, was fet afide fome years before it expired. The refult of Mr. Arkwright's different inventions and improvements is a combination of machinery, by which cotton is *carded*, *roved*, and *fpun*, with the utmoft exactnefs and equality; and fuch a degree of perfection attained in fpinning *warp*, as is not to be equalled in any other part of the world. To thefe improvements this country is entirely indebted for the great extent of its cotton manufactures; large buildings having been erected for that branch both in England and Scotland, many of which contain feveral thoufands of fpindles, each driven by one or more large water wheels; and fome of fuch extent as to fpin at the rate of one thoufand yards of twift or warp yarn in a minute.

Other machines have been invented at different times, and a variety of improvements made by different mechanics and manufacturers; one of which in particular we muft not omit to mention. It is called a *Mule*, being a kind of mixture of machinery between the *warp* machine of Mr. Arkwright and the *woof*-machine or hand jenny of Mr. Hargrave; and was alfo invented in Lancafhire. This machine bids fair to be of great ufe in fpinning cotton yarn for muflins to a degree of finenefs never before known in this country, being nearly equal in quality to thofe ufually brought from India.

Cotton-*Mills*, are large buildings with peculiar machinery for carding, roving, and fpinning cotton: fee the preceding article. Thefe were entirely unknown in this country before the different inventions and improvements of Meffrs Arkwright and Hargrave; fince which time great numbers have been erected in England, and feveral in Scotland. The firft erections of the kind were by Meffrs Arkwright and Hargrave, both in the town of Nottingham, and both nearly at the fame time. The engines were then driven by horfes: but fince that time they have been chiefly erected upon water-falls in different parts of the country; particularly the warp machines, which are better adapted for being driven by water than any other. The moft extenfive of thefe is in the village and neighbourhood of Cromford in Derbyfhire, and under the immediate infpection of Sir Richard Arkwright. The firft that was erected in Scotland was for Mr. Peter Brotherfton, under the infpection and direction of Mr. John Hackett from Nottingham; and is in the neighbourhood of Pennycuick near Edinburgh. Since which time feveral have been erected in the neighbourhood of Glafgow, Paifley, Lanark, Perth, &c.

Lavender Cotton. See Santolina.

Philofophic Cotton, a name given to the flowers of zinc, on account of their white colour and refemblance to cotton.

Silk Cotton. See Bombax.

Cotton-*Weed*. See Gnaphalium.

Cotton (Sir Robert), a moft eminent Englifh antiquarian, defcended from an ancient family, was born in 1570. In his 18th year he began to collect ancient records, charters, and other MSS. Camden, Selden, and Speed, acknowledged their obligations to him in their refpective works. He was highly diftinguifhed by queen Elizabeth, and by James I. who created him a baronet. He wrote many things himfelf; but our principal obligations to him are for his valuable library, confifting of curious manufcripts, &c. which he was forty years in collecting. At his death in 1631, he left the property of it to his family, though defigned for public ufe. A large acceffion was made to this library by private benefactions before the death of the founder, and afterwards by the purchafes of his heirs, and donations of others, who added to it a great number of books, chiefly relating to the hiftory and antiquities of our own nation. An act of parliament was obtained, at the requeft of Sir John Cotton, in 1700, for preferving it after his deceafe, under the above denomination, for public ufe. It is now fixed in the Britifh Mufeum. For ftatutes relating to it, fee 12 and 13 W. III. c. 5. and 5 Anne, cap. 30.

Cotton (Charles), a burlefque poet, was defcended of a good family, and lived in the reigns of Charles II. and James II. His moft celebrated piece is *Scarronides* or *Traveftie* of the firft and fourth books of the Æneid. But though, from the title, one would be apt to imagine it an imitation of Scarron's famous Traveftie of the fame author, yet upon examination, it would be found greatly to excel not only that, but every other attempt of the fame kind that hath been hitherto made in any language. He has alfo tranflated feveral of Lucian's dialogues, in the fame manner, under the title of *the Scoffer Scoff'd*;—and written another poem of a more ferious kind, entitled *the Wonders of the Peak*. The exact period of either Mr. Cotton's birth or his death, is no-where recorded; but it is probable the latter happened about the time of the revolution. Neither is it better known what his circumftances were with refpect to fortune; they appear, however, to have been eafy, if we may judge from the turn of his writings, which is fuch as feems fcarcely poffible for any one to indulge whofe mind was not perfectly at eafe.

COTTUS, or Bull-head, in ichthyology, a genus belonging to the order of thoracici. The head is broader than the body, and the gill-membrane has fix rays. There are fix fpecies; of which the moft remarkable are, 1. The *gobio*, or river bull-head, is very common in all our clear brooks: it lies almoft always at the bottom, either on the gravel or under a ftone: it depofits its fpawn in a hole which it forms among the gravel, and quits it with great reluctance. It feeds on water infects. This fifh feldom exceeds the length of three inches and an half: the head is large, broad, flat, and thin at its circumference, being well adapted for infinuating itfelf under ftones: on the middle part of the covers of the gills is a fmall crooked fpine turning inwards. The eyes are very fmall: the irides yellow; the body grows flender towards the tail, and is very fmooth. The colour of this fifh is as difagreeable as its form, being dufky, mixed with a dirty yellow; the belly is whitifh. The tafte, however, is excellent. 2 The *cataphractus*, armed bull-head, or *pogge*, is very common on moft of the Britifh coafts. It feldom exceeds five inches and an half in length; and even feldom arrives at that fize. The head is large, bony, and very rugged: the end of the nofe is armed with four fhort upright fpines; on the throat are a number of fhort white beards; the body is octagonal, and covered with a number of ftrong bony crufts, divided into feveral compartments, the ends of which project into a fharp point, and form feveral echinated lines along the back and fides from the head to the tail. 3. The *fcorpius*, or father-lafher, is not uncommon on the rocky coafts of this ifland; it lurks under ftones, and will take a bait. It feldom exceeds 8 or 9 inches

in length. The head is large, and has a moſt formidable appearance, being armed with vaſt ſpines, which it can oppoſe to any enemy that attacks it, by ſwelling out its cheeks and gill-covers to a large ſize. The noſe and ſpace contiguous to the eyes are furniſhed with ſhort ſharp ſpines; the covers of the gills are terminated by exceeding long ones, which are both ſtrong and very ſharp pointed. The mouth is large; the jaws covered with very ſmall teeth; the roof of the mouth is furniſhed with a triangular ſpot of very minute teeth. This ſpecies is very frequent in the Newfoundland ſeas, where it is called *ſcolping*: it is alſo as common on the coaſt of Greenland, in deep water near the ſhore. It is a principal food of the natives, and the ſoup made of it is ſaid to be agreeable as well as wholeſome.

COTULA, MAY-WEED; a genus of the polygamia ſuperflua order belonging to the ſyngeneſia claſs of plants. The receptacle is almoſt naked; the pappus marginated; the florets of the diſc quadrifid; of the radius frequently none. There are ſix ſpecies, all of them herbaceous annuals, riſing ſix or eight inches high, and adorned with yellow flowers. There are none of them natives of this country, and moſt of them require artificial heat.

COTULA, or *Cotyla*, a liquid meaſure in uſe among the ancients. Fannius ſays, the cotyla was the ſame thing with the hemina, which was half a ſextary. Chorier obſerves, that the cotyla was uſed as a dry meaſure as well as a liquid one; from the authority of Thucydides, who in one place mentions two cotylæ of wine, and in another two cotylæ of bread.

COTURNIX, in ornithology. See TETRAO.

COTYLEDON, NAVEL-WORT; a genus of the pentagynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 13th order, *Succulentæ*. The calyx is quinquefid; the corolla monopetalous: there are five nectariferous ſcales at the baſe of the germen, and five capſules. There are eight ſpecies, moſt of them hardy ſucculent perennials; though ſome require to be kept in a ſtove, as being natives of warm climates. They riſe from half a foot to a yard and an half high, and are adorned with yellow flowers growing in umbels. They are eaſily propagated either by ſeed or cuttings of their branches.

COTYLEDONES, in anatomy, are certain glandular bodies, adhering to the chorion of ſome animals.

COTYLEDONES, in botany, the periſhable porous ſide-lobes of the ſeed, which involve, and for ſome time furniſh nouriſhment to, the embryo plant.

COTYTTO, the goddeſs of all debauchery. Her feſtivals called *Cotyttia* were celebrated by the Athenians, Corinthians, Thracians, &c. during the night. Her prieſts were called *baptæ*, and nothing but debauchery and wantonneſs prevailed at the celebration. A feſtival of the ſame name was obſerved in Sicily, where the votaries of the goddeſs carried about boughs hung with cakes and fruit, which it was lawful for any perſon to pluck off. It was a capital puniſhment to reveal whatever was ſeen or done at theſe ſacred feſtivals. It coſt Eupolis his life for an unreaſonable reflection upon them. The goddeſs Cotytto is ſuppoſed to be the ſame as Proſerpine.

COUCH, in painting, denotes a lay, or impreſſion of colour, whether in oil or water, wherewith the painter covers his canvas, wall, wainſcot, or other ſurface to be painted. The word is alſo uſed for a lay or impreſſion on any thing, to make it firm and conſiſtent, or to ſcreen it from the weather. Paintings are covered with a couch of varniſh; a canvas to be painted muſt firſt have two couches of ſize, before the colours be laid; two or three couches of white lead are laid on wood, before the couch of gold is applied: the leather-gilders lay a couch of water and white of eggs on the leather, before they apply the gold or ſilver leaf. The gold wire-drawers alſo uſe the word *couch* for the gold or ſilver leaf wherewith they cover the maſs to be gilded or ſilvered, before they draw it through the iron that is to give it its proper thickneſs. The gilders uſe couch for the quantity of gold or ſilver leaves applied on the metals in gilding or ſilvering. Each couch of gold is but one leaf, or two at moſt, and each of ſilver three, to gild: if the gilding be hatched, there are required from eight to twelve couches; and only three or four if it be without hatching. To ſilver, there are required from four to ten couches, according to the beauty of the work.

COUCH-*Graſs*, in botany. See TRITICUM.

COUCHANT, in heraldry, is underſtood of a lion, or other beaſt, when lying down, but with his head raiſed; which diſtinguiſhes the poſture of couchant from dormant, wherein he is ſuppoſed quite ſtretched out and aſleep.

COUCHE, in heraldry, denotes any thing lying along: thus, chevron-couche, is a chevron lying ſideways, with the two ends on each ſide of the ſhield, which ſhould properly reſt on the baſe.

COUCHER, or COURCHER, in our ſtatutes, is uſed for a factor, or one that continues in ſome place or country for traffic; as formerly in Gaſcoign, for the buying of wines. Anno 37 Edw. III. c. 16.

COUCHER is alſo uſed for the general book in which any religious houſe or corporation regiſter their particular acts. Anno 3 and 4 Edw. VI. c. 10.

COUCHING *of a* CATARACT, in ſurgery. See SURGERY.

COVE, a ſmall creek or bay, where boats and ſmall veſſels may ride at anchor, ſheltered from the wind and ſea.

COVENANT, in law, is the conſent and agreement of two or more perſons to do, or not to do, ſome act, or thing, contracted between them. Alſo it is the declaration the parties make, that they will ſtand to ſuch agreement, relating to lands or other things; and is created by deed in writing, ſealed and executed by the parties, or otherwiſe it may be implied in the contract thereto. And if the perſons do not perform their covenants, a writ or action of covenant is the remedy to recover damages for the breach of them.

COVENANT, in eccleſiaſtical hiſtory, denotes a contract or convention agreed to by the Scotch in the year 1638 for maintaining their religion free from innovation. In 1581, the general aſſembly of Scotland drew up a confeſſion of faith, or national covenant, condemning epiſcopal government, under the name of *hierarchy*, which was ſigned by James I. and which he enjoined on all his ſubjects. It was again ſubſcribed in 1590 and 1596. The ſubſcription was renewed in 1638, and the ſubſcribers engaged by oath to maintain religion in the ſame ſtate as it was in 1580, and to reject all innovations introduced ſince that time. This oath annexed to the confeſſion of faith received the name of the *covenant*: as thoſe who ſubſcribed it were called *covenanters*.

COVENANT, in theology, is much uſed in connection with other terms; as, 1. *The Covenant of Grace* is that which is made between God and thoſe who believe the goſpel, whereby they declare their ſubjection to him, and he declares his acceptance of them and favour to them. The goſpel is ſometimes denominated a *covenant of grace*, in oppoſition to the Moſaic law. 2. *Covenant of Redemption* denotes, a mutual ſtipulation, tacit or expreſs, between Chriſt and the Father, relating to the redemption of ſinners by him, previous to any act on Chriſt's part under the character of Mediator. 3. *Covenant of Works* ſignifies, in the language of ſome divines, any covenant whereby God requires perfect obedience from his creatures, in ſuch a manner as to make no expreſs proviſion for the pardon of offences to be committed againſt the precepts of it, on the repentance of ſuch ſuppoſed offenders, but pronounces a ſentence of death upon them: ſuch, they ſay, was the cove-

nant made with Adam in a ſtate of innocence, and that made with Iſrael at Mount Sinai.

Solemn League and COVENANT, was eſtabliſhed in the year 1643, and formed a bond of union between Scotland and England. It was ſworn and ſubſcribed by many in both nations; who hereby ſolemnly abjured popery and prelacy, and combined together for their mutual defence. It was approved by the parliament and aſſembly at Weſtminſter, and ratified by the general aſſembly in Scotland in 1645. King Charles I. diſapproved of it when he ſurrendered himſelf to the Scots army in 1646: but in 1650 Charles II. declared his approbation both of this and the national covenant by a ſolemn oath; and in Auguſt of the ſame year, made a farther declaration at Dunfermline to the ſame purpoſe, which was alſo renewed on occaſion of his coronation at Scone in 1651. The covenant was ratified by parliament in this year; and the ſubſcription of it required by every member, without which the conſtitution of the parliament was declared null and void. It produced a ſeries of diſtractions in the ſubſequent hiſtory of that country, and was voted illegal by parliament, and proviſion made againſt it. Stat. 14 Car. II. c. 4.

Ark of the COVENANT, in Jewiſh antiquity. See ARK.

COVENTRY, a large and populous city of Warwickſhire, which, with Lichfield, is a biſhop's ſee. Its market is on Friday. It is a county of itſelf, governed by a mayor, 2 bailiffs, 2 ſheriffs, and 10 aldermen, and ſends 2 members to parliament. It has 10 wards, 3 pariſh-churches, 2 free-ſchools, and ſeveral hoſpitals. The houſes being moſtly old, and built of wood and plaſter, with ſtories projecting over each other, make a mean appearance. It had very early a great trade in various articles of manufacture, as cloths, ſtuffs, thread, &c. At preſent, its principal branch is that of ſilk ribands: ſome gauzes, camlets, and laſtings are alſo made here. The goods are ſent to London by waggons; but this city has a communication with the Staffordſhire Grand Trunk, by a canal to Fradley; and by another canal, which joins the Oxford canal at Braunſton, it has alſo a communication with the Thames. Coventry is 91 miles N. W. of London. W. lon. 1. 28. N. lat. 52. 28.

CO-VERSED SINE, in geometry, the remaining part of the diameter of a circle, after the verſed ſine is taken from it. See GEOMETRY.

COVERT, in law, *Femme Couvert*, denotes a woman married, and ſo covered by, or under the protection of her huſband.

COVERT-*way*, or CORRIDOR, in fortification, a ſpace of ground, level with the field on the edge of the ditch, three or four fathoms broad, ranging quite round the half moons and other works toward the country. It has a parapet raiſed on a level, together with its banquets and glacis. See FORTIFICATION.

COVERTURE, in law, is applied to the ſtate and condition of a married woman, who is under the power of her huſband, and therefore called *femme couvert*.

COUGH, in medicine. See MEDICINE.

COUGH, in farriery. See FARRIERY. The cough called the *huſk*, is a diſeaſe to which young bullocks are ſubject. In this diſorder the wind-pipe and its branches are loaded with ſmall taper worms. Farmers reckon the diſeaſe incurable; but fumigations with cinnabar, or with tobacco, might prove ſerviceable.

COUHAGE, or STINKING BEANS; a kind of kidney-beans imported from the Eaſt Indies, where they are uſed as a cure for the dropſy. The down growing on the outſide of the pod is ſo pointed as, like a nettle, to ſting the fleſh, though not with ſo painful a ſenſation. This, by a corruption of the word, is called *cow-itch*. The plant is a ſpecies of DOLICHOS.

COVIN, a deceitful compact or agreement between two or more to deceive or prejudice a third perſon: As, if a tenant for life conſpire with another, that this other ſhall recover the land which the tenant holds, in prejudice of him in reverſion. Dr. Skinner takes the word to be a corruption of the Latin *conventum*, and therefore writes it *coven*. See CONSPIRACY.

COVING, in building, is when houſes are built projecting over the ground-plot, and the turned projecture arched with timber, lathed and plaſtered.

COVINUS, among the ancients, a kind of chariot, in which the Gauls and Britons uſed to fight in battles.

COUL, or COWL. See COWL.

COULTER, in huſbandry, an iron inſtrument, fixed in the beam of the plough, and ſerving to cut the edge of each furrow. See HUSBANDRY.

COUNCIL, or COUNSEL, in a general ſenſe, an aſſembly of ſome conſiderable perſons to concert meaſures relative to the ſtate. In Britain, the law, in order to aſſiſt the king in the diſcharge of his duties, the maintenance of his dignity, and the exertion of his prerogative, hath aſſigned him different councils to adviſe with.

1. The high court of parliament. See PARLIAMENT.

2. The peers of the realm are by their birth hereditary counſellors of the crown; and may be called together by the king, to impart their advice in all matters of importance to the realm, either in time of parliament, or, which hath been their principal uſe, when there is no parliament in being. Accordingly, Bracton, ſpeaking of the nobility of his time, ſays, they might properly be called "conſules à conſulendo; reges enim tales ſibi aſſociant ad conſulendum." And in the law-books it is laid down, that the peers are created for two reaſons: 1. *Ad conſulendum*; 2. *Ad defendendum, regem*: for which reaſon the law gives them certain great and high privileges; ſuch as freedom from arreſts, &c. even when no parliament is ſitting; becauſe the law intends, that they are always aſſiſting the king with their counſel for the commonwealth, or keeping the realm in ſafety by their proweſs and valour.

Inſtances of conventions of the peers, to adviſe the king, have been in former times very frequent; though now fallen into diſuſe, by reaſon of the more regular meetings of parliament. Sir Edward Coke gives us an extract of a record, 5 Henry IV. concerning an exchange of lands between the king and the earl of Northumberland, wherein the value of each was agreed to be ſettled by advice of parliament (if any ſhould be called before the feaſt of St. Lucia), or otherwiſe by advice of the grand council of peers, which the king promiſes to aſſemble before the ſaid feaſt, in caſe no parliament ſhall be called. Many other inſtances of this kind of meeting are to be found under our ancient kings: though the formal method of convoking them had been ſo long left off, that when king Charles I. in 1640, iſſued out writs under the great ſeal, to call a council of all the peers of England, to meet and attend his majeſty at York, previous to the meeting of the long parliament, the earl of Clarendon mentions it as a new invention, not before heard of; that is, as he explains himſelf, ſo old, that it had not been practiſed in ſome hundreds of years. But though there had not, for long a time before, been an inſtance, nor has there been any ſince, of aſſembling them in ſo ſolemn a manner, yet in caſes of emergency, our princes have at ſeveral times thought proper to call for, and conſult as many of the nobility as could eaſily be brought together: as was particularly the caſe with king James II. after the landing of the prince of Orange; and with the prince of Orange himſelf, before he called the convention parliament which afterwards called him to the throne. Beſides this general meeting, it is uſually looked upon to be the right of each particular peer of the realm, to demand an audience of the king, and to lay before him with decency and reſpect ſuch matters as he ſhall judge of importance to the public weal.

3. A third council belonging to the king, are, according to Sir Edward Coke, his judges of the courts of law, for law-matters. And this appears frequently in the Englifh ftatutes, particularly 14 Edward III. c. 5. and in other books of law. So that when the king's council is mentioned generally, it muft be defined, particularized, and underftood, *fecundum fubjectam materiem:* "according to the fubject matter:" and if the fubject be of a legal nature, then by the king's council is underftood his council for matters of law; namely, his judges. Therefore, when by ftatute 16 Richard II. c. 5. it was made a high offence to import into England any papal bulls, or other proceffes from Rome: and it was enacted, that the offenders fhould be attached by their bodies and brought before the king and his council to anfwer for fuch offence; here, by the expreffion of king's *council*, were underftood the king's judges of his courts of juftice, the fubject-matter being legal: this being the general way of interpreting the word *council*.

4. But the principal council belonging to the king is his *privy council*, which is generally, by way of eminence, called *the council*. For an account of its conftitution and powers, fee the article PRIVY-*Council*.

Aulic COUNCIL. See AULIC.

Common COUNCIL, in the city of London, is a court wherein are made all bye-laws which bind the citizens. It confifts, like the parliament, of two houfes; an upper, compofed of the lord mayor and aldermen; and a lower, of a number of common-council men, chofen by the feveral wards, as reprefentatives of the body of the citizens.

COUNCIL *of War*, an affembly of the principal officers of an army or fleet, occafionally called by the general or admiral to concert meafures for their conduct with regard to fieges, retreats, engagements, &c.

COUNCIL, in church hiftory, an affembly of prelates and doctors, met for the regulating matters relating to the doctrine or difcipline of the church.

National COUNCIL, is an affembly of prelates of a nation under their primate or patriarch.

Oecumenical or *General* COUNCIL, is an affembly which reprefents the whole body of the univerfal church. The Romanifts reckon eighteen of them; Bullinger, in his treatife de Conciliis, fix; Dr. Prideaux, feven; and bifhop Beveridge has increafed the number to eight, which, he fays, are all the general councils which have ever been held fince the time of the firft Chriftian emperor. They are as follows: 1. The council of Nice, held in the reign of Conftantine the Great, on account of the herefy of Arius. 2. The council of Conftantinople called under the reign and by the command of Theodofius the Great, for much the fame end that the former council was fummoned. 3. The council of Ephefus, convened by Theodofius the younger at the fuit of Neftorius. 4. The council of Calcedon, held in the reign of Martianus, which approved of the Eutychian herefy. 5. The fecond council of Conftantinople, affembled by the emperor Juftinian, condemned the three chapters taken out of the book of Theodorus of Mopfueftia, having firft decided that it was lawful to anathematize the dead. Some authors tell us, that they likewife condemned the feveral errors of Origen about the Trinity, the plurality of worlds, and pre-exiftence of fouls. 6. The third council of Conftantinople, held by the command of Conftantius Pogonatus the emperor, in which they received the definitions of the five firft general councils, and particularly that againft Origen and Theodorus of Mopfueftia. 7. The fecond Nicene council. 8. The fourth council of Conftantinople, affembled when Louis II. was emperor of the Weft. The regulations which they made are contained in twenty-feven canons, the heads of which are fet down by M. du Pin, to whom the reader is referred.

COUNSEL, or *Advocates*, in Englifh courts of law, are of two fpecies or degrees; BARRISTERS and SERJEANTS. See thofe articles; alfo ADVOCATE. From both thefe degrees fome are ufually felected to be his majefty's counfel, learned in the law; the two principal of whom are called his *attorney-general*, and *folicitor-general*. The firft king's counfel, under the degree of ferjeant, was Sir Francis Bacon, who was made fo *honoris caufa*, without either patent or fee: fo that the firft of the modern order (who are now the fworn fervants of the crown, with a ftanding falary) feems to have been Sir Francis North, afterwards lord keeper of the Great Seal to king Charles II. Thefe king's counfel anfwer, in fome degree, to the advocates of the revenue, *advocati fifci*, among the Romans. For they muft not be employed in any caufe againft the crown without fpecial licence. A cuftom has of late years prevailed of granting letters patent of precedence to fuch barrifters as the crown thinks proper to honour with that mark of diftinction: whereby they are intitled to fuch rank and preaudience as are affigned in their refpective patents; fometimes next after the king's attorney-general, but ufually next after his majefty's counfel next being. Thefe, as well as the queen's attorney and folicitor-general, rank promifcuoufly with the king's counfel; and, together with them, fit within the bar of their refpective courts: but receive no falaries, and are not fworn; and therefore are at liberty to be retained in caufes againft the crown. And all other ferjeants and barrifters indifcriminately (except in the court of common-pleas, where only ferjeants are admitted) may take upon them the protection and defence of any fuitor, whether plaintiff or defendant; who are therefore called their *clients;* like the dependents on the ancient Roman orators. Thefe indeed practifed *gratis*, for honour merely, or at moft for the fake of gaining influence: and fo likewife it is eftablifhed with us, that a counfel can maintain no action for his fees; which are given, not as *locatio vel conductio*, but as *quiddam honorarium*; not as a falary or hire, but as a mere gratuity, which a counfellor cannot demand without doing wrong to his reputation; as is alfo laid down with regard to advocates in the civil law, whofe *honorarium* was directed by a decree of the fenate, not to exceed in any cafe 10,000 fefterces, or about 80l. of Englifh money. And in order to encourage due freedom of fpeech in the lawful defence of their clients, and at the fame time to check the unfeemly licentioufnefs of proftitute and illiberal men (a few of whom may fometimes infinuate themfelves even into the moft honourable profeffions), it hath been holden that a counfel is not anfwerable for any matter by him fpoken, relative to the caufe in hand, and fuggefted in the client's inftructions; although it fhould reflect upon the reputation of another, and even prove abfolutely groundlefs; but if he mentions an untruth of his own invention, or even upon inftructions, if it be impertinent to the caufe in hand, he is then liable to an action from the party injured. And counfel guilty of deceit and collufion are punifhable by the ftatute Weftm. 1. 3 Edw. I. c 28. with imprifonment for a year and a day, and perpetual filence in the courts: a punifhment ftill fometimes inflicted for grofs mifdemeanors in practice.

COUNSELLOR, in general, a perfon who advifes another: thus we fay, a counfellor at law, a privy counfellor, &c.

COUNSELLOR *at Law*, a perfon retained by a client to plead his caufe in a public court of judicature. See ADVOCATE, BARRISTER, COUNSEL, and SERJEANT.

Privy-COUNSELLOR. See PRIVY-*Council*.

COUNT, (COMES), a nobleman who poffeffes a domain erected into a county. See VISCOUNT. Englifh and Scottifh counts we diftinguifh by the title of *earls;* foreign ones ftill retain their proper name. The dignity of a count is a medium between that of a duke and a baron. Anciently, all generals, counfellors, judges, and fecretaries of cities, under Charlemagne, were called *counts*; the diftinguifhing character of a

duke and count being this, that the latter had but one town under him, but the former feveral. A count has a right to bear on his arms a coronet, adorned with three precious ftones, and furrounded with three large pearls, whereof thofe in the middle and extremities of the coronet advance above the reft. Counts were originally lords of the court, or of the emperor's retinue, and had their name *comites à comitando*, or *à commeando*: hence thofe who were always in the palace, or at the emperor's fide, were called *counts palatine*, or *comites à latere*. See PALATINE.

In the times of the commonwealth, *comites* among the Romans was a general name for all thofe who accompanied the proconfuls and proprætors into the provinces, there to ferve the commonwealth; as the tribune, præfects, fcribes, &c.

Under the emperors, *comites* were the officers of the palace. The origin of what we call *counts* feems owing to Auguftus, who took feveral fenators to be his *comites*, as Dion obferves, *i. e.* to accompany him in his voyages and travels, and to affift him in the hearing of caufes; which were thus judged with the fame authority as in full fenate. Gallienus feems to have abolifhed this council, by forbidding the fenators being found in the armies: and none of his fucceffors re-eftablifhed it. Thefe counfellors of the emperor were really counts, *comites, i. e.* companions of the prince; and they fometimes took the title thereof, but always with the addition of the emperor's name whom they accompanied: fo that it was rather a mark of their office than a title of dignity.—Conftantine was the firft who converted it into a dignity; and under him it was that the name was firft given abfolutely. The name once eftablifhed, was in a little time indifferently conferred, not only on thofe who followed the court, and accompanied the emperor, but alfo on moft kinds of officers; a long lift whereof is given us by Du Cange.

Eufebius tells us, that Conftantine divided the counts into three claffes: the firft bore the title of *illuftres*; the fecond that of *clariffimi*, and afterwards *fpectabiles*; the third were called *perfectiffimi*. Of the two firft claffes was the fenate compofed; thofe of the third had no place in the fenate, but enjoyed feveral other of the privileges of fenators. There were counts who ferved on land, others at fea; fome in a civil, fome in a religious, and fome in a legal capacity.

The Francs, Germans, &c. paffing into Gaul and Germany, did not abolifh the form of the Roman government: and as the governors of cities and provinces were called *counts, comites*, and *dukes, duces*, they continued to be called fo. They commanded in time of war; and in time of peace they adminiftered juftice. Thus, in the time of Charlemagne, counts were the ordinary judges and governors of the cities. Thefe counts of cities were beneath the dukes and counts who prefided over provinces; the firft being conftituted in the particular cities under the jurifdiction of the latter. The counts of provinces were in nothing inferior to dukes, who themfelves were only governors of provinces. Under the laft of the fecond race of French kings, they got their dignity rendered hereditary, and even ufurped the fovereignty when Hugh Capet came to the crown. His authority was not fufficient to oppofe their encroachments; and hence it is they date the privilege of wearing coronets in their arms; they affumed it then as enjoying the rights of fovereigns in their particular diftricts or counties. But, by degrees, moft of the counties became re-united to the crown.

The quality of count is now become very different from what it was anciently; being now no more than a title, which a king grants upon erecting a territory into a county, with a referve of jurifdiction and fovereignty to himfelf. At firft there was no claufe in the patent of erection, intimating the reverfion of the county to the crown in default of heirs male; but Charles IX. to prevent their being too numerous, ordained that duchies and counties, in default of heirs male, fhould return to the crown.

William the Conqueror, as is obferved by Camden, gave the dignity of counts in fee to his nobles; annexing it to this or that county or province, and allotting for their maintenance a certain proportion of money, arifing from the prince's profits in the pleadings and forfeitures of the provinces.

The Germans call a count *graaf*, or *graff*; which, according to a modern critic, properly fignifies *judge*; and is derived from *gravio* or *graffio*, of γϱάφω, *I write*. They have feveral kinds of thofe counts or graffs; as land-graves, mar-graves, burg-graves, and pals-graves, or counts palatine. Thefe laft are of two kinds; the former are of the number of princes, and have the inveftiture of a palatinate: the others have only the title of *count palatine* without the inveftiture of any palatinate. Some affert, that by publicly profeffing the imperial laws for twenty years, the party acquires the dignity of a count palatine; and there are inftances of profeffors of law who have affumed the title accordingly: but there are others who queftion this right.

COUNT, in law, denotes the original declaration in a real action; as the declaration is in a perfonal one: the libellus of the civilians anfwers to both. Yet, count and declaration are fometimes confounded, and ufed for each other; as, count in debt, count in appeal, &c.

COUNT-*Wheel*, in the ftriking part of a clock, a wheel which moves round once in 12 or 24 hours. It is fometimes called the *locking-wheel*. See CLOCK-*Making*.

COUNTER, a term which enters into the compofition of various words in our language, and generally implies oppofition; but when applied to deeds, means an exact copy kept of the contrary party, and fometimes figned by both parties.

COUNTER-*Changed*, in heraldry, the intermixture, or oppofition of any metal with a colour.

COUNTER-*Flory*, in heraldry, is faid of a treffure whofe flowers-de-luce are oppofite to others. See HERALDRY.

COUNTER-*Drawing*, in painting, is the copying a defign, or painting, by means of a fine linen-cloth, an oiled paper, or other tranfparent fheet, where the ftrokes appearing through are followed with a pencil, with or without colour. Sometimes it is done on glafs, and with frames or nets divided into fquares with filk or with thread, and alfo by means of inftruments invented for the purpofe, as the parallelogram.

COUNTER-*Ermine*, in heraldry, is the contrary of ermine, being a black field with white fpots.

COUNTERFEITS, in law, are perfons that obtain any money or goods by counterfeit letters or falfe tokens, who being convicted before juftices of affize or of the peace, &c. are to fuffer fuch punifhment as fhall be thought fit to be inflicted fhort of death, as imprifonment, pillory, &c.

COUNTER-FOIL, or COUNTER-STOCK, in the exchequer, that part of an ally which is kept by an officer of the court.

COUNTER-*Guard*, in a fortification, is a work raifed before the point of a baftion, confifting of two long faces parallel to the faces of the baftion, making a falient angle: they are fometimes of other fhapes, or otherwife fituated.

COUNTER-*Light*, or *Counter-jour*, a light oppofite to any thing, which makes it appear to difadvantage. A fingle counter-light is fufficient to take away all the beauty of a fine painting.

COUNTER-*March*, in military affairs, a change of the face or wings of a battalion, by which means thofe that are in the front come to be in the rear. It alfo fignifies returning, or marching back again.

COUNTER-*Mine*, in war, a well and gallery driven and funk till it meet the enemy's mine to defeat its end.

COUNTER-*Paled*, in heraldry, is when the efcutcheon is divided into twelve pales parted per feffe, the two colours being counterchanged; fo that the upper are of one colour and the lower of another.

COUNTER-*Part*, in mufic, denotes one part to be applied to

another. Thus the baſs is ſaid to be a counter-part to the treble.

COUNTER-*Paſſant*, in heraldry, is when two lions are in a coat of arms, and the one ſeems to go quite the contrary way from the other.

COUNTER-*Point*, in muſic: a term derived from the Latin propoſition *contra* and the verb *pungere*; becauſe the muſical characters by which the notes in each part are ſignified are placed in ſuch a manner each with reſpect to each as to ſhow how the parts anſwer one another. See COMPOSITION.

COUNTER-*Pointed*, *Contre-pointé*, in heraldry, is when two chevrons in one eſcutcheon meet in the points, the one riſing as uſual from the baſe, and the other inverted falling from the chief; ſo that they are counter to one another in the points. They may alſo be counter-pointed when they are founded upon the ſides of the ſhield, and the points meet that way, called *counter-pointed* in *feſſe*.

COUNTERPOISE, in the manege, is the liberty of the action and ſeat of a horſe-man; ſo that in all the motions made by the horſe, he does not incline his body more to one ſide than to the other, but continues in the middle of the ſaddle, being equally on his ſtirrups, in order to give the horſe the proper and ſeaſonable aids.

COUNTER-POTENT, *Contre Potencé*, in heraldry, is reckoned a fur as well as vair and ermine; but compoſed of ſuch pieces as repreſent the tops of crutches, called in French *potences*, and in old Engliſh *potents*.

COUNTER-*Proof*, in rolling preſs printing, a print taken off from another freſh printed; which by being paſſed through the preſs, gives the figure of the former, but inverted. To counterprove, is alſo to paſs a deſign in black-lead, or red chalk, through the preſs, after having moiſtened with a ſponge both that and the paper on which the counter-proof is to be taken.

COUNTER-*Quartered*, *contre-ecartelé*, in heraldry, denotes the eſcutcheon, after being quartered, to have each quarter again divided into two.

COUNTER-*Saliant*, is when two beaſts are borne in a coat leaping from each other directly the contrary way.

COUNTER-*Scarp*, in fortification, is properly the exterior talus or ſlope of the ditch; but it is often taken for the covered way and the glacis. In this ſenſe we ſay, the enemy have lodged themſelves on the counterſcarp, meeting before the middle of the curtain.

COUNTER-*Signing*, the ſigning the writing of a ſuperior in quality of ſecretary. Thus charters are ſigned by the king, and counter-ſigned by the ſecretary of ſtate, or lord chancellor.

COUNTER-*Time*, in the manege, is the defence or reſiſtance of a horſe that interrupts his cadence, and the meaſure of his manege, occaſioned either by bad horſemanſhip or by the vicious diſpoſition of the horſe.

COUNTER, is alſo the name of a counting-board in a ſhop, and of a flat piece of metal or ivory, uſed in playing at cards.

COUNTER *of a Horſe*, that part of a horſe's forehand which lies between the ſhoulders and under the neck.

COUNTERS *in a Ship* are two. 1. The hollow arching from the gallery to the lower part of the ſtraight piece of the ſtern, is called the *upper-counter*. 2. The lower counter is between the tranſum and the lower part of the gallery.

COUNTER is alſo the name of two priſons in the city of London, viz. the Poultry and Giltſpur-ſtreet.

COUNTORS, COUNTOURS, or COUNTERS, has been uſed for ſerjeants at law, retained to defend a cauſe, or to ſpeak for their client in any court of law. It is of theſe Chaucer ſpeaks thus:

——A ſheriff had he been, and a contour,
Was no where ſuch a worthy vavaſour.

They were anciently called *ſerjeant contours*.

COUNTRIES, among the miners, a term or appellation they give to their works under ground.

COUNTRY, among geographers, is uſed indifferently to denote either a kingdom, province, or leſſer diſtrict. But its moſt frequent uſe is in contradiſtinction to town.

COUNTRY-*Dance*, is of Engliſh origin, though now tranſplanted into almoſt all the countries and courts of Europe. There is no eſtabliſhed rule for the compoſition of tunes to this dance, becauſe there is in muſic no kind of time whatever which may not be meaſured by the motions common in dancing; and there are few ſong tunes of any note within the laſt century, that have not been applied to country dances.

COUNTY, in geography, originally ſignified the territory of a count or earl, but now it is uſed in the ſame ſenſe with ſhire; the one word coming from the French, the other from the Saxon. In this view, a county is a circuit or portion of the realm; into fifty-two of which, the whole land, England and Wales, is divided for its better government and the more eaſy adminiſtration of juſtice. For the execution of laws, in the ſeveral counties, excepting Cumberland, Weſtmoreland, and Durham, every Michaelmas term officers are appointed, under the denomination of *ſheriffs*. Other officers of the ſeveral counties are, a lord lieutenant, who has the command of the militia of the county; cuſtodes rotulorum, juſtices of peace, bailiffs, high conſtable, and coroner. Of the fifty-two counties, there are three of ſpecial note, which are therefore termed *counties palatine*, as Lancaſter, Cheſter, and Durham. See PALATINE.

COUNTY-*Corporate*, is a title given to ſeveral cities, or ancient boroughs, on which our monarchs have thought fit to beſtow extraordinary privileges; annexing to them a particular territory, land, or juriſdiction; and making them counties of themſelves, to be governed by their own ſheriffs and magiſtrates.

COUNTY-*Court*, in Engliſh law, a court, incident to the juriſdiction of the ſheriff. It is not a court of record, but may hold pleas of debt or damages under the value of 40s. Over ſome of which cauſes theſe inferior courts have, by the expreſs words of the ſtatute of Glouceſter, a juriſdiction totally excluſive of the king's ſuperior courts. For in order to be intitled to ſue an action of treſpaſs for goods before the king's juſticiars, the plaintiff is directed to make affidavit that the cauſe of action does really and *bona fide* amount to 40s. which affidavit is now unaccountably diſuſed, except in the court of exchequer. The ſtatute alſo 43 Eliz. c. 6. which gives the judges in many perſonal actions, where the jury aſſeſs leſs damages than 40s. a power to certify the ſame and abridge the plaintiff of his full coſts, was alſo meant to prevent vexation by litigious plaintiffs; who, for purpoſes of mere oppreſſion, might be inclinable to inſtitute ſuch ſuits in the ſuperior courts for injuries of a trifling value. The county-court may alſo hold plea of many real actions, and of all perſonal actions to any amount, by virtue of a ſpecial writ called *juſticies*; which is a writ empowering the ſheriff for the ſake of diſpatch to do the ſame juſtice in this county-court, as might otherwiſe be had at Weſtminſter. The freeholders of the county are the real judges in this court, and the ſheriff is the miniſterial officer. The great conflux of freeholders, which are ſuppoſed always to attend at the county-court, is the reaſon why all acts of parliament at the end of every ſeſſion were wont to be there publiſhed by the ſheriff; why all outlawries of abſconding offenders are there proclaimed; and why all popular elections which the freeholders are to make, as formerly of ſheriffs and conſervators of the peace, and ſtill of coroners, verderers, and knights of the ſhire, muſt ever be made *in pleno comitatu*, or in full county-court. By the ſtatute 2 Edw. VI. c. 25. no county-court ſhall be adjourned longer than for one month, conſiſting of 28 days. And this was alſo the ancient uſage, as appears from the laws of king Edward the elder: *pre-*

positus (that is the sheriff) *ad quartam circiter septimanam frequentem populi concionem celebrato; cuique jus dicito; litesque singulas dirimito.* In those times the county-court was a court of great dignity and splendour, the bishop and the ealdorman (or earl), with the principal men of the shire, sitting therein to administer justice both in lay and ecclesiastical causes. But its dignity was much impaired, when the bishop was prohibited, and the earl neglected to attend it. And, in modern times, as proceedings are removeable from hence into the king's superior courts, by writs of *pone* or *recordare*, in the same manner as from hundred-courts and courts-baron; and as the same writ of false judgment may be had, in nature of a writ of error, this has occasioned the same disuse of bringing actions therein.

COUPAR, the name of a town in Scotland, capital of the county of Fife, situated about 10 miles west of St. Andrew's. W. long. 2. 40. N. lat. 56. 20.—*Coupar* is also the name of a village in the shire of Angus, inhabited chiefly by weavers in the linen trade.

COUPED, in heraldry, is used to express the head, or any limb, of an animal, cut off from the trunk, smooth; distinguishing it from that which is called *erased*, that is, forcibly torn off, and therefore is ragged and uneven. COUPED is also used to signify such crosses, bars, bends, chevrons, &c. as do not touch the sides of the escutcheon, but are, as it were, cut off from them.

COUPEE, a motion in dancing, wherein one leg is a little bent, and suspended from the ground; and with the other a motion is made forwards. The word in the original French signifies a *cut*.

COUPLE-CLOSS, in heraldry, the fourth part of a chevron, never borne but in pairs, except there be a chevron between them, saith Guillim, though Bloom gives an instance to the contrary.

COUPLET, a division of a hymn, ode, song, &c. wherein an equal number, or equal measure, of verses, is found in each part; which divisions, in odes, are called *strophes*. Couplet, by an abuse of the word, is frequently made to signify a couple of verses.

COURAGE, in ethics, is that quality of the mind, derived either from the constitution or principle, or both, that enables men to encounter difficulties and dangers. See FORTITUDE.

COURANT, a French term synonymous with *current*, and properly signifies running. See CURRENT.

COURANT, is also a term in music and dancing; being used to express both the tune or air and the dance. With regard to the first, *courant*, or *currant*, is a piece of music in triple time: the air of the courant is ordinarily noted in triples of minims; the parts to be repeated twice. It begins and ends when he who beats the measure falls his hand; in contradistinction from the saraband, which ordinarily ends when the hand is raised. With regard to dancing, the courant was long the most common of all the dances practised in England: it consists, essentially, of a time, a step, a balance, and a coupee; though it also admits of other motions. Formerly they leaped their steps; in which point, the courant differed from the low dance and pavades. There are simple courants and figured courants, all danced by two persons.

COURAP, the modern name for a distemper very common in Java and other parts of the East-Indies. It is a sort of herpes or itch on the arm-pits, groins, breast, and face: the itching is almost perpetual; and the scratching is followed by great pain and a discharge of matter, which makes the linen stick so to the skin as not easily to be separated without tearing off the crust. *Courap* is a general name for any sort of itch; but this distemper is thus called by way of eminence. It is so contagious that few escape it. For the cure, gentle and repeated purging is used, and externally the ointment of nitrated quicksilver in small quantity is a good topic.

COURBARIL. See HYMENEA.

COURIER, or CURRIER, (from the French *courir*, "to run,") a messenger sent post, or express, to carry dispatches. Antiquity, too, had its couriers. We meet with two kinds: 1. Those who ran on foot, called by the Greeks *hemerodromi*, q. d. "couriers of a day." Pliny, Corn. Nepos, and Cæsar, mention some of these who would run 20, 30, 36, and in the circus even 40 leagues per day. 2. Riding couriers, *cursores equitantes*, who changed horses as the modern couriers do. Xenophon attributes the first couriers to Cyrus. Herodotus says they were very common among the Persians, and that there was nothing in the world more swift than these kind of messengers. "That prince (says Xenophon) examined how far a horse would go in a day; and built stables, at such distances from each other, where he lodged horses, and persons to take care of them; and at each place kept a person always ready to take the packet, mount a fresh horse, and forward it to the next stage: and thus quite through his empire." But it does not appear that either the Greeks or Romans had any regular fixed couriers till the time of Augustus: under that prince they travelled in cars; though it appears from Socrates they afterwards went on horseback. Under the western empire they were called *viatores*; and under that of Constantinople, *cursores*: whence the modern name. See POST.

COURLAND, a duchy situated between E. long. 21. 26. and between N. lat. 56. 30. and 57. 30. It is bounded by the river Dwina, which divides it from Livonia, on the north; by Lithuania, on the east; by Samogitia, on the south; and by the Baltic sea on the west; being 130 miles long and 30 broad. This duchy was formerly independent, and elected its own duke; but is now subject to Russia.

COURSE, *route*, in navigation, the angle contained between the nearest meridian and that point of the compass upon which a ship sails in any particular direction.

COURSE, in architecture, denotes a continued range of stones, level, or of the same height, throughout the whole length of the building; and not interrupted by any aperture. It forms a parapet to the intermediate space between the body of the building and the wings.

COURSE *of Plinths*, is the continuity of a plinth of stone or plaster in the face of a building; to mark the separation of the stories.

COURSE is also used for the time ordinarily spent in learning the principles of a science, or the usual points and questions therein. Thus, a student is said to have finished his course in the humanity class, in philosophy, &c.

COURSE is also used for the elements of an art exhibited and explained, either in writing or by actual experiment. Hence our courses of philosophy, anatomy, chemistry, mathematics, &c. probably so called as going throughout or running the whole length or course of the art, &c.

COURSES, a name by which the principal sails of a ship are distinguished, viz. the main-sail, the fore-sail, and the mizen: the mizen-stay-sail and fore-sail are also sometimes comprehended in this denomination; as are the main-stay sails of all brigs and schooners. See SAIL.

COURSING, among sportsmen. There are three several sorts of courses with gre-hounds: 1. At the hare; 2. At the fox; and, 3. At the deer. For the *deer*, there are two sorts of courses; the one in the paddock, the other either in the forest or the purlieu. For the paddock course, there must be the gre-hound and the terrier, and the mongrel gre-hound, whose business it is to drive away the deer before the gre-hounds are slipped; a brace or a leash are the usual number slipped at a time, seldom at the utmost more than two brace. In coursing

the deer in the forest or purlieu, there are two ways in use: the one is, coursing from wood to wood; and the other, upon the lawns close by the keeper's lodge. In the coursing from wood to wood, the way is to throw in some young hounds into the wood to bring out the deer; and if any deer come out that is not weighty, or a deer or antler which is buck, sore, or sorrel, then you are not to slip your gre-hounds, which are held at the end of the wood, where the keepers, who can guess very well on these occasions, expect that the deer will come out. If a proper deer come out, and it is suspected that the brace or leash of gre-hounds slipped after him will not be able to kill him, it is proper to waylay him with a couple of fresh gre-hounds. The coursing upon the lawn is the most agreeable of all other ways. When the keeper has notice of this, he will lodge a deer for the course; and then, by coming under the wind, the gre-hound may be brought near enough to be slipped for a fair course.

The best method of coursing the *hare*, is to go out and find a hare sitting; which is easily done in the summer, by walking across the lands, either stubble, fallow, or corn grounds, and casting the eye up and down: for in summer they frequent those places for fear of the ticks, which are common in the woods at that season; and in autumn the rains falling from the trees offend them. The rest of the year there is more trouble required; as the bushes and thickets must be beat to rouse them, and oftentimes they will lie so close, that they will not stir till the pole almost touches them: the sportsmen are always pleased with this, as it promises a good course. If a hare lies near any close or covert, and with her head that way, it is always to be expected that she will take to that immediately on being put up; all the company are therefore to ride up and put themselves between her and the covert before she is put up, that she may take the other way, and run upon open ground. When a hare is put up, it is always proper to give her ground, or *law*, as it is called; that is, to let her run 12 score yards, or thereabouts, before the gre-hounds are slipped at her; otherwise she is killed too soon, the greater part of the sport is thrown away, and the pleasure of observing the several turnings and windings that the creature will make to get away is all lost. A good sportsman had rather see a hare save herself after a fair course, than see her murdered by the gre-hounds as soon as she is up.

In coursing the *fox*, no other art is required, than standing close, and in a clear wind, on the outside of some grove where it is expected he will come out; and when he is come out, he must have head enough allowed him, otherwise he will return back to the covert. The slowest gre hound will be able to overtake him, after all the odds of distance necessary; and the only danger is the dog being hurt by the fox, which too frequently happens. For this reason, no gre-hound of any value should be run at this course; but the strong, hard, bitter dogs, that will seize any thing.

The *laws of coursing* established by the duke of Norfolk, and other sportsmen, are these: 1. He that is chosen fewterer or letter-loose of the dogs, shall receive the gre-hounds matched to run together into his leash as soon as he comes into the field; he is to march next to the hare-finder, or him who is to start the hare, until he come to the form; and no horseman or footman is to go before or side-ways, but all straight behind, for the space of about 40 yards. 2. A hare ought never to be coursed with more than a brace of gre-hounds. 3. The hare-finder is to give the hare three sohoes before he puts her up from her form or seat, to the end that the dogs may be prepared and attend her starting. 4. If there be not a particular danger of losing the hare, she should have about twelve score yards law. 5. The dog that gives the first turn, if after that there be neither cote, slip, nor wrench, wins the wager. 6. A go-by, or bearing the hare, is counted equivalent to two turns. 7. If neither dog turns the hare, he that leads to the last covert wins. 8. If any dog turns the hare, serves himself, and turns her again, it is as much as a cote, and a cote is esteemed as much as two turns. 9. If all the course be equal, he that beats the hare shall win; and if he be not borne, the course shall then be judged *dead*. 10. If a dog take a fall in his course, and yet perform his part, he may challenge the advantage of a turn more than he gave. 11. If a dog turn the hare, serve himself, and give divers cotes, and yet in the end shall stand still in the field, the other dog, if he turns home to the covert, although he gives no other, shall be adjudged to win the wager. 12. If by misfortune a dog be rid over in the course, that course shall be adjudged void, and he that did the mischief is to make reparation to the owner. 13. If a dog gives the first and last turn, and there be no other advantage betwixt them, he that gives the odd turn wins. 14. A cote is when a gre-hound goes endways by the side of his fellow, and gives the hare a turn. 15. A cote serves for two turns, and two trippings or jerkings for a cote; and if the hare turns not quite about, she only *wrenches*, in the sportsman's phrase. 16. If there be no cotes given by either of the gre-hounds, but one serves the other at turning, then he that gives the most turns wins the wager. 17. Sometimes a hare does not turn, but wrenches; for she does not turn except she turns as it were round. In these cases, two wrenches stand for one turn. 18. He that comes in first at the death of the hare takes her up, and saves her from breaking; he cherishes the dogs, and cleanses their mouths from the wool; he is adjudged to have the hare for his pains. 19. Finally, those who are judges of the leash, must give their judgment before they depart out of the field, or else it is not to stand as valid.

COURT, an appendage to an house or habitation; consisting of a piece of ground inclosed with walls, but open upwards.

COURT is also used for the palace or place where a king or sovereign prince resides.

COURT, in a law sense, is defined to be a place wherein justice is judicially administered. And as, by our excellent constitution, the sole executive power of the laws is vested in the person of the king, it will follow, that all courts of justice, which are the medium by which he administers the laws, are derived from the power of the crown. For whether created by act of parliament or letters patent, or subsisting by prescription (the only methods by which any court of judicature can exist), the king's consent in the two former is expressly, and in the latter impliedly, given. In all these courts, the king is supposed, in contemplation of law, to be always present; but as that is in fact impossible, he is there represented by his judges, whose power is only an emanation of the royal prerogative.

For the more speedy, universal, and impartial administration of justice between subject and subject, the law hath appointed a prodigious variety of courts, some with a more limited, others with a more extensive jurisdiction; some constituted to enquire only, others to hear and determine; some to determine in the first instance, others upon appeal and by way of review. See LAW, and the respective articles. One distinction may be here mentioned, that runs throughout them all; viz. that some of them are courts *of record*, others *not of record*. A court of record is that where the acts and judicial proceedings are enrolled in parchment for a perpetual memorial and testimony: which rolls are called the *records of the court*, and are of such high and supereminent authority, that their truth is not to be called in question. For it is a settled rule and maxim, that nothing shall be averred against a record, nor shall any plea, or

even proof, be admitted to the contrary. And if the exiftence of a record be denied, it fhall be tried by nothing but itfelf; that is, upon bare infpection whether there be any fuch record or no; elfe there would be no end of difputes. But if there appear any miftake of the clerk in making up fuch record, the court will direct him to amend it. All courts of record are the king's courts, in right of his crown and royal dignity, and therefore no other court hath any authority to fine or imprifon; fo that the very erection of a new jurifdiction with power of fine or imprifonment, makes it inftantly a court of record.— A court not of record is the court of a private man; whom the law will not intruft with any difcretionary power over the fortune or liberty of his fellow-fubjects. Such are the courts-baron incident to every manor, and other inferior jurifdictions: where the proceedings are not enrolled or recorded; but as well their exiftence as the truth of the matters therein contained fhall, if difputed, be tried and determined by a jury. Thefe courts can hold no plea of matters cognizable by the common law, unlefs under the value of 40s. nor of any forcible injury whatfoever, not having any procefs to arreft the perfon of the defendant.

In every court there muft be at leaft three conftituent parts, the *actor*, or plaintiff, who complains of an injury done; the *reus*, or defendant, who is called upon to make fatisfaction for it; and the *judex*, or judicial power, which is to examine the truth of the fact, to determine the law arifing upon that fact, and, if any injury appears to have been done, to afcertain, and by its officers to apply the remedy. It is alfo ufual in the fuperior courts to have attornies, and advocates or counfel, as affiftants. See ATTORNEY and COUNSEL.

COURT-BARON, in Englifh law, a court incident to every manor in the kingdom, to be holden by the fteward within the faid manor. This court-baron is of two natures: the one is a cuftomary court, appertaining entirely to the copyholders, in which their eftates are transferred by furrender and admittance, and other matters tranfacted relative to their tenures only. The other is a court of common law, and it is the court of the *barons*, by which name the freeholders were fometimes anciently called: for that it is held before the freeholders who owe fuit and fervice to the manor, the fteward being rather the regiftrar than the judge. Thefe courts, though in their nature diftinct, are equally confounded together. The court we are now confidering, viz. the freeholder's court, was compofed of the lord's tenants, who were the *pares* of each other, and were bound by their feodal tenure to affift their lord in the difpenfation of domeftic juftice. This was formerly held every three weeks; and its moft important bufinefs is to determine, by writ of right, all controverfies relating to the right of lands within the manor. It may alfo hold plea of any perfonal actions, of debt, trefpafs on the cafe, or the like, where the debt or damages do not amount to 40s. or three marks, which is the fame fum that bounded the jurifdiction of the ancient Gothic courts, in their loweft inftance, or *fierding courts*, fo called becaufe four were inftituted within every fuperior diftrict or hundred. But the proceedings on a writ of right may be removed into the county-court by a precept from the fheriff called a *tolt*, *quia tollit atque eximit caufam è curia baronum*. And the proceedings in all other actions may be removed into the fuperior courts by the king's writ of *pone*, or *accedas ad curiam*, according to the nature of the fuit. After judgment given, a writ alfo of *falfe judgment* lies to the courts at Weftminfter to re-hear and review the caufe, and not a writ of *error*; for this is not a court of record: and therefore, in fome of thefe writs of removal, the firft direction given is to caufe the plaint to be recorded, *recordari facias loquelam*.

COURT-*Martial*, a court appointed for the punifhing offences in officers, foldiers, and failors, the powers of which are regulated by the mutiny-bill. For other courts, fee ADMIRALTY, ARCHES, BENCH, COUNTY, COMMON-*Pleas*, CHANCERY, ECCLESIASTICAL, DUCHY, &c. &c.

COURTESY, or CURTESY, *of England*; a certain tenure whereby a man marrying an heirefs feized of lands of fee fimple, or fee-tail general, or feized as heir of the tail fpecial, and getting a child by her that cometh alive into the world, though both it and his wife die forthwith; yet, if fhe were in poffeffion, he fhall keep the land during his life, and is called *tenant per legem Angliæ*, " or tenant by the courtefy of England;" becaufe this privilege is not allowed in any country except Scotland, where it is called *curialitas Scotiæ*.

COURTESAN, a woman who proftitutes herfelf for hire, efpecially to people of fuperior rank. Lais, the famous Theban courtefan, ftands on record for requiring no lefs than 10,000 crowns for a fingle night's cohabitation.

COURTRAY, a town of the Auftrian Netherlands, fituated on the river Lys, about 23 miles fouth-weft of Ghent, and 14 eaft of Ypres. E. long. 3. 10. N. lat. 50. 48.

COUSIN, a term of relation between the children of brothers and fifters, who in the firft generation are called *coufin-germans*, in the fecond generation *fecond coufins*, &c. If fprung from the relations of the father's fide, they are denominated *paternal* coufins; if on the mother's, *maternal*. The word is ordinarily derived from *confanguineus*; though Menage takes it from *congenius*, or *congeneus*, q. d. *ex eodem genere*. In the primitive times, coufin-germans were allowed to marry, to prevent their making alliances in heathen families: but Theodofius the Great prohibited it, under pain of death; on pretence that they were, in fome fort, brothers and fifters with regard to each other.

COUSIN (John), a celebrated French painter, who excelled in painting on glafs. His picture of the Laft Judgment, in the veftry of the Minims of the Wood of Vincennes, is much admired. He was alfo a good fculptor. He wrote feveral works on geometry and perfpective; and died after the year 1689.

COUSU, in heraldry, fignifies a piece of another colour or metal placed in the ordinary, as if it were fewed on, as the word imports. This is generally of colour upon colour, or metal upon metal, contrary to the general rule of heraldry.

COUTANCES, a port town of Normandy, and capital of Coutantin, in W. long. 1. 32. N. lat. 49. 10. This town, anciently called *Conftantia* or *Cofedia*, is pleafantly fituated among meadows and rivulets about fix miles diftant from the fea. By the remains of a Roman aqueduct, and other ancient ruins, it appears to be a place of great antiquity. It is the fee of a bifhop fuffragan at Rome; and has a magnificent cathedral, efteemed one of the fineft pieces of Gothic architecture in Europe. The trade of this town is very inconfiderable, and the fortifications are quite demolifhed. They have feveral religious houfes, and two parochial churches.

COUTHUTLAUGH, from the Saxon *couth*, " knowing," and *utlaugh*, " outlaw;" he that wittingly receives a man outlawed, and cherifhes or conceals him: for which offence he was in ancient times fubject to the fame punifhment with the outlaw himfelf.

COVERT, in heraldry, denotes fomething like a piece of hanging, or a pavilion falling over the top of a chief or other ordinary, fo as not to hide, but only to be a covering to it.

COW, in zoology. See BOS.

COW-*Burner*. See BUPRESTIS.

Sea-COW, in zoology. See TRICHECUS.

COW-*Itch*, or *cowhage*, in botany. See COUHAGE, and DOLICHOS.

Cow's-*Lip*, in botany. See Primula.

COWARD, in heraldry, a term given to a lion borne in an efcutcheon with his tail doubled, or turned in between his legs.

COWEL (Dr. John), a learned and eminent civilian, born about the year 1544. In 1607 he compiled a *Law Dictionary*, which gave great offence to Sir Edward Coke and the common lawyers: fo that they firft accufed him to James I. as afferting that the king's prerogative was in fome cafes limited; and when they failed in that attempt, they complained of him to the houfe of commons, as a betrayer of the rights of the people, by afferting that the king was not bound by the laws; for which he was committed to cuftody, and his book publicly burnt. He alfo publifhed *Inftitutiones Juris Anglicani*, in the manner of Juftinian's Inftitutes; and died in the operation for the ftone, in 1611.

COWES, a town and harbour on the north-eaft coaft of the Ifle of Wight, in Hampfhire. It has no market, but is the beft place for trade in the whole ifland; yet as it lies low, the air is accounted unhealthy. It is eight miles fouth-eaft of Portfmouth. W. long. 1. 25. N. lat. 50. 45.

COWL, or Coul, a fort of monkifh habit worn by the Bernardines and Benedictines. The word is formed from *cucullus*, by confounding the two firft fyllables into one, as being the fame twice uttered.—There are two kinds of cowls: the one white, very large, worn in ceremony, and when they affift at the office; the other black, worn on ordinary occafions, in the ftreets, &c. F. Mabillon maintains the cowl to be the fame thing in its origin with the fcapular. The author of the apology of the emperor Henry IV. diftinguifhes two forms of cowls: the one is a gown reaching to the feet, having fleeves, and a capuchin, ufed in ceremonies; the other a kind of hood to work in, called alfo a *fcapular*, becaufe it only covers the head and fhoulders.

COWLEY (Abraham), an eminent poet, was born at London 1618. His father, who was a grocer, dying before he was born, his mother procured him to be admitted a king's fcholar at Weftminfter. His firft inclination to poetry arofe on his lighting on Spenfer's Fairy Queen, when he was but juft able to read: and this inclination fo far improved in him, that at 13 he began to write feveral poems; a collection of which was publifhed in 1613, when he was but 15. He has been reprefented as poffeffed of fo bad a memory that his teachers could never bring him to retain the ordinary rules of grammar. But the fact was, as Dr. Johnfon notices, not that he could not learn or retain the rules; but that being able to perform his exercifes without them, he fpared himfelf the labour. In 1636 he was elected a fcholar of Trinity College, Cambridge, and removed to that univerfity. Here he went through all his exercifes with a remarkable degree of reputation; and at the fame time muft have purfued his poetical turn with great eagernefs, as it appears that the greater part of his poems were written before he left that univerfity. He had taken his degree of Mafter of arts before 1643, when, in confequence of the turbulence of the times, he, among others, was ejected from the college: whereupon, retiring to Oxford, he entered himfelf of St. John's college: and that very year, under the denomination of a *fcholar of Oxford*, publifhed a fatire called the Puritan and the Papift. It is apparent, however, that he did not remain very long at Oxford: for his zeal to the royal caufe engaging him in the fervice of the king, who was very fenfible of his abilities, and by whom he was frequently employed, he attended his majefty in many of his journeys and expeditions, and gained not only that prince's efteem, but that of many other great perfonages, and in particular of Lord Falkland, one of the principal fecretaries of ftate.

During the heat of the civil war, he was fettled in the Earl of St. Alban's family; and when the queen-mother was obliged to retire into France, he accompanied her thither, laboured ftrenuoufly in the affairs of the royal family, undertook feveral very dangerous journeys on their account, and was the principal inftrument in maintaining an epiftolary correfpondence between the king and queen, whofe letters he cyphered and decyphered with his own hand. His poems, entitled The Miftrefs, were publifhed at London in 1647; and his comedy called The Guardian, afterwards altered and publifhed under the title of Cutter of Coleman-ftreet, in 1650. In 1656 it was thought proper by thofe on whom Mr. Cowley depended that he fhould come over into England, and, under pretence of privacy and retirement, fhould give notice of the pofture of affairs in this nation. Upon his return he publifhed a new edition of all his poems, confifting of four parts; viz. 1. Mifcellanies. 2. The Miftrefs, or Several Copies of Love-Verfes. 3. Pindarique Odes, written in imitation of the ftyle and manner of Pindar. 4. Davideis, a facred Poem of the troubles of David, in four books.

Soon after his arrival, however, he was feized, in the fearch after another gentleman of confiderable note in the king's party: but although it was through miftake that he was taken, yet when the republicans found all their attempts of every kind to bring him over to their party proved ineffectual, he was committed to a fevere confinement, and it was even with confiderable difficulty that he obtained his liberty; when, venturing back to France, he remained there, in his former fituation, till near the time of the king's return. During his ftay in England he wrote his Two Books of Plants, publifhed firft in 1662: to which he afterwards added four books more; and all fix, together with his other Latin poems, were printed at London in 1678. It appears by Mr. Wood's *Fafti Oxonienfes*, that our poet was created doctor of phyfic at Oxford, December 2, 1657.

Soon after the reftoration, he became poffeffed of a very competent eftate, through the favour of his principal friends the duke of Buckingham and the earl of St. Alban's; and being now upwards of 40 years of age, he took up a refolution to pafs the remainder of a life which had been a fcene of tempeft and tumult, in that fituation which had ever been the object of his wifhes, a ftudious retirement. He chofe for his firft rural refidence Barn Elms, a place liable, in winter, to great dampnefs of the foil, which greatly affected his health. On his recovery, he removed to Chertfey, a fituation not much more healthy, where he had not been long, before he was feized with another confuming difeafe, of which he died on the 28th of July, 1667, being the 49th of his age; and, on the 3d of Auguft following, he was interred in Weftminfter-abbey, near the afhes of Chaucer and his beloved Spenfer. A monument was alfo erected to his memory by George Villiers duke of Buckingham in 1675.

Befides the works already mentioned, Mr. Cowley wrote, among other things, A Propofition for the Advancement of Experimental Philofophy; A Difcourfe by way of Vifion concerning the Government of Oliver Cromwell; and Several Difcourfes by way of Effays in profe and verfe. Mr. Cowley had defigned alfo a difcourfe concerning Style, and a Review of the Principles of the Primitive Chriftian Church, but was prevented by death. A fpurious Piece, entitled The Iron Age, was publifhed under Mr. Cowley's name during his abfence; and, in Mr. Dryden's Mifcellany Poems, we find A Poem on the Civil War, faid to be written by our author, but not extant in any edition of his works. An edition of his works was publifhed by Dr. Spratt, afterwards bifhop of Rochefter, who alfo prefixed to it an account of the author's life. The reverend editor mentions, as very excellent of their kind, Mr. Cowley's letters to his Friends, none of which, however, were publifhed.

The moral character of Mr. Cowley appears, from every account of it, to have been very excellent. "He is reprefented by Dr. Spratt (fays Dr. Johnfon) as the moft amiable of mankind; and this pofthumous praife may be fafely credited, as it

has never been contradicted by envy or by faction." As a poet, his merits have been variously estimated: Lord Clarendon has said he made a flight above all men; Addison, in his account of the English poets, that he improved upon the Theban bard; the duke of Buckingham, upon his tomb-stone, that he was the English Pindar, the Horace, the Virgil, the delight, the glory of his times. And with respect to the harshness of his numbers, the eloquent Spratt tells us, that if his verses in some places seem not so soft and flowing as one would have them, it was his choice and not his fault.

COX (Richard), a learned prelate, and principal pillar of the Reformation, was born at Whaddon in Buckinghamshire, of low parentage, in the year 1499. He was a man of considerable learning, a zealous and rigid bulwark of the church of England, and an implacable enemy both to Papists and Puritans. He died on the 22d July, 1581, aged 81.

COXWOLD, a town in the North-riding of Yorkshire, 14 miles north of York. W. long. 1. 10. N. lat. 54. 16.

COYPEL (Anthony), an excellent French painter, born at Paris in 1661. Noel Coypel, his father, being chosen by M. Colbert to be director of the academy at Rome, he took his son with him into Italy, where Anthony Coypel formed himself on the works of the greatest masters, and on his return to France was made first painter to the Duke of Orleans. That prince employed him in painting the grand gallery of the royal palace, and allowed him a pension. In 1714 he was director of the Academy of Painting and Sculpture. In 1715 he was made the first painter to the French king, and was ennobled on account of his merit. He died in 1772. M. Coypel, his son, also excelled in the same art.

COZENING; tricking, or defrauding.—In law, it denotes an offence where any thing is done deceitfully, whether belonging to contracts or not, which cannot be properly termed by any special name.

COZUMEL, an island near the western coast of Jucatan, where Cortez landed and refreshed his troops before entering upon the conquest of Mexico. W. long. 89. 0. and N. lat. 13. 0.

CRAB, in zoology. See CANCER.

CRAB's *Claws*, once an article in the materia-medica, were the tips of the claws of the common crab calcined and levigated. Calcined bones have exactly the same properties.

CRAB's *Eyes*, in pharmacy, are a strong concretion in the head of the cray-fish. These are calcined and levigated like crab's claws, and possess similar medicinal qualities.

CRAB-*Lice*, a troublesome kind of vermin, which stick so fast with their claws to the skin as to render it difficult to dislodge them. Being viewed with a glass they nearly resemble the small crab-fish; whence they obtained their popular name. They are also called *plactulae*, *morpiones*, *petolae*, and *pessolatae*: they usually infest the arm-pits and *pudenda*. They will be quickly destroyed, and drop off dead, upon the application of a little quickfilver ointment. Among the vulgar, this sort of vermin is reckoned to prognosticate speedy mortality to those whom they abandon without being removed by medicine.

CRAB, a sort of wooden pillar, whose lower end, being let down through a ship's decks, rests upon a socket like the capstern; and having in its upper end three or four holes, at different heights, through the middle of it, one above another, into which long bars are thrust, whose length is nearly equal to the breadth of the deck. It is employed to wind in the cable, or to raise any other weighty matter which requires a great mechanical power. This differs from a capstern, as not being furnished with a *drum-head*, and by having the bars to go entirely through it, reaching from one side of the deck to the other; whereas those of the capstern, which are superior in number, reach only about eight inches or a foot into the drum-head, according to the size thereof. The machine is represented in Plate 63, fig. 4. See also CAPSTERN.

CRAB-*Yaws*, a name in Jamaica for a kind of ulcer on the soles of the feet, with hard callous lips, so hard that it is difficult to cut them. They are cured with strong quickfilver ointment.

CRACATOA, the southernmost of a cluster of islands in the entrance of the straits of Sunda. It consists of elevated land, gradually rising on all sides from the sea, and is entirely covered with trees, except a few spots, which have been cleared by the natives for the purpose of forming rice-fields. The population is considerable. Its coral reefs afford small turtles in abundance; but other refreshments are scarce, and are sold at exorbitant prices. E. lon. 105. 56. S. lat. 8. 6.

CRACOW, a city, formerly the capital of Poland, where the kings were elected and crowned. It was once almost the centre of the Polish dominions, but, since the partition of Poland in 1774, it is become a frontier town. It is situated on the Vistula, which is broad and shallow. Though the city and suburbs occupy a vast tract of ground, they scarcely contain 18,000 inhabitants. The great square is spacious and well-built; the houses were once richly furnished and well inhabited, but are now either untenanted, or in a state of melancholy decay. Many of the streets are broad and handsome; but almost every building bears the marks of ruined grandeur. The churches alone seem to have preserved their original splendour. The devastation of this unfortunate town was begun by the Swedes in 1702, when it was taken by Charles XII. But it has experienced still greater calamities during the commotions of the present reign; having been taken and retaken by the Russians and the Confederates. It has a university, founded by Casimir the Great, and once called the Mother of Polish Literature; but its lustre has been greatly obscured since the removal of the royal residence to Warsaw. To the southern part of the town, on a rock near the Vistula, is the ancient royal palace, surrounded by brick walls and old towers, which form a kind of citadel. In this place were kept the regalia of Poland. Adjoining is the cathedral, within the walls of the citadel, in which most of the sovereigns of Poland are interred. Cracow is 130 miles S. S. W. of Warsaw. E. lon. 20. 16. N. lat. 50. 8.

CRADLE, a well-known machine in which infants are rocked to sleep, to the great detriment of their health and senses. The term denotes also that part of the stock of a cross-bow where the bullet is put.

CRADLE, in surgery, a case of wood in which a broken leg is laid after being set. The same term is used to signify a light kind of arched frame or tilt, intended merely to prevent the bed-clothes from pressing upon the limb.

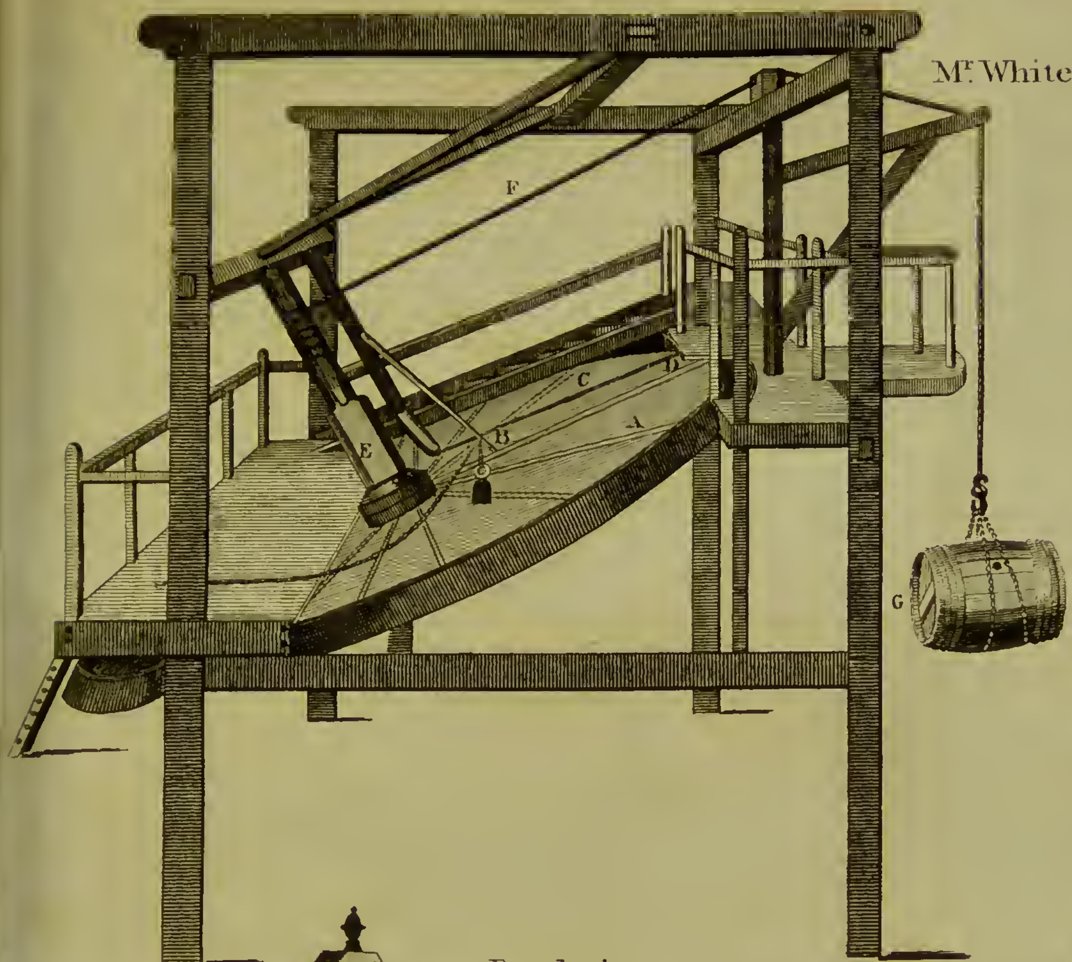
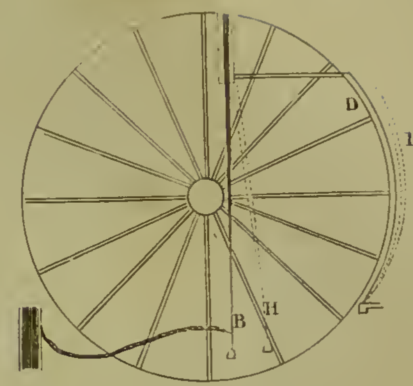
CRADLE, in engraving, is the name of an instrument used in scraping mezzotintos, and preparing the plate. It is formed of steel, resembling a chissel with one sloping side, upon which are cut hollow lines very near each other, and at equal distances. The acting part of this tool is made circular, and the corners are rounded. After being properly tempered, it must be sharpened on the whetstone. There are various sizes of this instrument.

CRADLE, among shipwrights, a frame placed under the bottom of a ship, in order to conduct her smoothly and steadily into the water when she is going to be launched; at which time it supports her weight while she slides down the descent or sloping passage called *the ways*, which are for this purpose daubed with soap and tallow. See Plate 87.

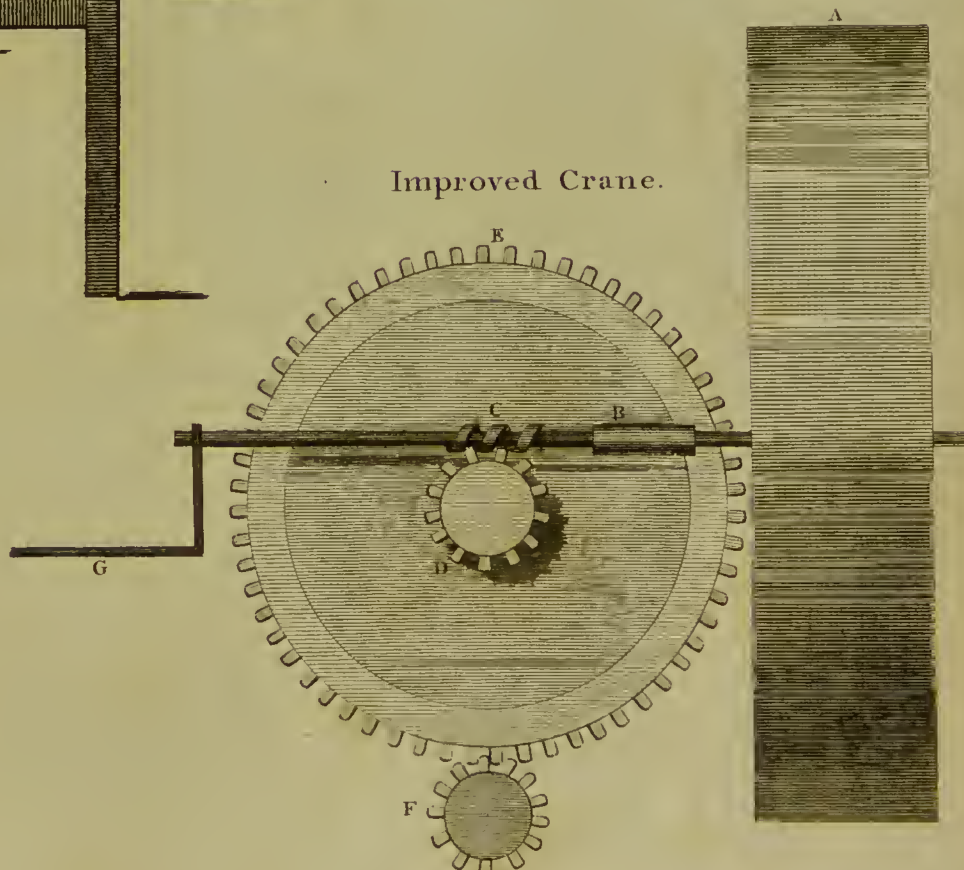
CRAFT, a general name for all sorts of vessels employed to load or discharge merchant-ships, or to carry along-side, or return the stores of men of war. Such are lighters, hoys, barges, prames, &c. See those articles.

CRAKE, or CORN-CRAKE. See RALLUS.

CRAIL, or CARREIL, a parliament town of Scotland, situated on the sea coast of the county of Fife, about 7 miles south-east of St. Andrew's. W. long. 2. 20. and N. lat. 56. 17.

Mr. White's Crane for Wharfs.



Improved Crane.

Bowler's Improved Churn.

Contrivance to prevent Accidents in working Wheel Cranes.

Staffordshire Fire place.

Profile of Staffordsh. Fire pla.

CRAMBLE, Sea-cabbage, Sea-beach Kale, or Sea-colewort, in botany; a genus of the ſiliquoſa order, belonging to the tetradynamia claſs of plants; and in the natural method ranking under the 39th order, *Siliquoſæ*. The four longer filaments are forked at top, with an anthera only on one point of each; the fruit a dry, globoſe, and deciduous berry. There are three ſpecies, all of them herbaceous eſculents with perennial roots, producing annually large leaves reſembling thoſe of cabbage ſpreading on the ground, with ſtrong flower-ſtalks and yellowiſh flowers. Only one of the ſpecies is a native of Britain. It grows wild on the ſhores of many of the maritime counties of England, but is cultivated in many gardens as a choice eſculent; and the young robuſt ſhoots of its leaves and flower-ſtalks, as they iſſue forth from the earth after the manner of aſparagus-ſhoots, are then in the greateſt perfection for uſe. At this period they appear white as if blanched, and when boiled eat exceeding ſweet and tender. Its principal ſeaſon for uſe is in April and May. This plant may alſo be employed in the pleaſure-ground as a flowering perennial, for the ſtalks divide into fine branchy heads of flowers. It is propagated by ſeeds ſown in any common light earth in autumn or ſpring, where the plants are to remain, which, when two years old, will produce ſhoots fit for uſe, will multiply exceedingly by the roots, and continue for many years.

CRAMERIA, in botany, a genus of the monogynia order, belonging to the tetrandria claſs of plants. There is no calyx; the corolla has four petals; the ſuperior nectary is trifid, the inferior biphyllous; the fruit is a dry, monoſpermous, and echinated berry.

CRAMOND, Over and Nether, two villages about four miles weſt of Edinburgh; of which only the laſt deſerves notice, as having been once a famous naval ſtation of the Romans. It is ſituated at the influx of the river Almon into the Forth. Three Roman roads meet at this place, which was called by them *Alaterva*, and whither they brought their grain for the ſupport of their troops. The village contains about 300 inhabitants. Here are the remains of a bath and ſudatory; and many altars, medals, &c. have been dug up.

CRAMP, a kind of ſpaſm, which contracts the muſcles of the legs, feet, &c. with a violent though ſometimes tranſitory pain; being uſually driven off with friction alone. The word comes from the German *krampſe*, which ſignifies the ſame. A glaſs of tar-water, drank night and morning, has been recommended; and, by old women, a rod of brimſtone, held in the hand. The beſt remedy is to ſtretch out the affected limb powerfully and reſolutely for ſome time together.

Cramp-*Fiſh*, or *Torpedo*. See Raja.

Cramp-*Iron*, or *Cramps*, a piece of iron bent at each end, which ſerves to faſten together pieces of wood, ſtones, or other things.

CRAMPONEE, in heraldry, an epithet given to a croſs which has at each end a cramp or ſquare piece coming from it; that from the arm in chief towards the ſiniſter angle, that from the arm on that ſide downwards, that from the arm in baſe towards the dexter ſide, and that from the dexter arm upwards.

CRANAGE, the liberty of uſing a crane at a wharf, and alſo the money paid for drawing up wares out of a ſhip, &c. with a crane.

CRANE, in ornithology. See Ardea.

Crane, in mechanics, a machine uſed in building for raiſing large ſtones and other weights. See Mechanics, and Plate 88.

Crane's-*Bill*, in botany. See Geranium.

Cranes *Fly*, in zoology, a ſpecies of Tipula.

CRANGANOR, a Dutch factory on the Malabar coaſt in the Eaſt Indies, ſeated in E. long. 75. 5. N. lat. 10. 0.

CRANIOLARIA, in botany; a genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 40th order, *Perſonatæ*. The calyx of the flower is double, the under one tetraphyllous, the upper one a monophyllous ſpatha; the tube of the corolla very long; the capſule almoſt the ſame with that of the *martynia*; which ſee. There are two ſpecies, both natives of hot climates, and neither of them poſſeſſed of any remarkable property.

CRANIUM, in anatomy, an aſſemblage of ſeveral bones which cover and encloſe the brain and cerebellum, popularly called the *ſkull*. See Anatomy. The word comes from the Greek κρανιον, of κρανος, *galea*, "helmet;" becauſe it ſerves to defend the brain like a head-piece. Pezron again derives κρανιον from the Celtic *cren*, becauſe of its roundneſs.

CRANK, a contrivance in machines, in manner of an elbow, only of a ſquare form, projecting out from an axis or ſpindle; and ſerving by its rotation, to raiſe and fall the piſtons of engines for raiſing water or the like.

Crank, in ſea language. A ſhip is ſaid to be *crank-ſided* when, for want of a ſufficient quantity of ballaſt or cargo, ſhe cannot bear her ſails, or can bear but ſmall ſail, for fear of overſetting. She is ſaid to be *crank by the ground*, when her floor is ſo narrow that ſhe cannot be brought on ground without danger.

Crank is alſo an iron brace which ſupports the lanthorns on the poop-quarters, &c.

CRANMER (Thomas), a celebrated archbiſhop, reformer, and martyr, whoſe public character is noticed at large in moſt of our Engliſh hiſtories. He was the ſon of Thomas Cranmer, Eſq. of Aſlacton in Nottinghamſhire, where our author was born in 1489. Archbiſhop Cranmer wrote a great number of books: many of them he publiſhed himſelf; and many of them ſtill remain in MSS. viz. two folio volumes in the king's library, ſeveral letters in the Cotton collection, &c. Mr. Gilpin remarks, That "the character of the Archbiſhop hath been equally the ſubject of exaggerated praiſe and of undeſerved cenſure. The moſt indefenſible parts of the Archbiſhop's character are the readineſs with which he ſometimes concurred in the unjuſtifiable proceedings of Henry VIII. and the inſtances wherein he ſhewed himſelf to be actuated by intolerant principles. One of the moſt honourable tranſactions of Archbiſhop Cranmer's life, was the firm ſtand that he made againſt the act of the ſix articles. This act was ſo ſtrongly ſupported by the King, that even the Proteſtants in parliament made little oppoſition to it. But Cranmer oppoſed it with great zeal and ſteadineſs. His behaviour in the cauſe of the Duke of Norfolk was alſo entitled to great commendation. He was indeed remarkable for the placability of his temper, and for ſhowing kindneſs to thoſe by whom he had been greatly injured. Hence it is mentioned in Shakeſpeare's Henry VIII. as a common ſaying concerning him:

> ———"Do my Lord of Canterbury
> But one ſhrewd turn, and he's your friend for ever."

Archbiſhop Cranmer was a great friend and patron of learned foreigners, who had been perſecuted for their attachment to the principles of the Reformation. Mr. Gilpin ſays, "the ſuffering profeſſors of Proteſtantiſm, who were ſcattered in great numbers about the various countries of Europe, were always ſure of an aſylum with him. His palace at Lambeth might be called a ſeminary of learned men; the greater part of whom perſecution had driven from home. Here, among other celebrated reformers, Martyr, Bucer, Aleſs, Phage, found ſanctuary. Martyr, Bucer, and Phage, were liberally penſioned by the Archbiſhop till he could otherwiſe provide for them. It was his wiſh to fix them in the two univerſities, where he hoped their great knowledge and ſpirit of enquiry would forward his deſigns of reſtoring learning; and he at length obtained profeſ-

forſhips for them all. Bucer and Phage were ſettled at Cambridge; where they only ſhowed what might have been expected from them, both dying within a few months after their arrival. But at Oxford, Martyr acted a very conſpicuous part, and contributed to introduce among the ſtudents there a very liberal mode of thinking.

"Archbiſhop Cranmer (ſays Mr. Hume), was undoubtedly a man of merit; poſſeſſed of learning and capacity; and adorned with candour, ſincerity, and beneficence, and all thoſe virtues which were fitted to render him uſeful and amiable in ſociety. His moral qualities procured him univerſal reſpect; and the courage of his martyrdom, though he fell ſhort of the rigid inflexibility obſerved by many, made him the hero of the Proteſtant party."

CRANNY, in glaſs-making, an iron inſtrument wherewith the necks of glaſſes are formed.

CRANTARA, among the ancient Britons, was a ſort of military ſignal uſed for collecting the diſtant and ſcattered warriors to the ſtandard of their chief. A prince having immediate occaſion for the aſſiſtance of his followers to repel ſome ſudden invaſion, or engage in ſome expedition, beſides ſtriking the ſhield and ſounding the horn to give warning to thoſe who were within hearing, he ſent the crantara, or a ſtick burnt at the end and dipped in the blood of a goat, by a ſwift meſſenger, to the neareſt hamlet, where he delivered it without ſaying a word but the name of the place of rendezvous. This crantara, which was well underſtood to denounce deſtruction by fire and ſword to all who did not obey this ſummons, was carried with great rapidity from village to village; and the prince in a little time found himſelf ſurrounded by all his warriors ready to obey his commands.

CRANTOR, a Greek philoſopher and poet, was born at Solos in Cilicia. He left his native country, where he was admired; went to Athens, and there ſtudied with Polemon under Xenocrates. He was conſidered as one of the chief ſupporters of the Platonic ſect; and was the firſt who wrote commentaries upon Plato's works. He flouriſhed 270 years before Chriſt.

CRAPE, a light tranſparent ſtuff, in manner of gauze: made of raw ſilk gummed and twiſted on the mill; woven without croſſing, and much uſed in mourning. Crapes are either craped, *(i. e. criſped)*, or ſmooth; the firſt double, expreſſing a cloſer mourning; the latter ſingle, uſed for that leſs deep. The white is reſerved for young people, or thoſe devoted to virginity. The ſilk deſtined for the firſt is more twiſted than that for the ſecond; it being the greater or leſs degree of twiſting, eſpecially of the warp, which produces the criſping given it when taken out of the loom, ſteeped in clear water, and rubbed with a piece of wax for the purpoſe. Crapes are all dyed raw. The invention of this ſtuff came originally from Bologna; but, till of late years, Lyons was ſaid to have the chief manufacture of it. Hiſtory tells us, that St. Bathilda, Queen of France, made fine crape *(crepa)* of gold and ſilver, to lay over the body of St. Eloy. The Bollandiſts own they cannot find what this *crepa* was. Binet ſays, it was a frame to cover the body of the ſaint; but others, with reaſon, take it to be a tranſparent ſtuff, through which the body might be ſeen; and that this was the *crepa* whence our word crape was formed.

CRAPULA, among the old phyſicians: a term ſynonymous with SURFEIT.

CRASHAW (Richard), who was in his life-time honoured with the friendſhip of Cowley, and ſince his death by the praiſe of Mr. Pope, who condeſcended both to read his poems and to borrow from them, was the ſon of William Craſhaw, an eminent divine, and educated at the Charter-houſe in London. He was then ſent to Pembroke-hall in Cambridge, and was afterwards of Peter-houſe, where he was fellow; in both which colleges he was diſtinguiſhed for his Latin and Engliſh poetry. Afterwards he was ejected from his fellowſhip, together with many others, for denying the covenant in the time of the rebellion. He alſo changed his religion, being by catholic artifices perverted to the church of Rome; not *converted*, but rather, as Pope ſays, *outwitted*. He went to Paris, in hopes of recommending himſelf to ſome preferment there; but being a mere ſcholar, was incapable of executing the new plan he had formed. There he fell into great diſtreſs, which Cowley the poet hearing of in 1646, very kindly ſought him out, gave him all the aſſiſtance he could, and at laſt got him recommended to Henrietta Maria queen of England, then reſiding at Paris. Obtaining from her letters of recommendation, he travelled into Italy; and by virtue of thoſe letters became ſecretary to a cardinal at Rome, and at laſt one of the canons or chaplains of the rich church of our lady at Loretto, ſome miles diſtant from thence, where he died and was buried about 1650. Before he left England he wrote certain poems, entitled, *Steps to the Temple*; beſides ſeveral others.

CRASIS, among phyſicians, the temper of the blood peculiar to every conſtitution.

CRASIS, in grammar, is a figure whereby two different letters are contracted either into one long letter or diphthong. Such, *e. g.* is οφις for οφιας; αληθη for αληθεα, &c. τυχȣς for τυχεος, &c. where ι and α are contracted into ι: ε and α into η; and η and ο into ȣ.

CRASSAMENTUM, in phyſic, the thick red cohering part of the blood, otherwiſe called *cruor*, in contradiſtinction to the ſerum or aqueous part.

CRASSULA, LESSER ORPINE, or LIVE-EVER; a genus of the pentagynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 13th order, *Succulentæ*. The calyx is pentaphyllous; the petals five, with five nectariferous ſcales at the baſe of the germen, and five capſules. There are 17 ſpecies, all of them natives of warm climates. Several of them are cultivated in this country, but require the aſſiſtance of artificial heat for their preſervation. They riſe from one foot to ſix or eight in height, and are ornamented with oblong, thick, ſucculent leaves, and funnel-ſhaped pentapetalous flowers of a ſcarlet, white, or greeniſh colour. They are propagated by off-ſets or cuttings; and muſt be potted in light ſandy compoſt, retained in a ſunny part of the green-houſe all winter, and very ſparingly watered. In ſummer they may be placed in the full air in a ſheltered place, and in dry weather watered twice a week.

CRASSUS (M. Licinius), a celebrated Roman, ſurnamed *Rich* on account of his opulence. His head was cut off and ſent to Orodes, who poured melted gold down his throat, and inſulted his misfortunes. Though he has been called avaricious, yet he ſhewed himſelf always ready to lend money to his friends without intereſt. He was fond of philoſophy, and his knowledge of hiſtory was extenſive.

CRATÆGUS, WILD-SERVICE TREE, HAWTHORN, &c. a genus of the digynia order, belonging to the icoſandria claſs of plants; and in the natural method ranking under the 36th order, *Pomaceæ*. The calyx is quinquefid; the petals five; the berry inferior, diſpermous. There are ten ſpecies, all of the tree and ſhrub kind, hardy and deciduous. Thoſe moſt valuable for economical and ornamental purpoſes in gardening are the following:

1. The *oxycanthus*, hawthorn, or white thorn, grows naturally all over Europe. In the ſtate in which we are uſed to obſerve it, it is nothing better than a tall, uncouth, irregular ſhrub; but trained up as a ſtandard, it ſwells to a large timber ſize, with a tall ſtem and a full ſpreading head. The ſtandard hawthorn, whether we view its flowers in the ſpring, its foliage

in the fummer, or its fruit in the autumn or winter, is one of the moft ornamented plants, ftanding fingly, that can be fcattered over a park or lawn. Its ufes will be explained under the article Hedges.

The common hawthorn fports in the following varieties: the large *fcarlet* hawthorn; the *yellow* hawthorn; the *white* hawthorn; the *maple-leaved* hawthorn; the *double-bloffomed* hawthorn; the *Glaftonbury* thorn. The laft of thefe differs in no refpect from the common hawthorn, only that it fometimes flowers in the winter. It is faid to have originally been the ftaff of Jofeph of Arimathea, who, attended by eleven companions, came over into Britain, and founded, in honour of the Bleffed Virgin, the firft Chriftian church in this ifle. As a proof of his miffion, he is faid to have ftuck his ftaff into the ground, which immediately fhot forth and bloomed. This tree is falfely faid to have bloffomed on Chriftmas-day ever fince, and is univerfally diftinguifhed by the name of the *Glaftonbury thorn*.

2. The *azarolus*, or azarole thorn, is a native of Italy and the fouth of France. It will grow to be fifteen or fixteen feet high. The leaves are large, nearly trifid, ferrated and obtufe. The flowers are large, come out in May, and in the different varieties are fucceeded by fruit of different fize, fhape, and relifh. The principal varieties of this fpecies are: the azarole with ftrong thorns; the azarole with no thorns; the jagged leaved azarole; the oriental medlar.

3. The *aria theophrafti*, called the *white-leaf-tree*, is a native of moft of the cold countries of Europe. It will grow to be more than twenty feet high. This tree is engaging at all times of the year, and catches the attention even in the winter; for then we fee it ftand, though naked of leaves, with a more ftraight ftem, with fmooth branches, fpotted with white, at the end of which are the buds, fwelled for the next year's fhoot, giving the tree a bold and fine appearance. In the fpring the leaves come out of courfe, and look delightfully, having their upper furface green and the lower white. Their figure is oval; they are unequally ferrated, about three inches long, and half as wide. Several ftrong nerves run from the mid-rib to the border, and they are placed alternately on the branches, which appear as if powdered with the fineft meal. The flowers are produced at the end of the branches in May: they are white, grow in large bunches, having mealy footftalks; and are fucceeded by red berries, which will be ripe in autumn.

4. The *terminalis*, wild fervice, or maple-leaved fervice, is a large growing tree, native of England, Germany, Switzerland, and Burgundy. It will arrive to near fifty feet, and is worth propagating for the fake of the timber, which is very white and hard. This tree grows naturally in feveral woods in England; and it is the fruit of this fpecies that is tied in bunches and expofed for fale in the autumn: it is gathered in the woods, and by fome perfons is much liked. The leaves in fome degree refemble thofe of the maple-tree in fhape; their upper furface is a fine green, their under hoary; and they grow alternately on the branches. The flowers come out in May, exhibiting themfelves in large clufters at the end of the branches. They are white, and are fucceeded by the aforefaid eatable fruit, which, when ripe, is of a brown colour, and about the fize of a large haw.

5. The *coccinea*, or Virginian azarole, is a native of Virginia and Canada. It will grow to be near twenty feet high. The ftem is robuft, and covered with a light-coloured bark. The branches are produced without order, are of a dark brown colour, and poffeffed of a few long fharp thorns. The leaves are fpear-fhaped, oval, fmooth, and ferrated; of a thickifh confiftence, and often remain on the tree the greateft part of the winter. Each feparate flower is large; but as few of them grow together, the umbels they form are rather fmall. They come out in May, and are fucceeded by a large dark-red coloured fruit, which ripens late in the autumn. The varieties of this fpecies are: The pear-leaved thorn; the plum-leaved thorn with very long ftrong fpines and large fruit; the plum-leaved thorn with fhort fpines and fmall fruit.

6. The *crus galli*, or cockfpur thorn, is a native of Virginia and Canada, and grows to about twenty feet high. It rifes with an upright ftem, irregularly fending forth branches, which are fmooth, and of a brownifh colour, fpotted thinly with fmall white fpots. It is armed with thorns that refemble the fpurs of cocks, which gained it the appellation of cockfpur thorn. In winter the leaf-buds appear large, turgid, and have a bold and pleafant look among others of different appearances. In fummer this tree is very delightful. The leaves are oval, angular, ferrated, fmooth, and bend backwards. They are about four inches long, and three and a half broad; have five or fix pair of ftrong nerves running from the mid-rib to the border; and die to a brownifh-red colour in the autumn. The flowers are produced in very large umbels, making a noble fhow in May; and are fucceeded by large fruit of a bright red colour, which have a good effect in the winter. The principal varieties of this fpecies are: The cockfpur hawthorn with many thorns; the cockfpur hawthorn with no thorns; the cockfpur hawthorn with eatable fruit.

7. The *tomentofa*, goofeberry-leaved Virginia hawthorn, grows to about feven or eight feet high. The branches are flender, and clofely fet with fharp thorns. The leaves are cuneiform, oval, ferrated, and hairy underneath. The flowers are fmall, and of a white colour: they are produced from the fides of the branches about the end of May; and are fucceeded by yellow fruit, which ripens late in autumn. There is a variety of this called the *Carolina Hawthorn*, which has longer and whiter leaves, large flowers and fruit, and no thorns.

8. The *viridis*, or green-leaved Virginia hawthorn, has the ftem and branches together deftitute of thorns. The leaves are lanceolate, oval, nearly trilobate, ferrated, fmooth, and green on both fides. The flowers are white, moderately large, come out the end of May, and are fucceeded by a roundifh fruit, which will be ripe late in the autumn.

The refpective fpecies are all propagated by fowing the feeds; and the varieties are continued by budding them upon ftocks of the white thorn. This latter method is generally practifed for all the forts; though, when good feeds can be procured, the largeft and moft beautiful plants are raifed that way.

CRATCHES, in farriery, a fwelling on the paftern, under the fetlock, and fometimes under the hoof; for which reafon it is diftinguifhed into the finew-cratches, which effect the finew, and thofe upon the coronet, called *quittor-bones*.

CRATER, Cup, in aftronomy, a conftellation of the fouthern hemifphere; whofe ftars, in Ptolemy's Catalogue, are feven; in Tycho's, eight; in Hevelius's, ten; in the Britannic Catalogue, thirty-one.

Crater is alfo ufed to fignify the mouth or opening of a volcano or burning mountain, from whence the fire is difcharged. See Volcano.

CRATES, of Thebes, a famous philofopher, was the difciple of Diogenes the Cynic. It is faid that he threw all his money into the fea, that he might the more freely apply himfelf to the ftudy of philofophy. Others affert, that he placed it in another perfon's hands, with orders to give it to his children if they fhould happen to be fools: For (faid Crates), if they fhould be philofophers, they will have no need of it: in which cafe it was to be given to the people. He flourifhed about 328 years before Chrift. He ought not to be confounded with Crates, a famous academic philofopher, the difciple and friend of Polemon. This laft Crates had Arcefilaus and

other celebrated philofophers for his difciples; and flourifhed about 300 years before Chrift.

CRATEVA, the GARLIC PEAR; a genus of the monogynia order, belonging to the dodecandria clafs of plants; and in the natural method ranking under the 25th order, *Putamineæ*. The corolla is tetrapetalous; the calyx quadrifid; the berry inferior difpermous. There are two fpecies, both of them natives of feveral parts of India. They are both of the tree kind; and are chiefly diftinguifhed by their fruit. The tapia, or garlic pear, has a fmooth round fruit about the fize of an orange, with a hard brown fhell or cover, which inclofes a mealy pulp, filled with kidney fhaped feeds. It hath a ftrong fmell of garlic, and communicates the fame to fuch animals as feed upon it. The tender buds from the young branches being bruifed and applied to the naked fkin, will blifter as effectually as cantharides. It rifes to the height of about 30 feet. The other grows to the fize of a very large tree, with trifoliate leaves fawed on the edges. The flowers have the fmell of rofes, and are fucceeded by an oblong fruit of the fize of an apple, covered with a very hard bony fhell, and containing a foft flefhy pulp, having the tafte of quinces. From the flowers of this plant is obtained by diftillation a water highly odoriferous and cordial; and the pulpy part of the fruit is prepared into various kinds of marmalades. Both fpecies may be propagated in this country by feeds. Thefe are to be fown upon a hot-bed in the fpring; and when the plants come up, they are to be treated in the manner directed for the ANNONA.

CRATINUS, an ancient comic poet, of whom we fhould fcarcely have known any thing, had not Quintilian, Horace, and Perfius, mentioned him, Eupolis, and Ariftophanes, as the great mafters of what we call the ancient comedy. It is gathered that he died in the 87th Olympiad. Suidas tells us that he wrote 21 plays, and that he was fplendid and bright in his characters.

CRATIPPUS, a celebrated peripatetic philofopher, was a native of Mitylene, where he taught philofophy; but at length went to Athens, where Brutus and the fon of Cicero were his difciples. Pompey went to fee him after the battle of Pharfalia, and propofed to him his difficulties in relation to the belief of a providence; when Cratippus comforted him, and by forcible arguments anfwered his objections. He wrote fome pieces about divination: and is fuppofed to be the fame with him whom Tertullian, in his book *De Anima*, has ranked among the writers upon dreams.

CRATO, a fmall town of Portugal, in the province of Alentejo, with a rich priory. It is the chief commandery which the knights of Malta have in Portugal. W. long. 8. 12. N. lat. 38. 50.

CRAVEN, or CRAVENT, a word of reproach, ufed in trials by battel. See BATTEL.

CRAX, in ornithology, the curaffou, a genus of birds belonging to the order of gallinæ. The bafe of the beak of each mandible is covered with wax; and the feathers of the head are curled. See plate 81. There are five fpecies, viz. 1. The *alecator*, or Indian hen of Sloane, is about the fize of a fmall turkey. It is black, with a white belly. A yellow wax covers about one half of each mandible; the tongue is entire; the temples are bare and black: the tail is roundifh, and confifts of 14 prime feathers; the legs are ftrong, and of a dufky brown colour. They are frequent at Guiana: and are called *powefe* by the natives from their cry, which is fomewhat fimilar; are pretty numerous in the woods, and make no fmall part of the food of the planters, being fupplied therewith by the Indian hunters; and their flefh is reckoned delicate, much like that of a turkey. They are eafily brought up tame, and are frequently found in the Dutch fettlements of Berbice, Effequebo, and Demerary. They are called at Brafil by the name of *curaffo*. It is found in the warm parts of America. 2. The *rubra*, or Peruvian hen, is red, with a blueifh head: it is a native of Peru. Thefe birds are natives of Mexico and Peru. They feed on fruits, and perch at night on trees: the flefh is white; and efteemed very good food. They are frequently kept tame in our menageries in England, and readily mix with other poultry, feeding on bread and grain; but this climate is not near warm enough for their nature, they not being able to bear the dampnefs of the grafs of our meadows, which renders them fubject to have their toes rot off. They will often live in this ftate fome time; and in one inftance which Mr. Latham faw, the whole of one foot was gone, and but part of one toe left on the other, before the creature died. 3. The *mitu*, or Brafilian pheafant, is black, with a dufky belly, and red wax: it is a native of Guinea and Brazil. 4. The globicera, has a yellow protuberance between the noftrils, and is of a blueifh-black colour: it is likewife a native of Brazil. 5. The pauxi, or Mexican pheafant of Briffonius, is of a blueifh colour, with blue wax, and the tip of the tail and belly white: is a native of Mexico.

CRAY-FISH, or CRAW-*Fifh*. See CANCER. The cray-fifh is a common article at the tables of the rich, and was once thought to poffefs fome medical properties favourable to perfons in a confumptive ftate, in which cafes they were exhibited in the form of broth, &c. Cray-fifh abound in the river Don in Mufcovy, where they are laid in heaps to putrefy; after which the ftones called *crab's eyes* are picked out. Thefe animals are very greedy of flefh, and flock in great numbers about dead carcafes. In Switzerland there are fome cray-fifh which are red while they are alive, and others blueifh. Some kinds of them alfo will never become red, even by boiling, but continue blackifh.

The cray-fifh difcharges itfelf of its ftomach, and, as M. Geoffrey thinks, of its inteftines too. Thefe, as they putrefy and diffolve, ferve for food to the animal; during the time of the reformation, the old ftomach feems to be the firft food the new one digefts. It is only at that time that the ftones are found called *crab's eyes*; they begin to be formed when the old ftomach is deftroyed, and are afterwards wrapped up in the new one, where they decreafe by degrees till they entirely difappear.

CRAYER (Cafpar de), was born at Antwerp in 1585, and was a difciple of Raphael Coxis, the fon of that Coxis who had ftudied under Raphael; but he foon fhowed fuch proofs of genius, and of an elevated capacity, that he far furpaffed his mafter, and therefore quitted him. Afterwards he made judicious obfervations on the particular excellencies of the moft renowned mafters to which he had any accefs; and taking nature for his conftant director and guide, he formed for himfelf a manner that was exceedingly pleafing. But nothing places the talents of Crayer in a ftronger light, than the teftimony of fo excellent an artift as Rubens That great man went to Antwerp particularly to vifit Crayer, and to fee his work; and after examining attentively a picture of his painting, in the refectory of the abbey of Affleghem, he publicly declared that no painter could furpafs Crayer. Nor was this mafter lefs diftinguifhed by Vandyck, who always expreffed a real efteem and friendfhip for him, and painted his portrait. He had fomewhat lefs fire in his compofitions than Rubens, but his defign is frequently more correct. His compofition generally confifted of a fmall number of figures; and with difcreet judgment, he avoided the encumbering his defign with fuperfluous particulars, or loading his fubject with any thing that feemed not to contribute to its elegance or probability. He grouped his figures with fingular fkill, and his expreffions have all the truth of nature. There is a remarkable variety in his draperies, and an equal degree of fimplicity in their folds; and as to his colouring, it is admirable. Of all his cotemporary painters, he was accounted to approach

nearest to Vandyck, not only in hiſtory but in portrait. The ſubject of that picture which was ſo honoured by the approbation of Rubens is the Centurion alighting from his horſe to proſtrate himſelf at the feet of our Saviour. It is a capital deſign of Crayer; and although it conſiſts of a great number of figures, the harmony and union are well preſerved.

CRAYON, a general name for any coloured ſtone, earth, or other ſubſtance, uſed in deſigning or painting in paſtel; whether they have been beaten and reduced to a paſte, or are uſed in their primitive conſiſtence, after ſawing or cutting them into long narrow ſlips. In this laſt manner are red crayons made, of blood-ſtone or red chalk; black ones, of charcoal and black lead, &c. Crayons of all other colours are compoſitions of earths reduced to paſte.

CRAYON-*Painting*. Whether the painter works with oil-colours, water-colours, or crayons, the grand object of his purſuit is ſtill the ſame: a juſt imitation of nature. But each ſpecies has its peculiar rules and methods. Painting with crayons requires in many reſpects a treatment different from painting in oil-colours; becauſe all colours uſed dry are in their nature of a much warmer complexion than when wet with oils, &c. For this reaſon, in order to produce a rich picture, a much greater portion of what painters term *cooling tints* muſt be applied in crayon-painting than would be judicious to uſe in oil. Without any danger of a miſtake, it may be ſuppoſed, that the not being acquainted with this obſervation is one great cauſe why ſo many oil painters have no better ſucceſs when they attempt crayon-painting. On the contrary, crayon-painters being ſo much uſed to thoſe tints which are of a cold nature when uſed wet, are apt to introduce them too much when they paint with oils, which is ſeldom productive of a good effect.

Whoever would practiſe this art muſt provide himſelf with ſome ſtrong blue or grey paper, the thicker the better, if the grain is not too coarſe or knotty, though it is almoſt impoſſible to get any entirely free from knots. Paper of a ſuitable quality in every reſpect may be had at moſt of the colour-ſhops in London. The ſtudent will find the fitting poſture, with the box of crayons in his lap, the moſt convenient for himſelf. The part of the picture he is immediately painting ſhould be rather below his face; for, if it be placed too high, the arm will be fatigued. Let the windows of the room where he paints be darkened, at leaſt to the height of ſix feet from the ground; and the ſubject to be painted ſhould be ſituated in ſuch a manner, that the light may fall with every advantage on the face, avoiding too much ſhadow, which ſeldom has a good effect in portrait-painting, eſpecially if the face he paints from has any degree of delicacy.

Before he begins to paint, let him be attentive to his ſubject, and appropriate the action or attitude proper to the age of the ſubject. The embelliſhments of the picture ſhould alſo be regulated by the rules of propriety and conſiſtency. Having obſerved this, let him proceed to draw the outline of the whole figure with a black lead pencil, or with white chalk. The artiſt muſt next employ himſelf on the features of the face; the outline of which being correct, let him take a crayon of pure carmine, and carefully draw the noſtril and edge of the noſe next the ſhadow; then, with the fainteſt carmine tint, lay in the higheſt light upon the noſe and forehead, which muſt be executed broad. He is then to proceed gradually with the ſecond tint, and the ſucceeding ones, till he arrive at the ſhadows, which muſt be covered brilliant, enriched with much lake, carmine, and ſhaded with a blackiſh green. This method will at firſt offenſively ſtrike the eye, from its crude appearance; but in the finiſhing, it will be a good foundation to produce a pleaſing effect, colours being much more eaſily ſullied when too bright than when the firſt colouring is dull, to raiſe the picture into a brilliant ſtate. The ſeveral pearly tints diſcernible in fine complexions muſt be imitated with blue verditer and white, which anſwers to the ultramarine tints uſed in oils. But if the parts of the face where theſe tints appear, are in ſhadow, the crayons compoſed of black and white muſt be ſubſtituted in their place. Though all the face when firſt coloured ſhould be laid in as brilliant as poſſible, yet each part ſhould be kept in its proper tone; by which means the rotundity of the face will be preſerved.

Let the ſtudent be careful when he begins the eyes, to draw them with a crayon inclined to the carmine tint, whatever may be the colour of the iriſes; he muſt lay them in brilliant, and at firſt not loaded with colour, but executed lightly: no notice is to be taken of the pupil yet. The ſtudent muſt let the light of the eye incline very much to the blue caſt, cautiouſly avoiding a ſtaring white appearance (which, when once introduced, is ſeldom overcome), preſerving a broad ſhadow thrown on its upper part, by the eye-laſh. A black and heavy tint is alſo to be avoided in the eye-brows; it is therefore beſt to execute them like a broad glowing ſhadow at firſt, on which, in the finiſhing, the hairs of the brow are to be painted; by which method of proceeding, the former tints will ſhow themſelves through, and produce the moſt pleaſing effect.

The lips ſhould be begun with pure carmine and lake, and in the ſhadow ſome carmine and black are required: the ſtrong vermilion tints ſhould be laid on afterwards. Beware of executing them with ſtiff, harſh lines, but gently intermix each with the neighbouring colours, making the ſhadow beneath broad, and enriched with brilliant crayons. The corner of the mouth muſt be formed with carmine, brown ochre, and greens, variouſly intermixed. If the hair is of a dark colour, preſerve much of the lake and deep carmine tints therein; this may eaſily be overpowered by the warmer hair tints, which, as obſerved in painting the eye-brows, will produce a richer effect when the picture is finiſhed; on the contrary, if this method is unknown or neglected, a poverty of colouring will be diſcernible.

After the ſtudent has covered over, or, as artiſts term it, has *dead-coloured* the head, he is to ſweeten or blend the ſhades together, by rubbing different parts gently with his finger, beginning at the ſtrongeſt light upon the forehead, paſſing his finger very lightly, and uniting it with the next tint. This he muſt continue till the whole is ſweetened together, often wiping his finger on a towel to prevent the colours from being ſullied. He muſt be cautious not to ſmooth or ſweeten his picture too often, becauſe it will give riſe to a thin and ſcanty effect, and have more the appearance of a drawing than a ſolid painting; as nothing but a body of rich colours can conſtitute a rich effect. To avoid this (as the ſtudent finds it neceſſary to ſweeten with the finger), he muſt occaſionally repleniſh the picture with more crayon.

When the head is brought to ſome degree of forwardneſs, let the back-ground be laid in, which muſt be treated in a different manner, covering it as thin as poſſible, and rubbing it into the paper with a leather ſtump. Near the face the paper ſhould be almoſt free from colour, for this will do great ſervice to the head, and by its thinneſs give both a ſoft and ſolid appearance. In the back ground alſo, no crayon that has whiting in its compoſition ſhould be uſed, but chiefly ſuch as are the moſt brilliant and the leaſt adulterated. The ground being painted thin next the hair, will give the artiſt an opportunity of painting the edges of the hair over in a light and free manner when he gives the finiſhing touches.

The ſtudent having proceeded thus far, the face, hair, and back-ground being entirely covered, he muſt carefully view the whole at ſome diſtance, remarking in what reſpect it is out of keeping, that is, what parts are too light and what too dark, being particularly attentive to the white or chalky appearances, which muſt be ſubdued with lake and carmine. The above

method being properly put in execution, will produce the appearance of a painting principally compofed of three colours, viz. carmine, black, and white, which is the beft preparation a painter can make for producing a fine crayon picture.

The next ftep is, to complete the back-ground and the hair, as the duft, in painting thefe, may fall on the face, and would much injure it if that was completed firft. From thence proceed to the forehead, finifhing downward till the whole picture is completed. In painting over the forehead the laft time, begin the higheft light with the moft faint vermilion tint, in the fame place where the faint carmine was firft laid, keeping it broad in the fame manner. In the next fhade fucceeding the lighteft, the ftudent muft work-in fome light blue tints, compofed of verditer and white, intermixing with them fome of the deeper vermilion tints, fweetening them together with great caution, infenfibly mingling them into one another, increafing the proportion of each colour as his judgment fhall direct. Some brilliant yellows may alfo be ufed, but fparingly; and towards the roots of the hair, ftrong verditer tints, intermixed with greens, will be of fingular fervice. Cooling crayons, compofed of black and white, fhould fucceed thefe, and melt into the hair. Beneath the eyes, the fweet pearly tints are to be preferved, compofed of verditer and white; and under the nofe, and on the temples, the fame may be ufed; beneath the lips, tints of this kind alfo are proper, mixing them with the light greens and fome vermilion.

In finifhing the cheeks, let the pure lake clear them from any duft contracted from the other crayons; then with the lake may be intermixed the bright vermilion; and laft of all (if the fubject fhould require it), a few touches of the orange-coloured crayon, but with extreme caution; but fweeten that part with the finger as little as poffible, for fear of producing a heavy difagreeable effect on the cheeks: as the beauty of a crayon-picture confifts in one colour fhowing itfelf through, or rather between, another: this the ftudent cannot too often remark, it being the only method of imitating beautiful complexions.

The eye is the moft difficult feature to execute in crayons, as every part muft be expreffed with the utmoft nicety, to appear finifhed; at the fame time that the painter muft preferve its breadth and folidity while he is particularizing the parts. To accomplifh this, it will be a good general rule for the ftudent to ufe his crayon in fweetening as much, and his finger as little, as poffible. When he wants a point to touch a fmall part with, he may break off a little of his crayon againft the box, which will produce a corner fit to work with in the minuteft parts. If the eye-lafhes are dark, he muft ufe fome of the carmine and brown ochre, and the crayon of carmine and black; and with thefe he may alfo touch the iris of the eyes (if brown or hazel), making a broad fhadow, caufed by the eye-lafh. Red tints of vermilion, carmine, and lake, will execute the corners of the eye properly: but if the eye-lids are too red, they will have a difagreeable fore appearance. The pupil of the eye muft be made of pure black: between this and the lower part of the iris, the light will catch very ftrongly, but it muft not be made too fudden, but gently diffufed round the pupil till it is loft in fhade. When the eye-balls are fufficiently prepared, the fhining fpeck muft be made with a pure white crayon, which fhould be firft broken to a point, and then laid on firm; but as it is poffible they may be defective in neatnefs, they fhould be corrected with a pin, taking off the redundant parts, by which means they may be formed as neat as can be required.

The difficulty, with refpect to the nofe, is to preferve the lines properly determined, and at the fame time fo artfully blended into the cheek, as to exprefs its projection, and yet no real line to be perceptible upon a clofe examination; in fome circumftances it fhould be quite blended with the cheek, which appears behind it, and determined entirely with a flight touch of red chalk. The fhadow caufed by the nofe is generally the darkeft in the whole face, partaking of no reflection from its furrounding parts. Carmine and brown ochre, carmine and black, and fuch brilliant crayons, will compofe it beft.

The ftudent having before prepared the lips with the ftrongeft lake and carmine, &c. muft with thefe colours make them completely correct; and when finifhing, introduce the ftrong vermilions, but with great caution, as they are extremely predominant. In painting the neck, he fhould avoid expreffing the mufcles too ftrong in the ftem, nor fhould the bones appear too evident on the cheft, as both have an unpleafing effect denoting a violent agitation of the body; a circumftance feldom neceffary to exprefs in portrait-painting. The moft neceffary part to be expreffed, and which fhould ever be obferved (even in the moft delicate fubjects), is a ftrong marking juft above the place where the collar-bones unite; and if the head is much thrown over the fhoulders, fome notice fhould be taken of the large mufcle that rifes from behind the ear, and is inferted into the pit between the collar-bones. All inferior mufcles fhould be, in general, quite avoided. The ftudent will find this caution neceffary, as moft fubjects, efpecially thin perfons, have the mufcles of the neck much more evident than would be judicious to imitate. As few necks are too long, it may be neceffary to give fome addition to the ftem, a fault on the other fide being quite unpardonable, nothing being more ungraceful than a fhort neck. In colouring the neck, let the ftudent preferve the ftem of a pearly hue, and the light not fo ftrong as on the cheft. If any part of the breaft appears, its tranfparency muft alfo be expreffed by pearly tints; but the upper part of the cheft fhould be coloured with beautiful vermilions delicately blended with the other.

The next confideration is the *Drapery*. Dark blue, purple, black, pink, and all kinds of red draperies alfo, fhould be firft tinged with carmine, which will render the colours much more brilliant than any other method; over this fhould be laid on the paper the middle tint (a medium between the light and dark tints, of which the drapery is to be painted), except the dark maffes of fhadow, which fhould be laid on at firft as deep as poffible; thefe, fweetened with the finger, being deftitute of the fmaller folds, will exhibit a mafterly breadth which the leffer folds, when added, ought by no means to deftroy. With the light and dark tints, the fmaller parts are next to be made with freedom, executing as much with the crayon, and as little with the finger, as poffible; in each fold marking the laft ftroke with the crayon, which ftroke the finger muft never touch. In the cafe of reflections, the fimple touch of the crayon will be too harfh, therefore fingering will be neceffary afterwards, as reflected lights are always more gentle than thofe which are direct. With refpect to reflections in general, they muft always partake of the fame colour as the object reflecting; but in the cafe of fingle figures, it may be ufeful to make fome particular obfervations.

In a blue drapery, let the reflections be of a greenifh caft; in green draperies, make them of a yellow tint; in yellow, of an orange; in orange, reflect a reddifh caft; in all reds, fomething of their own nature, but inclined to the yellow: black fhould have a reddifh reflection; the reflection of a reddifh tint will alfo prefent purples to the beft advantage. Of whatever colour the drapery is, the reflection on the face muft partake of it, otherwife the picture, like paintings on glafs, will have but a gaudy effect. Linen, lace, fur, &c. fhould be touched fpiritedly with the crayon, fingering very little, except the latter; and the laft touches, even of this, like all other parts, fhould be executed by the crayon, without fweetening with the finger at all.

Laftly, the ftudent fhould carefully avoid finifhing one part in particular, till he has properly confidered the connection it is

to have with the reft. The neglect of this is the principal reafon why the performances of indifferent painters are fo deftitute of what is termed breadth, fo confpicuoufly beautiful in the works of great mafters. It muft be granted, that this obfervation relates more particularly to large compofitions, where a diverfity of figures requires fuch a judicious difpofition, that each may affift in the combination of a kind of univerfal harmony; yet, even in portrait-painting, the ftudent fhould be particularly attentive to obferve this idea of breadth, if he is defirous of acquiring that importance and dignity which conftitutes excellence in painting.

Of the materials. The perfection of crayons confifts, in a great meafure, in their foftnefs; for it is impoffible to execute a brilliant picture with them if they are otherwife; on which account great care fhould be obferved in preparing them, to prevent their being hard. In all compofitions, flake-white and white lead fhould be wholly rejected, becaufe the flighteft touch with either of thefe would unavoidably turn black.

The ufual objection to painting in crayons is, that they are fubject to change; but whenever this happens, it is entirely owing to an injudicious ufe of the above-mentioned whites, which will ftand only in oils. To obviate thefe bad effects, let the ftudent make ufe of common whiting, wafhed, and made up into a crayon.

As thofe ftudents who attempt the art of crayon-painting may be readily fupplied by the fhops with every kind of crayon, we fhall not enter into the manner of their preparation farther than to obferve, that in moft cafes the colouring matter is ftruck upon fome foft and white earth, as alumine, (fee CHEMISTRY, p. 427,) and the mafs whilft moift, like clay, rolled up in the fhape of pencils, and dried for ufe. This obfervation applies only to colours derived from *animal* or *vegetable* fubftances (fee the article COLOUR-*making*); but crayons of many kinds may be formed of the pure *earths* alone, without any other preparation than that of moiftening, rolling, and afterwards drying them. Colours naturally fo hard as not to mark eafily upon paper require to be blended with alumine or fome other earth of a loofe texture, by which this quality may be corrected. We will inftance this in the preparation of crayons from *Carmine*, the texture of which is inclinable to hardnefs: Take a fufficient quantity of carmine, lay it upon a grinding-ftone, and grind it with fpirits of wine till it becomes fmooth. The fimple colour being thus prepared, the next ftep is to compofe the different tints by a mixture with alumine or whiting. The proportion to be obferved confifts of 20 gradations to one, which may be clearly underftood by the following directions: To three parts of the fimple colour, thus levigated, add about one part of the white earth. Of this, when properly incorporated, make two parcels. The next gradation fhould be compofed of equal quantities of carmine and whiting, of which four crayons may be made. The third compofition fhould have one fourth carmine and three fourths whiting; of this make fix crayons, which will be a good proportion with the reft. The laft tint fhould be made of whiting, very faintly tinged with carmine, of which make about eight crayons, which will complete the above-mentioned proportion. As thefe compound tints are levigated, they are to be laid immediately upon a chalk-ftone, that the moifture may be abforbed to the proper degree of drynefs for forming into crayons, which may be known by its lofing the greater part of its adhefive quality when taken into the hand; if the confiftence is found to be right, it may be formed into pencils and then laid upon glafs to dry.

The artift fhould arrange his crayons in claffes for the convenience of painting with them. Some thin drawers, divided into a number of partitions, is the moft convenient method of difpofing them properly. The crayons fhould be depofited according to their feveral gradations of light. The box made ufe of fhould be about a foot fquare, with nine partitions. In the upper corner on the left hand (fuppofing the box to be in the lap when he paints), let him place the black and grey crayons, thofe being the moft feldom ufed; in the fecond partition, the blues; in the third, the greens and browns; in the firft partition on the left hand of the fecond row, the carmines, lakes, vermilions, and all deep reds; the yellows and orange in the middle, and the pearly tints next; and as thefe laft are of a very delicate nature, they muft be kept very clean, that the gradations of colour may be eafily diftinguifhed: in the loweft row, let the firft partition contain a piece of fine linen rag to wipe the crayons with while they are ufing; the fecond, all the pure lake and vermilion tints; and the other partition may contain thofe tints which, from their complex nature, cannot be claffed with any of the former.

CRAZE MILL, or CRAZING *Mill*, a mill in all refpects like a grift-mill to grind corn, and fo called by the tin miners, who ufe it to grind their tin, which is yet too great after trambling.

CREAM, a general name applicable to all fubftances that feparate from a liquor, and are collected upon its furface; but is more particularly applied to the oily fcum which rifes upon milk after it has ftood for fome time.

CREAM *of lime*, is that part of the lime which had been diffolved in the water in its cauftic ftate, but having again attracted fome fixed air from the atmofphere, becomes incapable of folution, and therefore feparates from the water in the mild ftate of chalk or limeftone.

CREAM *of Tartar*, is the *cryftals* of Tartar pulverifed. It is well known as a mild purgative, and of late years has been employed largely with advantage in dropfies. For a more particular account, fee CHEMISTRY, p. 462.

CREAT, in the manege, an ufher to a riding-mafter; or a gentleman bred in the academy, with an intent of making himfelf capable of teaching the art of riding the great horfe.

CREATION, in its primary import, feems to fignify the bringing into being fomething which did not before exift. The term is therefore moft generally applied to the original production of the materials whereof the vifible world is compofed. It is alfo, however, ufed in a fecondary or fubordinate fenfe, to denote thofe fubfequent operations of the Deity upon the matter fo produced, by which the whole fyftem of nature and all the primitive genera of things received their form, qualities, and laws.

There is no fubject concerning which there have been more difputes than this of creation. It is certain that none of the ancient philofophers had the fmalleft idea of its being poffible to produce a fubftance out of nothing, or that even the power of the Deity himfelf could work without any materials to work upon. Hence fome of them, among whom was Ariftotle, afferted that the world was eternal both as to its matter and form. Others, though they believed that the gods had given the world its form, yet imagined the materials whereof it is compofed to have been eternal. Indeed the opinions of the ancients, who had not had the benefit of revelation, were on this head fo confufed and contradictory, that nothing of any confequence can be deduced from them. The freethinkers of our own and former ages have denied the poffibility of creation, as being a contradiction to reafon; and of confequence have taken the opportunity from thence to difcredit revelation. On the other hand, many defenders of the facred writings have afferted, that creation out of nothing, fo far from being a contradiction to reafon, is not only probable, but demonftrably certain. Nay, fome have gone fo far as to fay, that from the very infpection of the vifible fyftem of nature, we are able to infer that it was once in a ftate of non-exiftence. It would be impoffible for us, however, to enter into the multiplicity of

arguments ufed on both fides; nor can we pretend to fettle it, as the fubject is confeffedly above human comprehenfion.

As to the works of creation which the Deity is known to us to have performed; all other beings, befide himfelf, are his creatures. Men and other animals that inhabit the earth and feas, all the immenfe varieties of herbs and plants of which the vegetable kingdom confifts; the globe of the earth, and the expanfe of the ocean; thefe we know to have been produced by his power. Befides the terreftrial world which we inhabit, we fee many other material bodies difpofed around it in the wide extent of fpace. Concerning the periods of time at which the Deity executed his feveral works of creation, it cannot be pretended that mankind have had opportunities of receiving very particular information. From viewing the phenomena of nature, and confidering the general laws by which they are regulated, we cannot draw any conclufive or even plaufible inference with refpect to the precife period at which the univerfe muft have begun to exift. We know not, nor can we hope to afcertain, whether the different fyftems of planets circulating round our fun and the fixed ftars, were all created at one period, or each at a different period. We cannot even determine, from any thing that appears on the face of nature, whether our earth was not created at a later period than any of her fellow planets which revolve round the fame fun. Aftronomers are, from time to time, making new difcoveries in the heavens; and it is impoffible to fay whether fome of thefe fucceffive difcoveries may not be owing to fucceffive creations.

Philofophers have, indeed, formed fome curious conjectures concerning the antiquity of the earth, from the appearances of its furface, and from the nature and difpofition of its interior ftrata. The beds of lava in the neighbourhood of volcanoes have afforded ground for fome calculations, which, though they do not fix the period of the earth's origin, are yet thought to prove that period to have been much more remote than the earlieft age of facred or profane hiftory. From the former we are naturally led to expect fome accurate and credible information concerning the antiquity of the globe. As the authenticity of the Holy Scriptures is fo incontrovertibly eftablifhed, wherever they afford evidence concerning any fact, that evidence muft be regarded as decifive. A fact fo important as the prefent may be thought highly worthy of a place in them. Unfortunately, however, even the facred writings do not fix the era of the creation with fufficient accuracy; they leave us, in fome meafure, at a lofs whether to extend what they fay concerning that era to the whole contents of created fpace, or to confine it to our earth and its inhabitants: different copies give different dates; and even in the fame copy, different parts relating the fame events, either difagree or do not fpeak decifively with regard to the length of the time in which they paffed.

CREBILLON (Profper Joliot de), a French writer of tragedy, and ufually ranked near Corneille and Racine, was born at Dijon in 1674. He was orignally deftined to the profeffion of the law, and placed at Paris with that view; but the impetuofity of his paffions rendering him unfit for bufinefs, he was urged by fome friends, who difcerned very well his natural turn, to attempt dramatic compofitions. He complied, but not till after many refufals; and gave at length a tragedy, which met with great fuccefs. He then marched on in the career he had begun, but was checked by a fit of love for an apothecary's daughter; which fit of love ended in marriage. His father, doubly enraged at his fon for thus furrendering himfelf to the two demons of Love and Poetry, difinherited him; but falling fick fome years after, in 1707, he re-eftablifhed him in all his rights, and died. Crebillon was, however, little better for his acquifitions, the greater part being probably wafted before they came; and thus, though high in fame and at the prime of life, he ftill continued poor. He loft his wife in 1711, and fortune long frowned upon him, till at laft he obtained a place in the French academy, and the employment of cenfor of the police. He was afterwards in good circumftances, and happy to the end of his life, which was a very long one; for he did not die till 1762, aged 88. He was much regretted and lamented, as old as he was; being a very worthy man, and of many and great virtues. He was of a temperament extremely robuft, without which he could not have held out fo long; for he ate prodigioufly, and continued to the laft fo to do. He flept little, and lay as hard as if upon the floor; not from any pious principle of mortifying, but becaufe he liked it. He was always furrounded with about 30 dogs and cats; and ufed to fmoke a good deal of tobacco, to keep his room fweet againft their exhalations. Whenever he was ill, he ufed to manage himfelf according to his own fancy and feelings; for he always made a jeft of phyfic and phyficians. He was a dealer in *bons mots*. Being afked one day in full company, which of his works he thought the beft? "I don't know (fays he) which is my beft production; but this (pointing to his fon) is certainly my worft."

CRECY, Crescy, or Cressy. See Cressy.

CREDENTIALS, letters of recommendation and power, efpecially fuch as are given to ambaffadors or public minifters, by the prince or ftate that fends them to foreign courts.

CREDIBILITY, a fpecies of evidence, lefs indeed than abfolute certainty or demonftration, but greater than mere poffibility: it is nearly allied to probability, and feems to be a mean between poffibility and demonftration.

CREDIT, in commerce, a mutual truft or loan of merchandife or money, on the reputation of the probity and folvibility of a dealer. Credit is either public or private. Every trader ought to have fome eftate, ftock, or portion of his own, fufficient to carry on the traffic he is engaged in: they fhould alfo keep their dealings within the extent of their capital, fo that no difappointment in their returns may incapacitate them from fupporting their credit. Yet traders of worth and judgment may fometimes lie under the neceffity of borrowing money for carrying on their bufinefs to the beft advantage; but then the borrower ought to be fo juft to his own reputation and to his creditors, as to be well affured that he has fufficient effects within his power to pay off his obligations in due time. But if a trader fhould borrow money to the extent of his credit, and launch out into trade fo as to employ it with the fame freedom as if it was his own proper ftock, fuch a way of management is very precarious, and may be attended with dangerous confequences. Merchants ought never to purchafe their goods for exportation upon long credit, with intent to difcharge the debt by the return of the fame goods; for this has an injurious influence on trade feveral ways: and if any merchant has occafion to make ufe of his credit, it fhould always be for the borrowing of money, but never for the buying of goods; nor is the large credit given to wholefale traders a prudential or juftifiable practice in trade. The public credit of a nation is faid to run high when the commodities of that nation find a ready vent, are fold at a good price, and when dealers may be fafely trufted with them: alfo when lands and houfes find ready purchafers; when money is to be borrowed at a low intereft; when the price of ftock is high; when people think it fafe and advantageous to venture large fums in trade; and when notes, mortgages, &c. will pafs for money.

Letters of Credit, are thofe given to perfons in whom a merchant, &c. can truft, to take money of his correfpondent abroad, in cafe he happens to need it.

Credit is alfo ufed for the currency which papers or bills have with the public or among dealers. In this fenfe credit is faid to rife, when, in negotiating the fhares of the company, they are received and fold at prices above *par*, or the ftandard of their firft creation. Difcredit is oppofed to credit, and is ufed where money, bills, &c. fall below *par*.

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Credit was also anciently a right which lords had over their vassals; consisting in this, that during a certain time they might oblige them to lend them money. In this sense, the Duke of Brittany had credit during fifteen days on his own subjects, and those of the bishop of Nantes; and the bishop had the same credit or right among his subjects and those of that prince.

CREDITON, a large town in Devonshire, with a market on Saturday. It is seated between two hills. The church is a handsome structure, built in the form of a cathedral, to which belongs a free-school. The town was almost destroyed by fire in 1743. It has a considerable manufactory of serges, and is 12 miles N. W. of Exeter, and 181 W. by N. of London. W. lon. 3. 45. N. lat. 50. 49.

CREDITOR, a person to whom any sum of money is due, either by obligation, promise, or otherwise. See Debt.

CREECH (Thomas), eminent for his translations of ancient authors both in prose and verse, was son of Thomas Creech, and born near Sherborne in Dorsetshire in 1659. He was educated in grammar learning under Mr. Curganven of Sherborne, to whom he afterwards dedicated a translation of one of Theocritus's Idylliums; and entered a commoner of Wadham college in Oxford in 1675. Wood tells us that his father was a gentleman; but Giles Jacobs says, in his Lives and characters of English poets, that his parents' circumstances not being sufficient to afford him a liberal education, his disposition and capacity for learning raised him up a patron in Colonel Strangeways, whose generosity supplied that defect. Be that as it will, Creech distinguished himself much, and was accounted a good philosopher and poet, and a diligent student. The author of the *Nouvelles de la Republique des Lettres* informs us, that in the year 1700 Mr. Creech fell in love with a woman who treated him with great neglect, though she was complaisant enough to several others. This affront he could not bear, and resolved not to survive it. Whereupon he shut himself up in his study, where he hanged himself about the end of June 1700, and was found in that situation three days after. The Poetical Register says nothing of the particular manner of his death, but only that he unfortunately made away with himself in the year 1701; and ascribes this fatal catastrophe of Mr. Creech's life to the morosenefs of his temper, which made him less esteemed than his great merit deserved, and engaged him in frequent animosities and disputes upon that account. But from an original letter of Arthur Charlett, preserved in the Bodleian library, it has lately been discovered, that this unhappy event was owing to a very different cause. There was a fellow collegian of whom Creech frequently borrowed money; but repeating his applications too often, he met one day with such a cold reception, that he retired in a fit of gloomy disgust, and in three days was found hanging in his study. Creech's principal performances are, 1. A translation of Lucretius. 2. A translation of Horace; in which, however, he has omitted some few odes. 3. The Idylliums of Theocritus, with Rapin's Discourse of Pastorals. 4. A translation of Manilius's Astronomicon; besides translations of several parts of Virgil, Ovid, and Plutarch; printed in different collections.

CREED, a brief summary of the articles of a Christian's belief. The most ancient form of creeds is that which goes under the name of the apostolic creed: besides this, there are several other ancient forms and scattered remains of creeds to be met with in the primitive records of the church. The first is the form of apostolical doctrine, collected by Origen; the second is a fragment of a creed preserved by Tertullian; the third remains of a creed is in the works of Cyprian; the fourth, a creed composed by Gregory Thaumaturgus, for the use of his own church; the fifth, the creed of Lucian the martyr; the sixth, the creed of the apostolical constitutions. Besides these scattered remains of the ancient creeds, there are extant some perfect forms, as those of Jerusalem, Cesarea, Antioch, &c. The most universal creeds are, the Apostolical, the Athanasian, and the Nicene creeds. See those articles. These three creeds are used in the public offices of the church of England; and subscription to them is required of all the established clergy. Subscription to these was also required of the dissenting teachers, by the toleration act; but from which they are now relieved by 19 Geo. III.

CREEK, a part of a haven, where any thing is landed from the sea. So many landing places as there are in a harbour or port, so many creeks there are. It is also said to be a shore or bank whereon the water beats, running in a small channel from any part of the sea; from the Latin *crepido*. This word is used in the stat. 4 Hen. IV. c. 20. and 5 Eliz. c. 5.

CREENGLES. See Cringle.

CREEPER, in ornithology. See Certhia.

Creeper, in naval affairs, an instrument of iron resembling a grappling, having a *shank*, and four hooks or claws. It is used to throw into the bottom of any river or harbour, with a rope fastened to it, to hook and draw up any thing from the bottom which may have been lost. See Plate 87.

CRELLIUS (John), a famous Socinian, born in 1590, in a village near Noremberg. In 1612 he went into Poland, where the Unitarians had a school, in which he became professor of divinity, and minister at Crackow, where he died in 1632, aged 42. He was the author of, 1. A famous Treatise against the Mystery of the Trinity; 2. Commentaries on a part of the New Testament; and other works. All of them are scarce.

CREMA, a city and bishop's see in Italy, capital of a district of the Milanese, called from it *Cremasco*: it stands almost in the middle between Milan and Mantua, in E. long. 10. 15. and N. lat. 45. 20.

CREMASTER, in anatomy, the name of a muscle of the testicle, of which there is one on each side. See Anatomy, *Table of the Muscles.*

CREMATION is sometimes used for burning, particularly when applied to the ancient custom of burning the dead. This custom is well known to have prevailed among most eastern nations, and continued with their descendants after they had peopled the different parts of Europe. Hence we find it prevailing in Greece, Italy, Gaul, Britain, Germany, Sweden, Norway, and Denmark, till Christianity abolished it.

CRENATE, in botany. See Botany, Plate 54, and the explanation, p. 48.

CRENELLE, or Imbattled, in heraldry, is used when any honourable ordinary is drawn, like the battlements on a wall to defend men from the enemies' shot. This attribute belongs to the arms of such as have defended castles for their prince or country, or of such as are skilled in architecture.

CRENOPHYLAX, in antiquity, a magistrate of Athens, who had the inspection of fountains.

CREODIBA, in the customs of the middle age, a robbery and murder committed in a wood, where the body of the person killed was burnt in order to prevent any discovery of the crime. The word, says Wendelinus, is compounded of *cruy* and *diven*, that is, "wood-robbers."

CREOLES, a name given to the families descended from the Spaniards who first settled at Mexico in America. These are much more numerous than the Spaniards properly so called, or the Mulattoes, which two other species of inhabitants they distinguish: they are excluded from all considerable employments.

CREPANCE, in the manege, a chop or scratch in a horse's leg, given by the sponges of the shoes of one of the hinder feet crossing and striking against the other hinder foot. This scratch very often degenerates into an ulcer. It is generally caused by bad shoeing.

CREPIDÆ, among the Romans, a kind of slippers or shoes,

which were always worn with the *pallium*, as the *calcei* were with the *toga*.

CREPIS, HAWK-WEED; a genus of the polygamia superflua order, belonging to the fyngenefia clafs of plants; and in the natural method ranking under the 49th order, *Compofitæ*. The receptacle is naked; the calyx calyculated with deciduous fcales; the pappus feathery and ftalked. There are 14 fpecies, moft of them herbaceous annuals, rifing to the height of a foot or a foot and a half; and having their branches terminated by ligulated compound red and yellow flowers. Thefe are very large, and confift of many flat florets fpread over one another imbricatim, and when fully blown appear as if radiated. They are very confpicuous and beautiful: and appear in June, July, and Auguft. They are fucceeded by plenty of feed, which, if permitted to fcatter on the ground, will produce a number of young plants without further trouble.

CREPITATION, that noife which fome falts make over the fire in calcination, called alfo *detonation*.

CREPITATION is alfo ufed in furgery, for the noife made by the ends or pieces of bones, when the furgeon moves a limb to affure himfelf by his ear of the exiftence of a fracture.

CREPONDIA, in antiquity, a term ufed to exprefs fuch things as were expofed along with children, as rings, jewels, &c. ferving as tokens whereby they afterwards might be known.

CREPUSCULUM, in aftronomy, twilight; the time from the firft dawn or appearance of the morning to the rifing fun; and again, between the fetting of the fun and the laft remains of day. Papias derives the word from *creperus*: which, he fays, anciently fignified *uncertain, doubtful*, q. d. *a dubious light*. The crepufculum is ufually computed to begin and end when the fun is about 18 degrees below the horizon; for then the ftars of the fixth magnitude difappear in the morning, and appear in the evening. It is of longer duration in the folftices than in the equinoxes, and longer in an oblique than in a right fphere. The crepufcula are occafioned by the fun's rays refracted in our atmofphere, and reflected from the particles thereof to the eye. See TWILIGHT.

CRESCENT, the new moon, which, as it begins to recede from the fun, fhows a little rim of light, terminating in points or horns, which are ftill increafing till it become full and round in the oppofition. The word is formed from *crefco*, "I grow." The term is alfo ufed for the fame figure of the moon in its wane or decreafe, but improperly; becaufe the points or horns are then turned towards the weft, whereas they look to the eaft in the juft crefcent.

CRESCENT, in heraldry, is a bearing in form of a half moon. The Ottomans bear finople, a crefcent, montant, argent. The crefcent is frequently ufed as a difference in coat armour, to diftinguifh it for that of a fecond brother or junior family. The figure of the crefcent is the Turkifh fymbol; or rather is that of the city Byzantium, which bore this device from all antiquity; as appears from medals ftruck in honour of Auguftus, Trajan, &c. The crefcent is fometimes montant, i. e. its points look towards the top of the chief, which is its moft ordinary reprefentation; whence fome contend, that the crefcent, abfolutely fo called, implies that fituation; though other authors blazon it montant, when the horns are towards the dexter fide of the efcutcheon, in which pofition others call it *incroiffant*. Crefcents are faid to be *adoffed*, when their backs or thickeft parts are turned towards each other; their points looking to the fides of the fhield. *Crefcent inverted*, is that whofe points look towards the bottom; *turned crefcents*, are placed like thofe adoffed; the difference is, that all their points look to the dexter-fide of the fhield: *conturned crefcents*, on the contrary, look to the finifter fide: *affronted* or *appointed crefcents*, are contrary to the adoffed, the points looking towards each other.

CRESCENT is alfo the name of a military order, inftituted by Renatus of Anjou, king of Sicily, &c. in 1448; fo called from the badge or fymbol thereof, a crefcent of gold enamelled. What gave occafion to this eftablifhment was, that Renatus took for his device a crefcent, with the word *loz*, "praife," which, in the ftyle of rebus, makes *loz in crefcent*, q. d. *by advancing in virtue, one merits praife*.

CRESCENTIA, the CALABASH TREE; a genus of the angiofpermia order, belonging to the didynamia clafs of plants; and in the natural method ranking under the 25th order, *Putamineæ*. The calyx is bipartite and equal; the corolla gibbous; the berry pedicellated or ftalked, unilocular, and polyfpermous; the feeds bilocular.

There are two fpecies: 1. The *cujete*, with oblong narrow leaves and a large oval fruit, is a native of Jamaica and the Leeward Iflands. It hath a thick trunk covered with a whitifh bark, which rifes from 20 to 30 feet high, and at the top divides into many branches, forming a large and regular head, garnifhed with leaves, which come out irregularly, fometimes fingle: at other times many arife out of the fame knot: the flowers are produced from the fides of the large branches, and fometimes from the trunk, ftanding upon long footftalks. They have but one petal, which is irregular; and they are of a greenifh yellow colour, ftriped and fpotted with brown. Thefe are fucceeded by very large fruit, generally fpherical, fometimes oval; and at other times they have a contracted neck like a bottle; and are fo large, that when the pulp and feeds are cleaned out, the fhells will contain three pints or two quarts of liquid. The fruit is covered externally with a thin fkin, of a greenifh-yellow colour when ripe. When this is peeled off, there appears a hard ligneous fhell, inclofing a pale yellowifh foft pulp of a tart unfavoury flavour, furrounding a great number of flat heart-fhaped feeds. 2. The *latifolia*, or broad-leaved calabafh, feldom rifes more than 15 or 20 feet high, with an upright trunk, covered with a white fmooth bark, fending out many lateral branches at the top, garnifhed with leaves three inches in length, and one and a quarter broad, ranged alternately. The flowers come out as in the former fpecies; but are fmaller, and of a deeper yellow colour. The fruit of this fort is fometimes round, fometimes oval, but of very unequal fizes. Both thefe fpecies are eafily propagated by feeds; but the plants are too tender to live in this country, unlefs they are conftantly kept in a ftove.

The fhells of calabafhes are made ufe of for various purpofes. At Barbadoes, befides drinking-cups and punch-bowls, there are made of them fpoons, difhes, and other utenfils for the flaves. Some of thefe fhells are fo large, as to be capable of holding 15 pints of water. The pulp is feldom eaten, except by cattle in the time of drought. The wood, which is hard and fmooth, is made into ftools, chairs, and other furniture.

CRESCIMBENI (John Maria), an Italian, was born at Macerata in Ancona, 1663. His talents for poetry and eloquence developed themfelves early. His verfes at firft had too much pomp and point; but refiding in Rome, and reading the beft Italian poets, brought him back to nature. He not only reformed himfelf, but undertook to reform bad tafte in general. From this motive he projected the eftablifhment of a new academy, under the name of *Arcadia*; the members of which did not at firft exceed 14, but afterwards increafed much. They called themfelves the fhepherds of Arcadia, and each took the name of fome fhepherd and fome place in that ancient kingdom. The founder of this fociety was appointed the director of it in 1690, and held this honourable poft 38 years; namely, to the year of his death, which happened in 1728. Among a great number of works, in verfe and profe, the principal is, An Hiftory of the Italian Poetry, very much efteemed, and reprinted, 1731, at Venice, in fix volumes 4to. This hiftory is accompanied with a commentary, containing anecdotes of

Italian poets. He publiſhed alſo, An Hiſtory of the Academy of Arcadia, together with the Lives of the moſt illuſtrious Arcadians, and many other works.

CRESCY, or CRESSY. See CRESSY.

CRESS, WATER-CRESS, or CRESSES, in botany. See SISYMBRIUM.

Indian CRESS. See TROPÆOLUM.

CRESSY, a village of France, in the department of the Straits of Calais and late province of Picardy; remarkable for the great victory over the French, gained there by Edward III. in 1346. It is 32 miles S. by E. of Calais.

CREST, in armoury, denotes the uppermoſt part of an armoury; or that part riſing over the caſque or helmet. Next to the mantle, ſays Guillim, the creſt or cognizance claims the higheſt place, being ſeated on the moſt eminent part of the helmet; yet ſo as to admit an interpoſition of ſome eſcrol, wreath, chapeau, crown, &c. The ancient warriors wore creſts to ſtrike terror into their enemies, as the ſight of the ſpoils of animals they had killed; or to give them the more formidable mien, by making them appear taller, &c. In the ancient tournaments, the cavaliers had plumes of feathers, eſpecially thoſe of oſtriches and herons, for their creſts; theſe tufts they called *plumarts*; and were placed in tubes, on the tops of high caps or bonnets. Some had their creſts of leather; others of parchment, paſteboard, &c. painted or varniſhed, to keep out the weather; others of ſteel, wood, &c. on which was ſometimes repreſented a member or ordinary of the coat; as, an eagle, fleur-de-lys, &c. but never any of thoſe called *honourable ordinaries*, as pale, feſſe, &c. The creſts were changeable at pleaſure; being reputed no other than as an arbitrary device or ornament. Herodotus attributes the riſe of creſts to the Carians, who firſt bore feathers on their caſques, and painted figures on their bucklers; whence the Perſians called them *cocks*. The creſt is eſteemed a greater mark of nobility than the armoury, as being borne at tournaments; to which none were admitted till they had given proof of their nobility. Sometimes it ſerves to diſtinguiſh the ſeveral branches of a family. It has alſo ſerved, on occaſion, as the diſtinguiſhing badge of factions. Sometimes the creſt is taken from the device; but more uſually it is formed of ſome piece of the arms: thus, the emperor's creſt is an eagle; that of Caſtile, a caſtle, &c. Families that exchange names, as the houſes of Brunſwick and Cologne have done, do not change their creſts; the firſt ſtill retain the horſe, and the latter the mermaid.

CREST, in heraldry, the figure placed above the helmet in an achievement. See HERALDRY.

CREST, a town of France, in the department of Drome and late province of Dauphiny, ſeated on the river Drome, 15 miles S. E. of Valence. E. long. 5. 26. N. lat. 44. 40.

CREST-*fallen*, a fault of an horſe, when the upper part of his neck, called the *creſt*, hangs to one ſide: this they cure by placing it upright, clipping away the ſpare ſkin, and applying ligatures or plaſters to keep it in a proper poſition.

CRETA, or CHALK, in natural hiſtory. See CHALK.

CRETE, one of the largeſt iſlands in the Mediterranean, lying between 22 and 27 degrees of eaſt longitude, and between 35 and 36 degrees of north latitude. According to Strabo, this iſland is 287 miles in length; according to Pliny, 270; and according to Scylax, 312. As to its breadth, it is not, as Pliny obſerves, above 55 miles where wideſt; whence it was ſtyled, as Stephanus obſerves, the *Long Iſland*. It has the Archipelago to the north, the African ſea to the ſouth, the Carpathian ſea to the eaſt, and the Ionian to the weſt. Anciently it was known by the names of *Aeria*, *Cithonia*, *Idæa*, *Curete*, *Macaris*, &c. but its moſt common name was that of *Crete*.

Nations are effaced from the earth like the monuments of their power, and after the revolution of ſeveral ages we can ſcarce trace in their poſterity any remains of their ancient character. Some of them exiſt longer, others ſhorter; but we may almoſt always calculate the period of their duration by the excellence of their laws, and the fidelity with which they ſupport and obey them. The republic of Crete, being eſtabliſhed on a ſolid baſis, knew no foreign maſter for a period of ten centuries. She bravely repelled the attacks of thoſe princes who attempted to enſlave her. At length the time arrived when the warlike and victorious Romans aſpired to the empire of the world, and would ſuffer none but their ſubjects or ſlaves to inhabit within the reach of their arms. Florus does not ſcruple to acknowledge, that the Romans had no other motives for invading Crete but the ambitious deſire of ſubduing the renowned native country of Jupiter.

The iſland of Crete is famous in the Greek annals for its heroes and important events. Joined with the ſmall kingdom of Cyrene, on the Libyan coaſt, it formed a Roman province, at firſt governed by a proconſul. A queſtor and an aſſiſtant were afterwards ſent there; at laſt, as Suetonius informs us, it was put under the government of a conſul. This iſland was one of the firſt places in the world that were favoured with the light of the goſpel. St. Paul introduced the Chriſtian faith into Crete; and his diſciple Titus, whom he left there to cheriſh and cultivate that precious plant, became the firſt biſhop of the iſland. In the reign of the emperor Leo, it had twelve biſhops, who were all ſubject to the patriarch of Conſtantinople.

This iſland remained under the dominion of the Romans till the time when Baldwin Count of Flanders, being raiſed to the throne, liberally rewarded the ſervices of Boniface Marquis of Montferrat, by making him king of Theſſalonica, and adding the iſland of Crete to his kingdom. That lord, being more covetous of gold than glory, ſold it to the Venetians in the year 1194; under whom it aſſumed the name of CANDIA. See that article.

CRETIO, in antiquity, a certain number of days allowed the heir to conſider whether he would act as heir to the deceaſed or not; after which time, if he did not act, he was excluded from the eſtate.

CREUX, a term in ſculpture, much uſed by the French; though not yet, that we know of, naturalized among us: but the want of a word of equal import in Engliſh, as it has frequently put us under a neceſſity of uſing this in the courſe of the preſent work; ſo it pleads ſtrongly for its admiſſion into our language. Creux originally ſignifies a *hollow*, *cavity*, or *pit*, out of which ſomething has been ſcooped or dug: hence it is uſed to denote that kind of ſculpture and graving where the lines and figures are cut and formed within the face or plane of the plate or matter engraven on. In this ſenſe it ſtands oppoſed to relievo; where the lines and figures are emboſſed, and appear prominent above the face of the plate.

CREW, the company of ſailors belonging to a ſhip, boat, or other veſſel. The ſailors that are to work and manage a ſhip are regulated by the number of laſts it may carry; each laſt making two ton. The crew of a Dutch ſhip, from 40 to 50 laſts, is ſeven ſailors and a ſwabber; from 50 to 60 laſts, the crew conſiſts of eight men and a ſwabber; and thus increaſes at the rate of one man for every ten laſts; ſo that a ſhip of 100 laſts has 12 men, &c. Engliſh and French crews are uſually ſtronger than Dutch; but always in about the ſame proportion. In a ſhip of war there are ſeveral particular crews, or gangs, as the boatſwain's crew, the carpenter's crew, the gunner's crew, &c.

CREVIER (JOHN BAPTIST LEWIS), a Pariſian, was trained under the celebrated Rollin, and afterwards became profeſſor of rhetoric. Upon the death of his maſter, in 1741, he took upon him to finiſh his Roman Hiſtory. He publiſhed other works,

and was greatly ferviceable to the caufe of virtue and religion as well as letters. His death happened, 1765, in a very advanced age. Befides the continuation juft mentioned, he publifhed, 1. An edition of *Livius, cum Notis*, in 6 vols. 4to, 1748; and afterwards another edition, better adapted to the ufe of his pupils, in 6 vols. fmall 8vo. 2. *La Hiftoire des Empereurs des Romains jufqu'à Conftantin*, 1749, 12 tom. 12mo. 3. *Hiftoire de l'Univerfité de Paris*, 7 tom. 12mo. 4. *Rhetorique Françoife*, a juft and ufeful work. 5. *Obfervations fur l'Efprit des Loix.* Here he ventured out of his depth; he fhould have kept within the precinct of the *belles lettres*.

CREUSA, in fabulous hiftory, daughter of Creon king of Corinth. As fhe was going to marry Jafon, who had divorced Medea, fhe put on a poifoned garment, which immediately fet her body on fire, and fhe expired in the moft excruciating torments. She had received this gown as a gift from Medea, who wifhed to take that revenge upon the infidelity of Jafon. Some call her *Clauce*, and ftate that fhe married Æneas, by whom fhe had, among other children, Afcanius.

CREA, in ornithology, a fpecies of Rallus.

CRIB, the rack or manger of a ftable, or the ftall or cabbin of an ox. It is alfo ufed for any fmall habitation, as a cottage, &c.

Crib, in the Englifh falt-works, a name given to a fort of cafe ufed in fome places inftead of the *drab*, to put the falt into as it is taken out of the boiling pan.

CRIBBAGE, a well known game at cards, which can be learnt only by practice.

CRIBRATION, in pharmacy, the paffing any fubftance through a fieve or fearce, in order to feparate the finer particles from the groffer.

Cribrosum os, in anatomy, called alfo *os ethmoides*. See Anatomy, p. 163.

CRICELASIA, the driving a ring or hoop. Driving a hoop was one of the ancient gymnaftics: this hoop was as high as the breaft of the perfon who ufed it. It was commended for rendering the limbs pliable, and for ftrengthening the nerves.

CRICETUS, in zoology. See Mus.

CRICK, among farriers, is when a horfe cannot turn his neck any manner of way, but holds it fore right, infomuch that he cannot take his meat from the ground without great pain. The fame complaint in the human fubject is known by the name of *crick*.

CRICKET, in zoology. See Gryllus.

Cricket is alfo the name of an exercife or game, with bats and a ball.

Mole-Cricket. See Gryllotalpa.

CRICKLADE, a borough of Wilts, with a market on Saturday. It is feated on the Thames, which almoft furrounds it. It is 25 miles S. W. of Oxford, and 83 W. of London. W lon. 1. 50. N. lat. 51. 49.

CRICOARYTANOIDÆUS, in anatomy, a name given to two mufcles of the larynx. See Anatomy, *Table of the mufcles*.

CRICOIDES, in anatomy, a cartilage of the larynx, called alfo the *annular cartilage*. It occupies the loweft part by way of bafe to the reft of the cartilages, and to the lower part of it the afpera arteria adheres. See Anatomy, *Table of the mufcles*.

CRICOTHYROIDÆUS, in anatomy, one of the five proper mufcles of the larynx. *Ibid.*

CRIM-TARTARS, a people of Afia, fo called becaufe they originally came from Crimea. They rove from place to place in fearch of paftures, their houfes being drawn on carts. There are a great number of them about Aftracan, to which place they flock in the winter-time; but they are not permitted to enter the city: for this reafon, they erect huts up and down in the open fields; which are made either of bull-rufhes or reeds, being about 12 feet in diameter, of a round form, and with a hole at the top to let out the fmoke. Their fuel is turf or cow-dung; and, when the weather is very cold, they cover the hut with a coarfe cloth, and fometimes pafs feveral days without ftirring out. They are generally of fmall ftature, with large faces, little eyes, and of an olive complexion. The men are generally fo wrinkled in their faces, that they look like old women. Their common food is fifh dried in the fun, which ferves them inftead of bread; and they eat the flefh of horfes as well as camels. Their drink is water and milk, efpecially mares milk, which they carry about in nafty leathern bags. Their garments are of coarfe grey cloth, with a loofe mantle made of a black fheep's fkin, and a cap of the fame. The women are clothed in white linen, with which likewife they drefs their heads, hanging a great many Mufcovian pence about them; and there is likewife a hole left to ftick feathers in. As for their religion, they are a fort of Mahometans; but do not coop up their women like the Turks.

Crim-Tartary, or *Crimea*. See Crimea.

CRIME, a breach or tranfgreffion of a law, or an action contrary to the purport of a law, either natural or divine, civil or ecclefiaftic; to which a penalty is annexed. The term *crime* includes in it the idea of determination and *defign* formed to do an injury. It is derived from the Latin *crimen*, of κρινω, *judico, I judge*.

The Romans diftinguifhed two kinds of *crimes*; viz. *private*, which only affected particular perfons; the profecution whereof was not allowed by the law to any but thofe interefted therein; as *adultery*, &c. and *public crimes*; the profecution whereof was fubmitted to all perfons, though in no-wife immediately interefted. With us, *crimes* are diftinguifhed into *capital*; as *treafon, murder, robberies*, &c. and *common*, as *perjuries*, &c. They are again divided into crimes cognizable by the king's judges; as thofe above mentioned: and fuch as are only cognizable in the fpiritual courts, as fimple *fornication*, &c.

The cognizance and admeafurement of *crimes and punifhments* form in every country the code of criminal law; or, as it is more ufually denominated in England, the doctrine of the *pleas of the crown*: fo called, becaufe the king, in whom centres the majefty of the whole community, is fuppofed by the law to be the perfon injured by every infraction of the public rights belonging to that community; and is therefore in all cafes the proper profecutor for every public offence.

The knowledge of this branch of jurifprudence, which teaches the nature, extent, and degrees of every crime, and adjufts to it its adequate and neceffary penalty, is of the utmoft importance to every individual in the ftate. For no rank or elevation in life, no uprightnefs of heart, no prudence or circumfpection of conduct, fhould tempt a man to conclude, that he may not at fome time or other be deeply interefted in thefe refearches. The infirmities of the beft among us, the vices and ungovernable paffions of others, the inftability of all human affairs, and the numberlefs unforefeen events which the compafs of a day may bring forth, will teach us (upon a moment's reflection), that to know with precifion what the laws of our country have forbidden, and the deplorable confequences to which a wilful difobedience may expofe us, is a matter of univerfal concern.

In proportion to the importance of the criminal law, ought alfo to be the care and attention of the legiflator in properly forming and enforcing it. It fhould be founded upon principles that are permanent, uniform, and univerfal; and always conformable to the dictates of truth and juftice, the feelings of humanity, and the indelible rights of mankind: though it fometimes (provided there be no tranfgreffion of thefe eternal boundaries) may be modified, narrowed, or enlarged, according to the local or occafional neceffities of the ftate which it is meant to govern. And yet, either from a want of attention to thefe

principles in the firſt connection of the laws, and adopting in their ſtead the impetuous dictates of avarice, ambition, and revenge; from retaining the diſcordant political regulations, which ſucceſſive conquerors or factions have eſtabliſhed, in the various revolutions of government; from giving a laſting efficacy to ſanctions that were intended to be temporary, and made (as lord Bacon expreſſes it) merely upon the ſpur of the occaſion; or from, laſtly, too haſtily employing ſuch means as are greatly diſproportionate to their end, in order to check the progreſs of ſome very prevalent offence: from ſome, or from all, of theſe cauſes it hath happened, that the criminal law is in every country of Europe more rude and imperfect than the civil. We ſhall not here enter into any minute enquiries concerning the local conſtitutions of other nations; the inhumanity and miſtaken policy of which have been ſufficiently pointed out by Monteſquieu, Beccaria, and other ingenious writers of their own. But even with us in Britain, where our crown-law is with juſtice ſuppoſed to be more nearly advanced to perfection; where crimes are more accurately defined, and penalties leſs uncertain and arbitrary; where all our accuſations are public, and our trials in the face of the world; where torture is unknown, and every delinquent is judged by thoſe of his equals, againſt whom he can form no exception, nor even a perſonal diſlike;—even here we ſhall occaſionally find room to remark ſome particulars that ſeem to want reviſion and amendment.

Although in various inſtances we may glory in the wiſdom of our laws, we ſhall find it ſomewhat difficult to juſtify the frequency of capital puniſhment inflicted (perhaps inconſiderately) by the multitude of ſucceſſive independent ſtatutes, upon crimes very different in their natures. It is a melancholy truth, that among the variety of actions which men are daily liable to commit, not leſs than 160 have been declared by act of parliament to be felonies without benefit of clergy; or, in other words, to be worthy of inſtant death. So dreadful a liſt, inſtead of diminiſhing, increaſes the number of offenders. The injured, through compaſſion, will often forbear to proſecute; juries, through compaſſion, will ſometimes forget their oaths, and either acquit the guilty or mitigate the nature of the offence; and judges, through compaſſion, will reſpite one half of the convicts, and recommend them to the royal mercy. Among ſo many chances of eſcaping, the needy and hardened offender overlooks the multitude that ſuffer: he boldly engages in ſome deſperate attempt to relieve his wants or ſupply his vices; and if, unexpectedly, the hand of juſtice overtakes him, he deems himſelf peculiarly unfortunate in falling at laſt a ſacrifice to thoſe laws which long impunity has taught him to contemn.

As to the trials and mode of puniſhment, ſee ARRAIGNMENT; TRIAL, and the references therefrom; CONVICTION; JUDGMENT; ATTAINDER; CORRUPTION *of Blood*; FORFEITURE; EXECUTION; the ſeveral *Crimes* under their reſpective names; and the article LAW.

CRIMEA, or CRIM-TARTARY, the ancient Taurica Cherſoneſus, a peninſula in Aſia, bounded on the S. and W. by the Black Sea; on the N. by the province of Catharinenſlaf, with which it communicates by the iſthmus of Perekop; and on the S. by the ſea of Afoph and the ſtrait of Caffa. It was early diſtinguiſhed by its extraordinary fertility and commercial advantages. Long before the time of Herodotus, its S. coaſt was occupied by Greek ſettlers, who built ſeveral towns, which, however, are not thought to have been exactly on the ſite of the modern ones. Theſe Greeks became tributary to the Scythians, who were afterwards driven from the country by Mithridates, king of Pontus. On his defeat and death, it became tributary to the Romans. It was ſucceſſively ravaged by the Sarmatæ, the Alani, the Goths, (who made an eſtabliſhment in the mountains to the S.) the Huns, and the Khazari. Toward the end of the 11th century, the Genoeſe ſettled in this country; but they were expelled by the Tartars in 1474. (See CAFFA.) Theſe Tartars had been ſettled in the Crimea above two centuries before the expulſion of the Genoeſe. They were ſubjects of Batu Khan, grandſon of Zingis; and their conqueſt was annexed to the kingdom of Kaſan, till the death of Tamerlane in 1400, when Edegai Khan, an officer of that prince, took poſſeſſion of it, and was ſucceeded by Deulet Gherai, in whoſe family the ſovereignty continued till the preſent century. The khans, however, were vaſſals, or tributary to the Turks, till the year 1774, when their independence was ſtipulated in the treaty of Cainargi. In 1783 the Ruſſians took poſſeſſion of the country with an army; the following year, it was ceded to them by the Turks; and the peaceable poſſeſſion of the whole was ſecured to them in 1791, by the ceſſion of the fortreſs of Oczakow. The Crimea is divided into two parts, by mountains which run E. and W. The N. diviſion is flat, poor, and fit for paſturage only. In the S. parts, the valleys are aſtoniſhingly productive, and the climate extremely mild, from the excluſion of thoſe violent winds by which the N. diviſion is frequently incommoded. The lower hills, extending from Caffa to the E. extremity of the country, are principally uſed in gardening, and produce excellent fruit. It is ſaid that the Tartar inhabitants do not at preſent exceed 70,000. Many muſt have periſhed in their civil diſſenſions; ſome in the defence of their country againſt the Ruſſians; and many more muſt have emigrated, from that diſlike which is generally conceived againſt a new government. But, under all its preſent diſadvantages, the poſſeſſion of the Crimea ſeems to have decided for ever the conteſt for ſuperiority between the rival courts of St. Peterſburgh and Conſtantinople. Achmetſted was made the capital in 1785. Beſide the ports of Kerth and Jenikalé, the road of Caffa, and the harbour of Baluclava, there is, near Sebaſtapol, one of the fineſt harbours in the world, ſecured from all winds, ſufficiently capacious to admit large fleets, with a depth of water for ſhips of any burden. The Crimea now forms one of the two provinces of the government of Catharinenſlaf, under the name of Taurida. In ſome late maps it is called Taurica.

CRIMEN FALSI. See FALSI *Crimen*.

CRIMSON, one of the ſeven red colours of the dyers. See DYEING.

CRINGLE, a ſmall hole made in the bolt-rope of a ſail, by intertwiſting one of the diviſions of a rope, called a *ſtrand*, alternately round itſelf and through the *ſtrands* of the bolt-rope, till it becomes threefold, and aſſumes the ſhape of a wreath or ring. The uſe of the cringle is generally to contain the end of ſome rope, which is faſtened thereto for the purpoſe of drawing up the ſail to its yard, or of extending the ſkirts by the means of *bridles*, to ſtand upon a ſide-wind. The word ſeems to be derived from *krinckelen* (Belg.) "to run into twiſts."

CRINUM, ASPHODEL-LILY; a genus of the monogynia order, belonging to the hexandria claſs of plants; and in the natural method ranking under the 9th order, *Spathaceæ*. The corolla is funnel-ſhaped, monopetalous, and ſexpartite, with three alternate ſegments having hooked appendages; the germen is covered in the bottom of the corolla, the ſtamina ſtanding aſunder. They are very beautiful green-houſe plants, riſing two or three feet high, each of them crowned by a large umbellate cluſter of ſpathaceous, monopetalous, long funnel-ſhaped flowers, blue, white, or ſtriped, having a very fragrant ſmell. They are propagated by off-ſets.

CRISIS, in medicine, is uſed in different ſenſes, both by ancient and modern phyſicians. With ſome it means frequently no more than the excretion of any noxious ſubſtance from the body. Others take the word for a ſecretion of noxious humours ſuppoſed to take place in fevers. Others uſe it for the critical

motion itſelf; and Galen defines a criſis in fevers, a ſudden and inſtantaneous change, either for the better or the worſe, deciſive of recovery or death.

CRISPIN *and* CRISPIANUS, two legendary ſaints, whoſe feſtival, as marked in the kalendar, is on the 25th of October. According to the legend, they were brethren, born at Rome; from whence they travelled to Soiſſons in France, about the year 303, to propagate the Chriſtian religion; and becauſe they would not be chargeable to others for their maintenance, they exerciſed the trade of ſhoemakers; but the governor of the town diſcovering them to be Chriſtians, ordered them to be beheaded. From which time the ſhoemakers made choice of them for their tutelar ſaints.

CRISTÆ, in ſurgery, a term denoting certain excreſcences which grow about the anus and pudenda, particularly in venereal caſes.

CRISTA GALLI, in anatomy, an eminence in the middle of the *os ethmoides*, advancing within the cavity of the cranium; and to which is faſtened that part of the dura mater which divides the brain, called *falx*. It has its name from its figure, which reſembles that of a cock's comb. In adults, this proceſs appears of a piece with the *ſeptum narium*.

CRITERION, or CRITERIUM, a ſtandard by which propoſitions and opinions are compared, in order to diſcover their truth or falſehood.

CRITHE, in ſurgery, commonly called the *ſtye*, is a ſort of tubercle that grows on the eye-lids. When ſmall, it is ſeated on the edge of the eye-lid; but when large, it ſpreads further. When theſe do not ſuppurate, they remain in a thickened and indurated ſtate. If there is little inflammation, they may be diſperſed by cooling lotions: but if thoſe do not ſucceed, we ſhould endeavour to ſuppurate them with a white-bread poultice, and the uſe of a little camphorated oil applied with a camel's hair pencil.

CRITHMUM, SAMPHIRE; a genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The fruit is oval and compreſſed, the florets equal. There are two ſpecies, the principal of which is the maritimum, or common maritime ſamphire. It hath a fibrous penetrating root; thick, ſucculent, branchy ſtalks riſing two feet high; winged fleſhy leaves, conſiſting of many ſmall ſpear-ſhaped lobes; with round yellow flowers growing in umbels. It is produced naturally on the ſea-coaſts among the gravel and rocks. Its leaves are an excellent pickle uſed for ſauces, and are by many eaten raw in ſallads. It is of a ſaltiſh reliſh, palatable, and comfortable to the ſtomach. It is not very eaſily preſerved in gardens. It muſt be ſown on gravelly or rocky ground, half an inch deep; in which ſituation the plants will come up, and laſt ſome years. The leaves of this plant are ſaid alſo to be aperient and diuretic.

CRITHOMANCY, a kind of divination, performed by examining the dough or matter of the cakes offered in ſacrifice, and the meal ſtrewed over the victims to be killed. Hence, in regard they commonly uſed barley-meal in theſe ceremonies, this kind of divination was called *crithomancy*, from κριθη, *barley*, and μαντεια, *divination*.

CRITIAS, one of the 30 tyrants ſet over Athens by the Spartans. He was eloquent and well-bred, but of dangerous principles. He cruelly perſecuted his enemies and put them to death. He was killed about 400 years before the Auguſtan age, in a battle againſt thoſe citizens whom his oppreſſion had baniſhed. He had been among the diſciples of Socrates, and had written elegies and other compoſitions, of which ſome fragments remain.

CRITICAL DAYS and SYMPTOMS, among the old phyſicians, were certain days and ſymptoms in the courſe of acute diſeaſes, which were ſuppoſed to indicate the patient's ſtate, and determine him either to recover or grow worſe.

CRITICISM, the art of judging with propriety concerning any object or combination of objects. But, in a more limited ſenſe, the ſcience of criticiſm is confined to the fine arts. The principles of the fine arts are beſt unfolded by ſtudying the ſenſitive part of our nature, and by learning what objects are naturally agreeable and what are naturally diſagreeable. The man who aſpires to be a critic in theſe arts, muſt pierce ſtill deeper: he muſt clearly perceive what objects are lofty, what low, what are proper or improper, what are manly, and what are mean or trivial. Hence a foundation for judging of taſte, and for reaſoning upon it: where it is conformable to principles, we can pronounce with certainty that it is correct; otherwiſe, that it is incorrect, and perhaps whimſical. Thus the fine arts, like morals, become a rational ſcience; and, like morals, may be cultivated to a high degree of refinement.

Manifold are the advantages of criticiſm, when thus ſtudied as a rational ſcience. In the firſt place, a thorough acquaintance with the principles of the fine arts redoubles the entertainment theſe arts afford. To the man who reſigns himſelf entirely to ſentiment or feeling, without interpoſing any ſort of judgment, poetry, muſic, painting, are mere paſtime; in the prime of life, indeed, they are delightful, being ſupported by the force of novelty and the heat of imagination: but they loſe their reliſh gradually with their novelty; and are generally neglected in the maturity of life, which diſpoſes to more ſerious and more important occupations. To thoſe who deal in criticiſm as a regular ſcience, governed by juſt principles, and giving ſcope to judgment as well as to fancy, the fine arts are a favourite entertainment; and in old age maintain that reliſh which they produce in the morning of life.

In the next place, a philoſophical enquiry into the principles of the fine arts, inures the reflecting mind to the moſt enticing ſort of logic: the practice of reaſoning upon ſubjects ſo agreeable tends to a habit; and a habit ſtrengthening the reaſoning faculties, prepares the mind for entering into ſubjects more difficult and abſtract. To have, in this reſpect, a juſt conception of the importance of criticiſm, we need but reflect upon the common method of education; which, after ſome years ſpent in acquiring languages, hurries us, without the leaſt preparatory diſcipline, into the moſt profound philoſophy. A more effectual method to alienate the tender mind from abſtract ſcience, is beyond the reach of invention: and accordingly, with reſpect to ſuch ſpeculations, the bulk of our youth contract a ſort of hobgoblin terror, which is ſeldom, if ever, ſubdued. Thoſe who apply to the arts are trained in a very different manner: they are led, ſtep by ſtep, from the eaſier parts of the operation to what are more difficult; and are not permitted to make a new motion till they be perfected in thoſe which regularly precede it. The ſcience of criticiſm appears then to be a middle link, connecting the different parts of education into a regular chain. This ſcience furniſhes an inviting opportunity to exerciſe the judgment: we delight to reaſon upon ſubjects that are equally pleaſant and familiar; we proceed gradually from the ſimpler to the more involved caſes: and in a due courſe of diſcipline, cuſtom, which improves all our faculties, beſtows acuteneſs upon thoſe of reaſon, ſufficient to unravel all the intricacies of philoſophy.

Nor ought it to be overlooked, that the reaſonings employed upon the fine arts are of the ſame kind with thoſe which regulate our conduct. Mathematical and metaphyſical reaſonings have no tendency to improve ſocial intercourſe; nor are they applicable to the common affairs of life: but a juſt taſte in the fine arts, derived from rational principles, furniſhes elegant ſubjects for converſation, and prepares us finely for acting in the ſocial ſtate with dignity and propriety.

The ſcience of rational criticiſm tends to improve the heart not leſs than the underſtanding. It tends, in the firſt place, to moderate the ſelfiſh affections: by ſweetening and harmonizing the temper, it is a ſtrong antidote to the turbulence of paſſion and violence of purſuit; it procures to a man ſo much mental enjoyment, that, in order to be occupied, he is not tempted in youth to precipitate into hunting, gaming, drinking; nor in middle age, to deliver himſelf over to ambition; nor in old age, to avarice. Pride and envy, two diſguſtful paſſions, find in the conſtitution no enemy more formidable than a delicate and diſcerning taſte: the man upon whom nature and culture have beſtowed this bleſſing, feels great delight in the virtuous diſpoſitions and actions of others: he loves to cheriſh them, and to publiſh them to the world: faults and failings, it is true, are to him not leſs obvious; but theſe he avoids, or removes out of ſight, becauſe they give him pain. On the other hand, a man void of taſte, upon whom the moſt ſtriking beauties make but a faint impreſſion, has no joy but in gratifying his pride or envy by the diſcovery of errors and blemiſhes. In a word, there may be other paſſions, which, for a ſeaſon, diſturb the peace of ſociety more than thoſe mentioned: but no other paſſion is ſo unwearied an antagoniſt to the ſweets of ſocial intercourſe: theſe paſſions, tending aſſiduouſly to their gratification, put a man perpetually in oppoſition to others; and diſpoſe him more to reliſh bad than good qualities, even in a companion. How different that diſpoſition of mind, where every virtue in a companion or neighbour is, by refinement of taſte, ſet in its ſtrongeſt light; and defects or blemiſhes, natural to all, are ſuppreſſed, or kept out of view!

In the next place, delicacy of taſte tends not leſs to invigorate the ſocial affections than to moderate thoſe that are ſelfiſh. To be convinced of this tendency, we need only reflect, that delicacy of taſte neceſſarily heightens our ſenſibility of pain and pleaſure, and of courſe our ſympathy, which is the capital branch of every ſocial paſſion. Sympathy, in particular, invites a communication of joys and ſorrows, hopes and fears: ſuch exerciſe, ſoothing and ſatisfactory in itſelf, is neceſſarily productive of mutual good-will and affection.

One other advantage of rational criticiſm is reſerved to the laſt place, being of all the moſt important; which is, that it is a great ſupport to morality. No occupation attaches a man more to his duty than that of cultivating a taſte in the fine arts: a juſt reliſh of what is beautiful, proper, elegant, and ornamental, in writing or painting, in architecture or gardening, is a fine preparation for the ſame juſt reliſh of theſe qualities in character and behaviour. To the man who has acquired a taſte ſo acute and accompliſhed, every action wrong or improper muſt be highly diſguſtful: if, in any inſtance, the overbearing power of paſſion ſway him from his duty, he returns to it upon the firſt reflection, with redoubled reſolution never to be ſwayed a ſecond time: he has now an additional motive to virtue, a conviction derived from experience, that happineſs depends on regularity and order, and that a diſregard to juſtice or propriety never fails to be puniſhed with ſhame and remorſe.—For the rules of criticiſm applicable to the fine arts, and derived from human nature, ſee ARCHITECTURE, BEAUTY, CONGRUITY, COMPARISON, GRANDEUR, &c.

CRITO, an Athenian philoſopher, flouriſhed 400 years before Chriſt. He was one of the moſt zealous diſciples of Socrates, and ſupplied him with whatever he wanted. He had ſeveral ſcholars who proved great men, and he compoſed ſome dialogues which are loſt.

CRIZZELLING, in the glaſs trade, a kind of roughneſs ariſing on the ſurface of ſome kinds of glaſs. This was the fault of a peculiar ſort of glaſs made, in Oxfordſhire and ſome other places, of black flints, a cryſtallized ſand, and a large quantity of nitre, tartar, and borax. The glaſs thus made is very beautiful, but, from the quantities of the ſalts in the mixture, is ſubject to crizzel; that is, the ſalts in the mixture, from their too great proportion, are ſubject either from the adventitious nitre of the air from without, or from warm liquors put in them, to be either increaſed in quantity or diſſolved, and thereby induce a ſcabrities or roughneſs irrecoverably clouding the tranſparence of the glaſs This is what is called *crizzelling*; but by uſing an Italian white pebble, and abating the proportions of the ſalts, the manufacture is now carried on with advantage, and the glaſs made with theſe ſalts is whiter than the Venetian, and is ſubject to no faults.

CROATIA, a part of the ancient Illyricum, is bounded on the eaſt by Sclavonia and Boſnia, on the ſouth and ſouth-weſt by Morlachai, and on the north by the Drave, which ſeparates it from a part of Sclavonia. It is about 80 miles in length and 70 in breadth, and was once divided between the Hungarians and Turks; but now the greateſt part of it is ſubject to the houſe of Auſtria. The Croats derive their origin from the Sclavi; and their language is a dialect of the Sclavonian, approaching very near to that of the Poles. The country is divided into two parts, viz. that under, and that beyond, the Save. In the late wars between the empreſs queen and the king of Pruſſia, no leſs than 50,000 men were raiſed out of this ſmall territory. Both horſe and foot are good ſoldiers, eſpecially the former. The ſoil, where cultivated, is fruitful in wine and oil, &c. but being a frontier country, and much expoſed to inroads, it is not ſo well cultivated as otherwiſe it might be.

CROCODILE, in zoology. See BASILISCUS.

Foſſile CROCODILE, one of the greateſt curioſities in the foſſile world which the late ages have produced. It is the ſkeleton of a large crocodile, almoſt entire, found at a great depth under ground, bedded in ſtone. This was in the poſſeſſion of Linkius, who wrote many pieces of natural hiſtory, and particularly an accurate deſcription of this curious foſſile. It was found in the ſide of a large mountain in the midland part of Germany, and in a ſtratum of black foſſile ſtone, ſomewhat like our common ſlate, but of a coarſer texture, the ſame with that in which the foſſile fiſh in many parts of the world are found. This ſkeleton had the back and ribs very plain, and was of a much deeper black than the reſt of the ſtone; as is alſo the caſe in the foſſile fiſhes which are preſerved in this manner. The part of the ſtone where the head lay was not found; this being broken off juſt at the ſhoulder, but that irregularly; ſo that, in one place, a part of the back of the head was viſible in its natural form. The two ſhoulder-bones were very fair, and three of the feet were well preſerved; the legs were of their natural ſhape and ſize, and the feet preſerved even to the extremities of the five toes of each.

CROCODILE, *crocodilus*, in rhetoric, a captious and ſophiſtical kind of argumentation, contrived to ſeduce the unwary, and draw them ſpeciouſly into a ſnare. It has its name crocodile from the following occaſion, invented by the poets: A poor woman, begging a crocodile that had caught her ſon walking by the river ſide to ſpare and reſtore him, was anſwered, that he would reſtore him, provided ſhe ſhould give a true anſwer to a queſtion he ſhould propoſe. The queſtion was, Will I reſtore thy ſon or not? To this the poor woman, ſuſpecting a deceit, ſorrowfully anſwered, Thou wilt not: and demanded then to have him reſtored, becauſe ſhe had anſwered truly. Thou lyeſt, ſays the crocodile; for, if I reſtore him, thou haſt not anſwered truly: I cannot therefore reſtore him without making thy anſwer falſe. Under this head may be reduced the propoſitions called *mentientes* or *inſolubiles*; which deſtroy themſelves. Such is that of the Cretan poet: *Omnes ad*

unum: Cretenſes ſemper mentiuntur: "All the Cretans, to a man, always lie." Either, then, the poet lies when he aſſerts that the Cretans all lie, or the Cretans do not all lie.

CROCUS, SAFFRON; a genus of the monogynia order, belonging to the triandria claſs of plants; and in the natural method ranking under the 6th order, *Enſatæ*. The corolla is ſexpartite and equal; the ſtigmata convoluted or rolled ſpirally inwards. Modern botaniſts allow only one ſpecies of this genus, which, however, comprehends many beautiful varieties. This hath a ſmall roundiſh brown, bulbous root, compreſſed at the bottom. Directly from the root iſſue many narrow leaves, of a deep green colour; and amidſt them the flowers all protruded from a thin univalvular radical ſpatha; the tube of the flower is long, ſtanding on the root, and ſerving as a footſtalk to the limb or upper part, which is erect, ſix-parted, widens gradually upward, and grows from about three to five or ſix inches high. The varieties of this ſpecies may be divided into two claſſes, the *autumnal* and *ſpring* flowering. The varieties of the firſt are *crocus officinalis*, or ſaffron of the ſhops; for a farther account of which, ſee the article SAFFRON. This hath a long tubed blueiſh purple flower, with three ſtigmata of a fine golden colour. Other varieties are the autumnal ſmall blue crocus; deep blue, ſky blue, whitiſh blue, many-flowered whitiſh blue, purpule, large ruſh-leaved purple, autumnal white crocus, and autumnal yellow crocus. The varieties of the vernal crocus are, ſmall and large, and golden yellow crocuſes, and the yellow black ſtriped, the yellow purple-ſtriped and double cloth of gold ones; the white, white purple-ſtriped, white purple bottom, white black-ſtriped, whitiſh cream-coloured, whitiſh aſh-coloured, little narrow-leafed white, and white blue-ſtriped crocuſes. Beſides theſe there are a great many others of a blue and purple colour finely variegated. The autumnal crocuſes flower about the beginning of October, but never ripen their ſeeds in this country.

CROCUS, in chemiſtry, denotes any metal calcined to a red or deep yellow colour.

CROCUS *Metallorum*, an emetic preparation of antimony and nitre, not much uſed at preſent.

CRŒSUS, the laſt king of Lydia, remarkable for his riches, his conqueſts, his temporary proſperity, and the ſad reverſe of his fortune. This fallen monarch ſurvived Cyrus. The manner of his death is not known.

CROFT, a little cloſe adjoining to a dwelling-houſe, and incloſed for paſture or arable land, or any other purpoſe. In ſome ancient deeds, *cruſta* occurs as the Latin word for a "croft;" but *cum toftis & croftis* is more frequent. Croft is tranſlated in Abbo Floriacenſis, by *prædium* a "farm."

CROISADE, or CRUSADE, a name given to the expedition of the Chriſtians againſt the infidels for the conqueſt of Paleſtine. Theſe expeditions commenced in the year 1066. The foundation of them was a ſuperſtitious veneration for thoſe places where our Saviour performed his miracles, and accompliſhed the work of man's redemption. Jeruſalem had been taken and Paleſtine conquered, by Omar the ſucceſſor of Abu Becr, who ſucceeded Mahomet himſelf. This proved a conſiderable interruption to the pilgrims, who flocked from all quarters to perform their devotions at the holy ſepulchre. They had, however, ſtill been allowed this liberty, on paying a ſmall tribute to the Saracen caliphs, who were not much inclined to moleſt them. But in 1065 this city changed its maſters. The Turks took it from the Saracens; and being much more fierce and barbarous than the former, the pilgrims now found they could no longer perform their devotions with the ſame ſafety they did before. An opinion was about this time alſo prevalent in Europe, which made theſe pilgrimages much more frequent than formerly. It was ſomehow or other imagined, that the thouſand years mentioned in the 20th chapter of the Revelations, were fulfilled; that Chriſt was ſoon to make his appearance in Paleſtine, to judge the world; and conſequently that journeys to that country were in the higheſt degree meritorious, and even abſolutely neceſſary. The multitudes of pilgrims which now flocked to Paleſtine meeting with a very rough reception from the Turks, filled all Europe with complaints againſt thoſe infidels who profaned the holy city by their preſence, and derided the ſacred myſteries of Chriſtianity even in the place where they were fulfilled. Pope Gregory VII. had formed a deſign of uniting all the princes of Chriſtendom againſt the Mahometans; but his exorbitant encroachments upon the civil power of princes had created him ſo many enemies, and rendered his ſchemes ſo ſuſpicious, that he was not able to make great progreſs in this undertaking. The work was reſerved for a meaner inſtrument.

Peter commonly called the *hermit*, a native of Amiens in Picardy, had made the pilgrimage to Jeruſalem; and being deeply affected with the dangers to which that act of piety now expoſed the pilgrims, as well as with the oppreſſion under which the eaſtern Chriſtians now laboured, formed the bold, and, to all appearance, impracticable deſign of leading into Aſia, from the fartheſt extremities of the Weſt, armies ſufficient to ſubdue thoſe potent and warlike nations that now held the Holy Land in ſlavery. He propoſed his ſcheme to Martin II. who then filled the papal chair; but he, though ſenſible enough of the advantages which muſt accrue to himſelf from ſuch an undertaking, reſolved not to interpoſe his authority till he ſaw a greater probability of ſucceſs. He ſummoned, at Placentia, a council conſiſting of 4000 eccleſiaſtics and 30,000 ſeculars. As no hall could be found large enough to contain ſuch a multitude, the aſſembly was held in a plain. Here the pope himſelf, as well as Peter, harangued the people, repreſenting the diſmal ſituation of their brethren in the Eaſt, and the indignity offered to the Chriſtian name in allowing the holy city to remain in the hands of infidels. Theſe ſpeeches were ſo agreeable to thoſe who heard them, that the whole multitude ſuddenly and violently declared for the war, and ſolemnly devoted themſelves to perform this ſervice, which they believed to be ſo meritorious in the ſight of God.

At this time Europe was ſunk in the moſt profound ignorance and ſuperſtition. The eccleſiaſtics had gained the greateſt aſcendant over the human mind; and the people, who committed the moſt horrid crimes and diſorders, knew of no other expiation than the obſervances impoſed on them by their ſpiritual paſtors. But amidſt the abject ſuperſtition which now prevailed, the military ſpirit had alſo univerſally diffuſed itſelf; and, though not ſupported by art or diſcipline, was become the general paſſion of the nations governed by the feudal law.

All orders of men now deemed the croiſades the only road to heaven, and were impatient to open the way with their ſwords to the holy city. Nobles, artiſans, peaſants, even prieſts, inrolled their names; and to decline this ſervice was branded with the reproach of impiety or cowardice. The nobles who inliſted themſelves were moved, by the romantic ſpirit of the age, to hope for opulent eſtabliſhments in the Eaſt, the chief ſeat of arts and commerce at that time. In purſuit of theſe chimerical projects, they ſold at the loweſt price their ancient caſtles and inheritances, which had now loſt all value in their eyes. The infirm and aged contributed to the expedition by preſents and money; and many of them, not ſatisfied with this, attended it in perſon, being determined, if poſſible, to breathe their laſt in ſight of that city where their Saviour had died for them. Women themſelves, concealing their ſex under the diſguiſe of armour, attended the camp; and commonly forgot decorum ſtill more, by proſtituting themſelves to the army. The greateſt

criminals were forward in a ſervice which they conſidered as an expiation for all crimes; and the moſt enormous diſorders were, during the courſe of theſe expeditions, committed by men inured to wickedneſs, encouraged by example, and impelled by neceſſity. The multitude of adventurers ſoon became ſo great, that their more ſagacious leaders became apprehenſive leſt the greatneſs of the armament would be the cauſe of its own diſappointment. For this reaſon they permitted an undiſciplined multitude, computed at 300,000 men, to go before them under the command of Peter the hermit, and Gautier or Walter, ſurnamed *moneyleſs*, from his being a ſoldier of fortune. Theſe took the road towards Conſtantinople through Hungary and Bulgaria; and truſting that heaven, by ſupernatural aſſiſtance, would ſupply all their neceſſities, they made no proviſion for ſubſiſtence in their march. They ſoon found themſelves obliged to obtain by plunder what they vainly expected from miracles; and the enraged inhabitants of the countries through which they paſſed, attacked the diſorderly multitude, and ſlaughtered them without reſiſtance. The more diſciplined armies followed after; and, paſſing the ſtraits at Conſtantinople, they were muſtered in the plains of Aſia, and amounted in the whole to 700,000 men. This rage for conquering the Holy Land did not ceaſe with this expedition. It continued for very near two centuries, and eight different croiſades were ſucceſſively ſet on foot, the events of which are amply detailed in hiſtory.

Yet although theſe croiſades were effects of the moſt abſurd ſuperſtition, they nevertheleſs tended very materially to promote the good of Europe. Multitudes indeed were deſtroyed. M. Voltaire computes the people who periſhed in the different expeditions at upwards of two millions. Many there were, however, who returned; and theſe having converſed ſo long with people who lived in a much more magnificent way than themſelves, began to entertain ſome taſte for a refined and poliſhed way of life. Thus the barbariſm in which Europe had been ſo immerſed, began to wear off ſoon after this time. The princes alſo who remained at home, found means to avail themſelves of the phrenſy of the people. By the abſence of ſuch numbers of reſtleſs and martial adventurers, peace was eſtabliſhed in their dominions. They alſo took the opportunity of annexing to their crowns many conſiderable fiefs, either by purchaſe, or by the extinction of the heirs; and thus the miſchiefs which muſt always attend feudal governments were conſiderably leſſened.

With regard to the bad ſucceſs of the croiſaders, it was ſcarce poſſible that any other thing could happen to them. The emperors of Conſtantinople, inſtead of aſſiſting, did all in their power to diſconcert their ſchemes. They were jealous, and not without reaſon, of ſuch an inundation of barbarians. Yet, had they conſidered their true intereſt, they would rather have aſſiſted them, or at leaſt ſtood neuter, than entered into alliances with the Turks. They followed the latter method, however, and were often of very great diſſervice to the weſtern adventurers, which laſt occaſioned the loſs of their city. But the worſt enemies the croiſaders had, were their own internal feuds and diſſenſions. They could neither agree while marching together in armies with a view to conqueſt, nor could they unite their conqueſts under one government after they had made them. They ſet up three ſmall ſtates, one at Jeruſalem, another at Antioch, and another at Edeſſa. Theſe ſtates, inſtead of aſſiſting, made war upon each other and on the Greek emperors; and thus became an eaſy prey to the common enemy. The horrid cruelties they committed alſo were ſuch as muſt have inſpired the Turks with the moſt invincible hatred againſt them, and made them reſiſt with the greateſt obſtinacy. They are ſuch as could have been committed only by barbarians inflamed with religious enthuſiaſm. When Jeruſalem was taken, not only the numerous garriſon were put to the ſword, but the inhabitants were maſſacred without mercy and without diſtinction. No age nor ſex was ſpared, not even ſucking children. According to Voltaire, ſome Chriſtians, who had been ſuffered by the Turks to live in that city, led the conquerors into the moſt private caves, where women had concealed themſelves with their children, and not one of them was ſuffered to eſcape. What eminently ſhows the enthuſiaſm by which theſe conquerors were animated, is their behaviour after this terrible ſlaughter. They marched over heaps of dead bodies towards the holy ſepulchre; and while their hands were yet polluted with the blood of ſo many innocent perſons, ſung anthems to the Saviour of mankind. Nay, ſo far did their religious enthuſiaſm overcome their fury, that theſe ferocious conquerors now burſt into tears. If the abſurdity and wickedneſs of this conduct can be exceeded by any thing, it muſt be by what follows. In the year 1204, the phrenſy of croiſading ſeized the children, who are ever ready to imitate what they ſee their parents engage themſelves in. Their childiſh folly was encouraged by the monks and ſchoolmaſters, and thouſands of thoſe innocents were conducted from the houſes of their parents on the faith of theſe words, "Out of the mouth of babes and ſucklings haſt thou perfected praiſe." Their baſe conductors ſold a part of them to the Turks, and the reſt periſhed miſerably.

CROISES, or Croizes, in Engliſh antiquity, pilgrims bound for the Holy Land, or ſuch as had been there; ſo called from a badge they wore in imitation of a croſs. The knights of St. John of Jeruſalem, created for the defence and protection of pilgrims, were particularly called *croiſes*.

CROISIERS, a religious order founded in honour of the invention or diſcovery of the croſs by the empreſs Helena. They are diſperſed in ſeveral parts of Europe, particularly in the Low Countries, France, and Bohemia, thoſe in Italy being at preſent ſuppreſſed. Theſe religious follow the rule of St. Auguſtine. They had in England the name of *crouched friars*.

CROMARTY, the capital of the ſhire of Cromarty, in Scotland, with an elegant and ſafe harbour capable of containing the greateſt fleets. W. long. 3. 40. N. lat. 57. 54.

CROMLECH, in Britiſh antiquities, are huge, broad, flat ſtones, raiſed upon other ſtones ſet up on end to ſupport them. They are common in Anglesey. See Plate 87. Theſe monuments are ſpoken of largely by Mr. Rowland, by Dr. Borlaſe, and by Wormius, under the name of *Ara* or altar. Mr. Rowland, however, is divided in his opinion; for he partly inclines to the notion of their having been altars, partly to their having been ſepulchres: he ſuppoſes them to have been originally tombs, but that in after times ſacrifices were performed upon them to the heroes depoſited within. Mr. Keiller preſerves an account of King Harold having been interred beneath a tomb of this kind in Denmark, and Mr. Wright diſcovered in Ireland a ſkeleton depoſited under one of them. The great ſimilarity of the monuments throughout the north, Mr. Pennant obſerves, evinces the ſame religion to have been ſpread in every part, perhaps with ſome ſlight deviations. Many of theſe monuments are both Britiſh and Daniſh; for we find them where the Danes never penetrated.

The cromlech, or cromleh, chiefly differs from the Kist-*vaen*, in not being cloſed up at the end and ſides, that is, in not ſo much partaking of the cheſt-like figure; it is alſo generally of larger dimenſions, and ſometimes conſiſts of a greater number of ſtones: the terms *cromleh* and *kiſt-vaen* are however indiſcriminately uſed for the ſame monument. The term *cromlech* is by ſome derived from the Armoric word *crum*, "crooked or bowing," and *leh* "ſtone," alluding to the reverence which perſons paid to them by bowing. Rowland derives it from the Hebrew words *carem-luach*, ſignifying a "devoted or conſecrated ſtone." They are called by the vulgar *coetne Arthor*, or *Arthor's quoits*, it being a cuſtom in Wales, as

well as Cornwall, to afcribe all great or wonderful objects to Prince Arthur, the hero of thofe countries.

CROMWELL (Oliver), ftyled *Lord Protector* of the commonwealth of England, one of the moft extraordinary perfonages mentioned in hiftory, was the fon of Mr. Robert Cromwell of Hinchinbrooke in the county of Huntingdon. His anceftors were of very honourable extraction, but no way related to Thomas Cromwell earl of Effex, the prime minifter and favourite of Henry VIII. He was born in the parifh of St. John, Huntingdon, where his father moftly lived, on the 24th or 25th of April 1599, and educated at the free fchool of that town. Little is known concerning him in his younger years, or indeed concerning his behaviour in private life. It is, however, related by authors of unfufpected veracity, that when at fchool he gave many figns of a very turbulent and reftlefs difpofition. He is alfo faid from his early years to have been fubject to the hypochondriac diforder, and to many deceptions of the imagination. He had a very remarkable one while at fchool. It happened in the day-time, when he was lying melancholy upon his back in bed. A fpectre, as he thought, approached him, and told him that he fhould be the greateft man in the kingdom. His father, being informed of this, was very angry, and defired his mafter to correct him feverely. This, however, produced no effect. Oliver perfifted in the truth of his ftory, and would fometimes mention it, though his uncle told him " it was too traitorous to be repeated."—From this fchool Oliver was removed to Sidney college in Cambridge, where he was admitted in 1616. His progrefs in his ftudies is uncertain; but he fpent much time in playing at foot-ball, cricket, and other robuft exercifes, at which he was very expert. His father dying after he had been about two years at college, Cromwell returned home; but the irregularity of his life gave fuch offence to his mother, that, by the advice of fome friends, fhe fent him to London, and placed him in Lincoln's inn. This expedient by no means anfwered the purpofe; her fon gave himfelf up to gaming, wine, and women, fo that he quickly diffipated all that was left him by his father. This diffipation, however, could be but of very fhort continuance; for he was married, before he was 21 years of age, to Elizabeth daughter of Sir James Bouchier of Effex. Soon after his marriage he returned to the country, where he led a very grave and fober life. This fudden reformation has been afcribed to his falling in with the Puritans; but it is certain, that Mr. Cromwell continued then, and for fome time after, a zealous member of the church of England, and formed a clofe friendfhip with feveral eminent divines. He continued at Huntingdon where he fettled after his marriage, till an eftate of between 400l. and 500l. *per annum* devolved to him by the death of his uncle Sir Thomas Stuart. This induced him to remove to the ifle of Ely, where the eftate lay; and here he embraced the puritanical doctrines. He was elected a member of the third parliament of Charles I. which met on the 20th of January 1628; and was a member of the committee for religion, where he diftinguifhed himfelf by his zeal againft popery. After the diffolution of that parliament, he returned again into the country, where he continued to exprefs much concern for religion, to keep company with filenced minifters, and to invite them often to lectures and fermons at his houfe. Thus he brought his affairs again into a very indifferent fituation; fo that, by way of repairing the breaches he had made in his fortune, he took a farm at St. Ives, which he kept five years. But this fcheme fucceeded fo ill, that he was obliged to give it up; and at laft, chagrined with his difappointments, and made uneafy by the treatment his party at that time received, he formed a defign of going over to New England. In this, however, he was difappointed; the king iffued a proclamation againft all fuch emigrations, and Cromwell was obliged to remain in England againft his will.

In 1638, Cromwell had firft an opportunity of getting himfelf publicly taken notice of. The earl of Bedford, and fome other perfons of high rank, who had eftates in the fen country, were very defirous of having it better drained; and though one project of this fort had failed, they fet on foot another, got it countenanced by royal authority, and fettled part of the profits upon the crown. This, though really intended for a public benefit, was oppofed as injurious to private property: and at the head of the oppofers was Mr. Oliver Cromwell, who had confiderable influence in thofe parts. The vigour he fhowed on this occafion recommended him to his friend and relation Mr. Hampden; who afterwards characterized him in parliament, as a perfon capable of contriving and conducting great defigns. But for all this he was not very fuccefsful in his oppofition; and as his private affairs were ftill declining, he was in very neceffitous circumftances at the approach of the long parliament. In this critical fituation he got himfelf elected member of parliament in the following manner: In the puritanical meetings which he conftantly frequented, Oliver had moft eminently diftinguifhed himfelf by his *gifts* of praying, preaching and expounding. At one of thefe meetings, he met with one Richard Tims, a tradefman of Cambridge. This man was fo much taken with Oliver, that he took it into his head to attempt getting him chofen burgefs for the approaching parliament. Being himfelf one of the common council, Tims imagined this defign might be brought about; and with this view went to Mr. Wildbore a relation of Cromwell's, to whom he communicated his intention. Wildbore agreed as to the fitnefs of the perfon; but told him the defign was impracticable, becaufe Oliver was not a freeman. Tims next addreffed one Evett on the fame fubject, who alfo made the fame objection. He recollected, however, that the mayor had a freedom to beftow; and a fcheme was immediately laid for fecuring this freedom to Cromwell. On application to the mayor, however, he told them that this freedom was already difpofed of to another; but this objection being obviated by promifing that perfon a freedom from the town, the mayor being informed that Cromwell was a man of great fortune, fignified his intention of beftowing the freedom upon him. Our hero, being informed of the good offices of his friends, made his appearance in the court dreffed in fcarlet richly laced with gold, and having provided plenty of claret and fweetmeats, they were fo freely circulated among the corporation, that Mr. Mayor's freeman was unanimoufly declared to be a very worthy gentleman. When the election came on, the mayor difcovered his miftake, but it was now too late; the party among the burgeffes was ftrong enough to choofe him, and accordingly did fo at the election next year.

When Cromwell firft came into parliament, he affected great plainnefs, and even careleffnefs, in his drefs. His attention to farming had entirely rufticated him, fo that he made a very uncouth appearance. " Who (fays Dr. South) that had beheld fuch a bankrupt, beggarly fellow, as Cromwell, firft entering the parliament houfe, with a thread-bare torn coat and greafy hat, and perhaps neither of them paid for, could have fufpected, that in the fpace of fo few years, he fhould, by the murder of one king, and the banifhment of another, afcend the throne, be invefted with the royal robes, and want nothing of the ftate of a king but the changing his hat into a crown?" Cromwell was very active in promoting the famous *Remonftrance*; which in reality laid the foundation of the civil war. He declared afterwards to Lord Falkland, that if the remonftrance had not been carried, he defigned to have converted the fmall remains of his eftate into ready money the next day, and to have left the kingdom by the firft opportunity. His firmnefs on this occafion fo effectually recommended him to Hampden, Pym, and the other leaders of the popular party, that

they took him into all their councils; and here he acquired that clear insight into things, and that knowledge of men, of which he afterwards made such prodigious use. His exploits during the civil war, his murder of the king, and usurpation of the kingdom, are related at large in the History of England.

With regard to the character of Cromwell, Mr. Hume expresses himself as follows: "The writers attached to this wonderful person make his character, with regard to abilities, bear the air of the most extravagant panegyric: his enemies form such a representation of his moral qualities as resembles the most virulent invective. Both of them, it must be confessed, are supported by such striking circumstances, in his fortune and conduct, as bestow on their representations a great air of probability. 'What can be more extraordinary (it is said), than that a person of private birth and education, no fortune, no eminent qualities of body, which have sometimes, nor shining qualities of mind, which have often, raised men to the highest dignities, should have the courage to attempt, and the abilities to execute, so great a design as the subverting one of the most ancient as well as best established monarchies in the world? that he should have the power and boldness to put his prince and master to an open and infamous death? should banish that numerous and strongly allied family? cover all these temerities under a seeming obedience to a parliament, in whose service he pretended to be retained? trample too upon that parliament in their turn, and scornfully expel them as soon as they gave him ground of dissatisfaction? erect in their place the dominion of the saints, and give reality to the most visionary idea which the heated imagination of any fanatic was ever able to entertain? suppress again that monster in its infancy, and openly set himself up above all things that ever were called *sovereign* in England? overcome first all his enemies by arms, and all his friends afterwards by artifice? serve all parties patiently for a while, and afterwards command them victoriously at last? over-run each corner of the three nations, and subdue with equal facility both the riches of the south, and the poverty of the north? be feared and courted by all princes, and adopted a brother to the gods of the earth? call together parliaments with a word of his pen, and scatter them again by the breath of his mouth? reduce to subjection a warlike and discontented nation by means of a mutinous army? command a mutinous army by means of seditious and factious officers? be humbly and daily petitioned, that he would be pleased, at the rate of millions a-year, to be hired as master of those who had formerly hired him for their servant? have the estates and lives of three nations as much at his dispofal as was once the little inheritance of his father, and be as noble and liberal in the spending of them? and, lastly (for there is no end of enumerating every particular of his glory), with one word bequeath all this power and splendor to his posterity? die possessed of peace at home, and triumph abroad? be buried among kings, and with more than regal solemnity? and leave a name behind him not to be extinguished but with the whole world; which, as it was too little for his praise, so it might have been for his conquests, if the short line of his mortal life could have stretched out to the extent of his immortal designs?'

"My intention is not to disfigure this picture drawn by so masterly a hand: I shall only endeavour to remove from it somewhat of the marvellous; a circumstance which on all occasion, gives much ground for doubt and suspicion. It seems to me, that the circumstance of Cromwell's life in which his abilities are principally discovered, is his rising, from a private stations in opposition to so many rivals, so much advanced before him, to a high command and authority in the army. His great courage, his signal military talents, his eminent dexterity and address, were all requisite for this important acquisition. Yet will not this promotion appear the effect of supernatural abilities, when we consider that Fairfax himself, a private gentleman, who had not the advantage of a seat in parliament, had, through the same steps, attained even to a superior rank; and, if endued with common capacity and penetration, had been able to retain it. To incite such an army to rebellion against the parliament, required no uncommon art or industry: to have kept them in obedience had been the more difficult enterprise. When the breach was once formed between the military and civil powers, a supreme and absolute authority, from that moment, is devolved on the general; and if he is afterwards pleased to employ artifice or policy, it may be regarded on most occasions as great condescension, if not as superfluous caution. That Cromwell was ever able really to blind or over-reach either the king or the republicans, does not appear: as they possessed no means of resisting the force under his command, they were glad to temporize with him; and, by seeming to be deceived, to wait for an opportunity of freeing themselves from his dominion. If he seduced the military fanatics, it is to be considered, that their interest and his evidently concurred; that their ignorance and low education exposed them to the grossest imposition; and that he himself was at bottom as frantic an enthusiast as the worst of them; and, in order to obtain their confidence, needed but to display those vulgar and ridiculous habits which he had early acquired, and on which he set so high a value. An army is so forcible, and at the same time so coarse a weapon, that any hand which wields it, may, without much dexterity, perform any operation, and attain any ascendant in human society.

"The domestic administration of Cromwell, though it discovers great ability, was conducted without any plan either of liberty or arbitrary power: perhaps his difficult situation admitted of neither. His foreign enterprises, though full of intrepidity, were pernicious to national interest; and seem more the result of impetuous fury or narrow prejudices, than of cool foresight and deliberation. An eminent personage, however, he was, in many respects, and even a superior genius; but unequal and irregular in his operations: and, though not defective in any talent except that of elocution, the abilities which in him were most admirable, and which contributed most to his marvellous success, were the magnanimous resolution of his enterprises, and his peculiar dexterity in discovering the characters and practising on the weaknesses of mankind.

"If we survey the moral character of Cromwell, with that indulgence which is due to the blindness and infirmities of the human species, we shall not be inclined to load his memory with such violent reproaches as those which his enemies usually throw upon it. Amidst the passions and prejudices of that time, that he should prefer the parliamentary to the royal cause, will not appear extraordinary; since even at present many men of sense and knowledge are disposed to think, that the question, with regard to the justice of the quarrel, may be regarded as doubtful and ambiguous. The murder of the king, the most atrocious of all his actions, was to him covered under a mighty cloud of republican and fanatical illusions; and it is not impossible but he might believe it, as many others did, the most meritorious action which he could perform. His subsequent usurpation was the effect of necessity, as well as of ambition; nor is it easy to see how the various factions could at that time have been restrained without a mixture of military and arbitrary authority. The private deportment of Cromwell, as a son, a husband, a father, a friend, is exposed to no considerable censure, if it does not rather merit praise. And, upon the whole, his character does not appear more extraordinary and unusual by the mixture of so much absurdity with so much penetration, than by his tempering such violent ambition and such enraged fanaticism with so much regard to justice and humanity."

That Cromwell continued a most complete and bigoted en-

thusiast to the very last, appears from his behaviour in his last sickness. His disease, which at first was a kind of slow fever, brought on by the cares and anxiety of his mind, soon degenerated into a tertian ague. For about a week the disorder continued without any dangerous symptoms, insomuch that every other day he walked abroad; but one day after dinner his five physicians coming to wait upon him, one of them having felt his pulse, said that it intermitted. At this Cromwell was surprised, turned pale, fell into a cold sweat, and, when he was almost fainting, ordered himself to be carried to bed: where, by the assistance of cordials, being brought a little to himself, he made his will with respect to his private affairs. The next morning, when one of his physicians came to visit him, Cromwell asked him, why he looked so sad? and when answer was made that so it became every one who had the weighty charge of his life and health upon him: "Ye physicians (says Cromwell) think I shall die: I tell you I shall not die this bout, I am sure of it. Do not you think (said he to the physician, looking more attentively at him), do not think that I am mad! I speak the words of truth upon surer grounds than your Hippocrates or Galen can furnish you with. God Almighty himself hath given that answer, not to my prayers alone, but also to the prayers of those who entertain a stricter commerce, and greater interest with him. Go on cheerfully, banishing all sadness from your looks; and deal with me as you would do with a serving-man. Ye may have a skill in the nature of things; yet nature can do more than all physicians put together, and God is far more above nature." As this physician was coming out of the chamber, he accidentally met with another, to whom he expressed his fear that the protector was turning light-headed. But the other informed him that the chaplains, being dispersed the preceding night into different parts of the house, had prayed for the protector's recovery, and unanimously received for answer that he should recover. Nay, to such a degree of madness did they at last arrive, that, a public fast being kept at Hampton court, they did not so much pray to God for the protector's health, as return thanks for the undoubted pledges they had of his recovery. On this account, though the physicians perceived his distemper increasing every hour, they took no notice of his danger, till it became necessary for him to appoint a successor while he had any breath remaining. But being then in a lethargic fit, he answered from the purpose; upon which he was again asked whether he did not name his eldest son Richard? and to this question he answered, Yes. Being then asked where his will was which he had formerly made concerning the heirs of the kingdom; he sent to look for it in his closet and other places, but in vain; for somebody had either stolen it, or he himself had burnt it. Soon after, he expired, on the 3d of September 1658, aged somewhat more than 56 years and four months. This day of September he supposed had always been the most fortunate for him in the whole year. A violent tempest, which immediately succeeded his death, served as a subject of discourse to the vulgar. His partisans, as well as his opponents, were fond of remarking this event: and each of them endeavoured, by forced inferences, to interpret it as best suited their particular prejudice.

It has been imagined by some, that Oliver Cromwell was poisoned: but for this there seems to be no reasonable foundation. His body was opened by Dr. Bates. He found the brain somewhat overcharged with blood, and the lungs a little inflamed; but what he reckoned to have been the principal cause of his disorder was a total reduction of the substance of the spleen into a matter resembling the dregs of oil. This, he thought, also accounted for the hypochondriac dispositions to which Cromwell had from his infancy been subject. Though the bowels were taken out, and the body filled with spices wrapped in a fourfold cere cloth, put first into a coffin of lead, and then into one of wood; yet the corruption was so great that the humour wrought itself through the whole, and there was a necessity of interring the body before the solemnity of the funeral. A very pompous funeral was ordered at the public expence, and performed from Somerset-house, with a splendour not only equal but superior to that bestowed upon crowned heads. Some have related that his body was deposited in Nasebv-field: others, that it was wrapped in lead, and sunk in the deepest part of the Thames, to prevent any insult that might afterwards be offered to it. But it seems beyond doubt that his body was interred at Westminster; as we are informed, that on the order to disinter him after the restoration, his corpse was found in a vault in the middle aisle of Henry VII.'s chapel. In the inside of the coffin, and on the breast of the corpse, was laid a copper plate finely gilt, inclosed in a thin case of lead. On one side of this plate were engraven the arms of England impaled with those of Oliver, and on the reverse the following legend: *Oliverius Protector Reipublicæ Angliæ, Scotiæ, et Hiberniæ, natus* 25 *Aprilis* 1599, *inauguratus* 16 *Decembris* 1653, *mortuus* 3 *Septembris ann.* 1658, *hic situs est.*

Cromwell was of a robust frame of body, and of a manly, though not agreeable aspect. His nose being remarkably red and shining, was often made the subject of ridicule. He left only two sons, Richard and Henry: and three daughters; one married to General Fleetwood, another to Lord Fauconberg, and a third to Lord Rich. His mother lived till after he was protector; and contrary to her orders he buried her with great pomp in Westminster Abbey. She could not be persuaded that ever his power or his person was in safety. At every noise she heard she would exclaim that her son was murdered; and was never satisfied that he was alive if she did not receive frequent visits from him. She was a decent woman; and by her frugality and industry had raised and educated a numerous family upon a small fortune. She had even been obliged to set up a brewery at Huntingdon, which she managed to good advantage. Hence Cromwell, in the invectives of that age, is often stigmatized with the name of brewer. Ludlow, by way of insult, mentions the great accession which he would receive to his royal revenues upon his mother's death, who possessed a jointure of 60 pounds a-year upon his estate. She was of a good family, of the name of Stuart; and is by some supposed to have been remotely allied to the royal family.

CRONENBURG, a town of Germany, in the circle of the Upper Rhine, and in the landgravate of Hesse Cassel, with a strong castle. It is seated at the foot of a high mountain, on a fertile soil, and is surrounded with a double wall. E. long. 8. 15. N. lat. 50. 15.

CRONENBURG, a strong fortress of Denmark, in the isle of Zealand, at the entrance of the Sound, where the Danes take toll of such ships as are bound for the Baltic. It was very richly furnished, but pillaged by the Swedes in 1658, who took away the furniture, among which were some statues of massy silver. It is built upon piles. E. long. 12. 50. N. lat. 56. 0.

CRONIUS, in chronology, the ancient name of the Athenian month Hecatombæon; which was the first of their year, and answered to the latter part of our June and beginning of July.—There were feasts called *Cronienes* celebrated at Athens in this month, in honour of Saturn, answering to the Saturnalia of the Romans.

CRONSLOT. See CRONSTADT.

CRONSTADT, a town and fortress of Russia, situated on the island of Retusari, on the gulf of Finland. It has a good harbour, which is the station of the Russian fleet, with the great magazines of naval stores, as well as docks and yards for building ships. It is 12 miles W. of Petersburg. E. long. 29. 56. N. lat. 59. 56.

CRONSTAT, a town of Transylvania, near the frontiers of Moldavia, subject to the house of Austria. E. long. 25. 0. N. lat. 47. 0.

CROP, the higheſt part or end of any thing cut off. It is particularly uſed for the corn gathered off a field in harveſt. See HUSBANDRY.

CROSIER, or CROZIER, a ſhepherd's crook; a ſymbol of paſtoral authority, conſiſting of a gold or ſilver ſtaff, crooked at top, carried occaſionally before biſhops and abbots, and held in the hand when they give the ſolemn benedictions. The cuſtom of bearing a paſtoral ſtaff before biſhops is very ancient, as appears from the life of St. Cæſarea of Arles, who lived about the year 500. Among the Greeks none but the patriarchs had a right to the croſier. The croſiers were at firſt no more than ſimple wooden ſtaves in form of a T, uſed to reſt and lean upon. By degrees they were made longer; and at length arrived to the form we now ſee them of. Regular abbots are allowed to officiate with a mitre and croſier.

CROSIER, in aſtronomy, four ſtars in the ſouthern hemiſphere, in the form of a croſs, ſerving thoſe who ſail in ſouth latitudes to find the antarctic pole.

CROSLET, in heraldry, is when a croſs is croſſed again at a ſmall diſtance from each of the two ends. Upton ſays it is not ſo often borne by itſelf in arms as other croſſes are, but often in diminutives, that is, in ſmall croſlets ſcattered about the field. See HERALDRY.

CROSS, a gibbet made with two pieces of wood placed croſswiſe, whether they croſs with right angles at the top like a T, or in the middle of their length like an X. The croſs to which our Saviour was faſtened, and on which he died, was of the former kind; being thus repreſented by old monuments, coins, and croſſes. The puniſhment of the croſs was common among the Syrians, Egyptians, Perſians, Africans, Greeks, Romans, and Jews. It was the moſt dreadful of all others, both for the ſhame and pain of it; and ſo ſcandalous, that it was inflicted as the laſt mark of deteſtation upon the vileſt of people. It was the puniſhment of robbers and murderers, provided that they were ſlaves too; but otherwiſe, if they were free, and had the privileges of the city of Rome, this was then thought a proſtitution of that honour, and too infamous a puniſhment for ſuch a one, let his crimes be what they would. The Moſaic law ordained, that the perſons executed ſhould not be left upon the tree after ſun-ſet, becauſe he that is hanged in this manner is accurſed of God, Deut. xxi. 22. The Jews believe, that the ſouls of thoſe who remain upon the gibbet, and without burial, enjoy no peace, and receive no benefit from the prayers of other people; but wander up and down till their bodies are buried: which agrees with the notions that the Greeks and Romans had of this matter, which may be ſeen in *Hom. Il.* 4. and *Virg. Æneid* 6.

The form of a croſs being ſuch as has been already deſcribed, the body of the criminal was faſtened to the upright piece by nailing the feet to it, and on the other tranſverſe piece generally by nailing the hands on each ſide. The Jews confeſs, that indeed they crucified people in their nation, but deny that they inflicted this puniſhment upon any one alive. They firſt put them to death, and then faſtened them to the croſs either by the hands or neck. But there are indiſputable proofs of their crucifying men frequently alive. The worſhippers of Baalpeor and the king of Ai were hung up alive; as were alſo the deſcendants of Saul, who were put into the hands of the Gibeonites, 2 Sam. xxi. 9.

Before crucifixion the criminal was generally ſcourged with cords: ſometimes little bones, or pieces of bones, were tied to theſe ſcourges, ſo that the condemned perſon might ſuffer more ſeverely. It was alſo a cuſtom, that he who was to be crucified ſhould bear his own croſs to the place of execution. After this manner we find Chriſt was compelled to bear his own croſs; and as he ſunk under the burden, Simeon the Cyrenian was conſtrained to bear it after him and with him.

There were ſeveral ways of crucifying; ſometimes the criminal was faſtened with cords to a tree, ſometimes he was crucified with his head downwards. This way St. Peter choſe out of reſpect to his maſter Jeſus Chriſt, not thinking himſelf worthy to be crucified like him; though the common way of crucifying was by faſtening the criminal with nails, one through each hand, and one through both feet, or one through each of them: for this was not always performed in the ſame manner; the ancients ſometimes repreſenting Jeſus Chriſt crucified with four nails, and ſometimes with three. The criminal was fixed to the croſs quite naked; and the ſoldiers divided his clothes among them, and caſt lots for his tunic, which is an under garment worn next the ſkin like a ſhirt.

Sometimes they who were faſtened upon the croſs lived a good while in that condition. St. Andrew is believed to have continued three days alive upon it. Euſebius ſpeaks of certain martyrs in Egypt who were kept upon the croſs till they were ſtarved to death. Pilate was amazed at Jeſus Chriſt dying ſo ſoon; becauſe naturally he muſt have lived longer, if it had not been in his power to have laid down his life and to take it up again. The thighs of the two thieves who were crucified together with our Saviour were broken in order to haſten their death, that their bodies might not remain upon the croſs on the Sabbath day (John xix. 31, 32, 33.), and to comply with the law of Moſes, which forbids the bodies to be left there after ſun-ſet. But among other nations they were ſuffered to remain upon the croſs a long time. Sometimes they were devoured alive by birds and beaſts of prey. Guards were appointed to obſerve that none of their friends or relations ſhould take them down and bury them. The ſtory of the Epheſian matron and the ſoldier who was ſet to guard the croſs, is very well known. The Roman ſoldiers who had crucified Jeſus Chriſt and the two thieves continued near the croſſes till the bodies were taken down and buried.

Croſſes were uſually, in former times, erected on the tops of houſes, by which tenants pretended to claim the privileges of the Templars Hoſpitallers, to defend themſelves againſt their rightful lords. This was condemned by the ſtatute Will. II. c. 37. It was uſual alſo, in thoſe days, to ſet up croſſes in places where the corpſe of any of the nobility reſted as it was carried to be buried, that *a tranſeuntibus pro ejus animo deprecetur*. Croſſes, &c. are forbidden, to be brought into England by 13 Eliz. c. 2. on pain of a *præmunire*, &c.

Invention of the CROSS, an ancient feaſt ſolemnized on the third of May, in memory of St. Helena's (the mother of Conſtantine) finding the true croſs of Chriſt deep in the ground on mount Calvary; where ſhe erected a church for the preſervation of part of it; the reſt being brought to Rome and depoſited in the church of the Holy Croſs of Jeruſalem.

Exaltation of the CROSS, an ancient feaſt, held on the 14th of September, in memory of this, that Heraclitus reſtored to mount Calvary the true croſs in 642, which had been carried off 14 years before by Coſroes king of Perſia, upon his taking Jeruſalem from the emperor Phocas. The adoration of the croſs appears to have been practiſed in the ancient church: inaſmuch as the Heathens, particularly Julian, reproach the primitive Chriſtians with it: and we do not find that their apologiſts diſclaimed the charge.

CROSS-*Bearer (port croix, cruciger)*, in the Romiſh church, the chaplain of an archbiſhop or a primate, who bears a croſs before him on ſolemn occaſions. The pope has the croſs borne before him every where; a patriarch any where out of Rome; and primates, metropolitans, and thoſe who have a right to the pallium, throughout their reſpective juriſdictions. Gregory XI. forbad all patriarchs and prelates to have it borne in the preſence of cardinals. A prelate bears a ſingle croſs, a patriarch a double croſs, and the pope a triple one on their arms.

CROSS-*Bearers* also denote certain officers in the inquisition, who make a vow before the inquisitors or their vicars to defend the Catholic faith, though with the loss of fortune and life. Their business is to provide the inquisitors with necessaries. They were formerly of great use; but in process of time some of their constitutions were changed, and they were called of the penance of St. Dominic.

Pectoral CROSS, is a cross of gold or silver, or other precious materials, often enriched with diamonds, which the bishops, archbishops, &c. and regular abbesses, wear hanging from the neck.

Order of the CROSS, or *Croisade*, an order of ladies instituted in 1668 by the empress Eleonora de Gonzagua, wife of the emperor Leopold; on occasion of the miraculous recovery of a little golden cross, wherein were inclosed two pieces of the true cross, out of the ashes of part of the palace. It seems the fire had burnt the case wherein it was inclosed, and melted the crystal, yet the wood remained untouched.

Maids of the CROSS, a community of young women instituted in 1265 at Roye in Picardy, and afterwards dispersed to Paris and other towns. They instructed young persons of their own sex. Some took the three vows of poverty, chastity, and obedience; others retained their liberty. They were under the direction of a superior; but the order is now abolished.

CROSS, in heraldry, is defined by Guillim, an ordinary composed of fourfold lines; whereof two are perpendicular, and the other two transverse; for so we must conceive of them, though they be not drawn throughout, but meet by couples, in four right angles, near the fesspoint of the escutcheon. See HERALDRY. This bearing was first bestowed on such as had performed, or at least undertaken, some service for Christ, and the Christian profession; and is held by many the most honourable charge in all heraldry. What brought it into such frequent use, was the ancient expeditions into the Holy Land; and the holy war pilgrims, after their pilgrimage, taking the cross for their cognizance; and the ensign of that war being the cross. In those wars, says Mackenzy, the Scots carried St. Andrew's cross; the French a cross argent; the English a cross or; the Germans, sable; the Italians, azure; the Spaniards, gules.

St. George's CROSS, or the red cross, in a field argent, is now the standard of England; that saint being the reputed patron of this nation.

CROSS, in mining, two nicks cut on the superficies of the earth, thus +, which the miners make when they take the ground to dig for ore. This cross gives the miners three days liberty to make and to set on stones. As many of these crosses as the miner makes, so many mears of ground he may have in the vein, provided he set on stones within three days after making his cross or crosses. But if he make but one cross, and a stander by makes the second, and a stranger makes the third, every one is served with the next mear, according as they have first or last, sooner or later, made their cross or crosses upon the ground.

CROSS, in coins, a name given to the right side or face, the other being called the *pile* or *reverse*. It has been a common error, that the reverse was meant by the cross; because at this time, with us, it is marked with figures disposed in that form: but the stamping the head of the prince in these kingdoms on the right side of the coin, was preceded by a general custom of striking on that part the figure of a cross; while the other, called the *pile*, contained the arms, or some other device.

CROSS, instead of a signature to a deed, &c. is derived from the Saxon practice of affixing the sign of the cross, whether they could write or not.

CROSS-*Bar Shot*, a cannon-ball with an iron bar passing through it, and standing six or eight inches out on each side. It is used at sea for destroying the enemy's rigging.

CROSS-*Bill*, in ornithology. See LOXIA.

CROSS-*Bill*, in chancery, is an original bill, by which the defendant prays relief against the plaintiff.

CROSS-*Bows*. See BOWS and ARCHERY.

CROSS-*grained Stuff*, in joinery. Wood is said to be cross-grained, when a bough or branch has shot out of it; for the grain of the branch shooting forward, runs athwart that of the trunk. In well grown wood this defect is scarce perceivable, except in working; but in deal-boards these boughs make knots. If the bough grew up with the young trunk, instead of a knot is found a curling in the stuff, very sensible, under the plane.

CROSS *Jack*, pronounced *cro-jack*, a sail extended on the lower yard of the mizen-mast, which is hence called the *cross-jack yard*. This sail, however, has generally been found of little service, and is therefore very seldom used.

CROSS-*Piece*, a rail of timber extended over the windlass of a merchant ship from the night heads to the belfry. It is stuck full of wooden pins, which are used to fasten the running rigging as occasion requires. See WINDLASS.

CROSS-*Tining*, in husbandry, a method of harrowing land, consisting in drawing the harrow up the interval it went down before, and down that which it was drawn up.

CROSS-*Trees*, certain pieces of timber, supported by the checks and trestle-trees, at the upper ends of the lower masts, athwart which they are laid to sustain the frame of the top.

CROSS-*Tree Yard*, is a yard standing square, just under the mizen top, and to it the mizen-top is fastened below. See CROSS *Jack*.

CROSS *Wort*, in botany. See VALENTIA.

Ordeal of the CROSS, a species of trial frequently practised in the days of superstition. See ORDEAL.

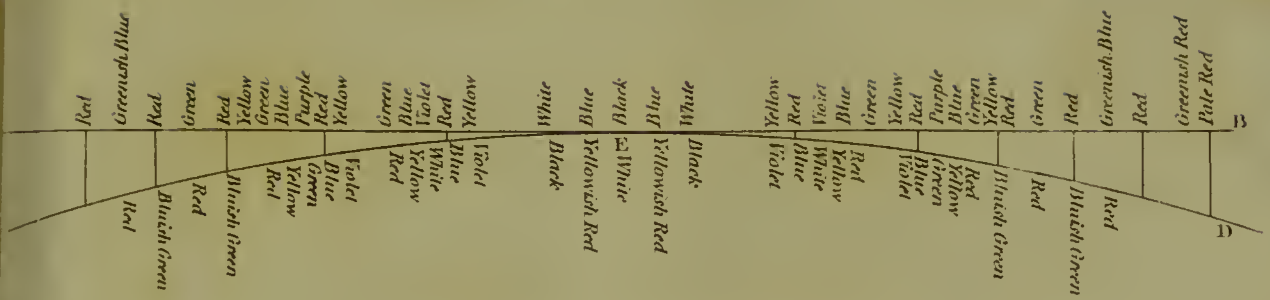
CROSS, an English artist, famous only for copying, in the reigns of Charles I. and Charles II. Of this talent there is a story current, more to the credit of his skill than of his probity. He is said to have been employed by Charles I. to copy the celebrated Madona of Raphael in St. Mark's church at Venice; and that, having obtained leave of the state for that purpose, he executed his piece so well as to bring away the original and leave his copy in the place of it. The deception was not detected until it was too late to recover the loss; and this piece was bought in Oliver's time by the Spanish ambassador for his master, who placed it in the Escurial.

CROSSEN, a handsome town of Silesia in Germany, and capital of a principality of the same name. It is situated at the confluence of the rivers Bobar and Oder, in a fertile country abounding in wine and fruits. There is a bridge over the Oder which is fortified. E. long. 15. 20. N. lat. 52. 5.

CROSSOSTYLUS, in botany; a genus of the polyandria order, belonging to the monadelphia class of plants. The calyx is a quadrangular, quadrifid, turbinated perianthium: the corolla consists of four elliptical petals; the stamina are 20 filiform filaments, almost the length of the calyx; the antheræ small and roundish; the pericarpium an hemispherical, unilocular berry, with many striæ on its upper part; the seeds numerous and roundish.

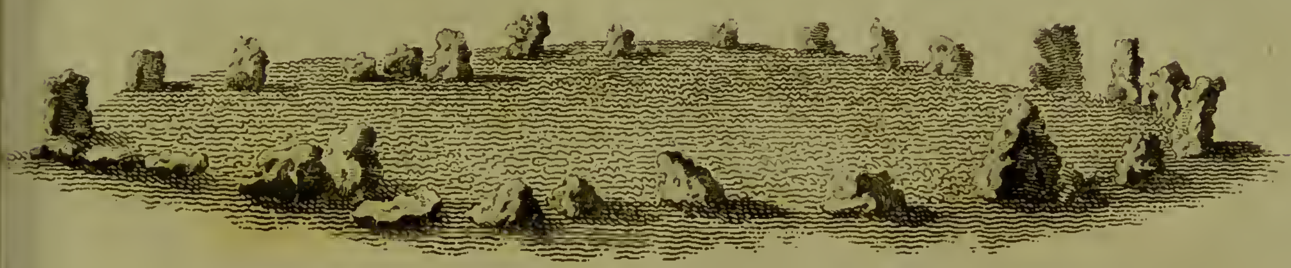
CROTALARIA, RATTLE-WORT; a genus of the decandria order, belonging to the diadelphia class of plants; and in the natural method ranking under the 32d order, *Papilionaceæ*. The legumen is turgid, inflated, and pedicellated; the filaments are coalited with a fissure on the back. There are 11 species, all of them natives of warm climates. They rise from 18 inches to 5 feet in height, and are adorned with flowers of a blue or yellow colour. The most remarkable species is the retusa, with simple oblong wedged leaves. It is a native of the island of Ceylon and some other parts of the East Indies. The flowers are yellow, the pods smooth, cylindrical, inflated, and placed horizontally: they are filled with seeds, which, when

Chromatic Rings.

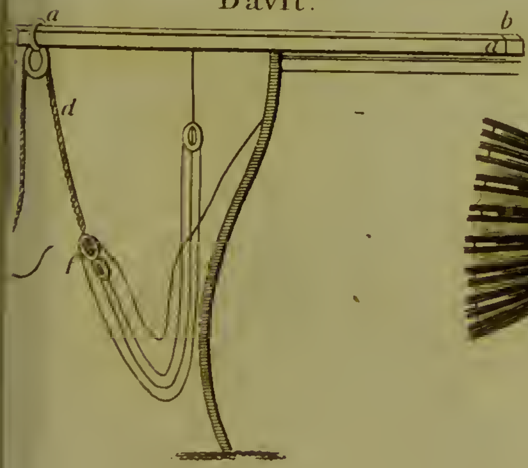


Pelican.

Druidical Circle.



Davit.

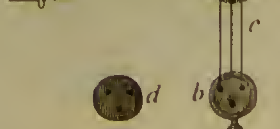


Lump Fish.

Crotalus *Horridus*.

Consanguinity.

Dead Eyes.



Condenser.

dried, and ſhaken by the ſlighteſt wind, emit a rattling noiſe: and this, by the rude inhabitants of the countries where the plant is native, is attributed to the devil, who is thought to deliver his oracles in this whimſical manner.

CROTALO, an inſtrument of military muſic, like that deſcribed in the next article. The Turks are the firſt, among the moderns, who introduced the uſe of it for their troops. It is now common in Flanders and Florence, and other territories on the continent. It has only one tone; but its effect in marking time may be diſtinctly heard through the noiſe of forty drums. This is the ſame inſtrument with the ancient cymbalum.

CROTALUM, an ancient kind of caſtagnetta, or muſical inſtrument, found on medals, in the hands of the prieſts of Cybele. The crotalum differed from the ſiſtrum; though authors frequently confound the two. It conſiſted of two little braſs plates or rods, which were ſhaken in the hand, and in ſtriking againſt each other made a noiſe. It was ſometimes alſo made of a reed ſplit lengthwiſe; one part whereof they ſtruck againſt the other; and as this made a noiſe ſomewhat like that of a crane's bill, they called that bird *crotaliſtria*, a player on the crotalla: and Ariſtophanes calls a great talker a *crotalum*. Clemens Alexandrinus attributes the invention to the Sicilians; and forbids the uſe thereof to the Chriſtians, becauſe of the indecent motions and geſtures that accompany it.

CROTALUS, or RATTLE-SNAKE, in zoology, a genus belonging to the order of amphibia ſerpentes; the characters of which are theſe: the belly is furniſhed with ſcuta, and the tail has both ſcuta and ſcales; but the principal characteriſtic of this genus is the rattle at the end of the tail. See Plate 89. The rattles conſiſt of ſeveral articulated cruſtaceous, or rather horny bags, which make a conſiderable rattling noiſe when the creature moves, and ſerves to warn people of their approach. There are five ſpecies; and the bite of every one of them is ſo highly poiſonous, that it generally kills in a ſhort time. Of theſe we have no account that can be depended upon, except that given by Mr. Cateſby of the horridus, or American rattle-ſnake. This grows ſometimes to the length of 8 feet, and weighs between 8 and 9 pounds. The colour of the head is brown; the eye red; the upper part of the body of a yellowiſh-brown colour, tranſverſely marked with irregular broad black liſts. The rattle is of a brown colour, compoſed of ſeveral horny, membranous cells, of an undulated pyramidal figure. Theſe are articulated within one another in ſuch a manner that the point of the firſt cell reaches as far as the baſis of the protuberant ring of the third, and ſo on; which articulation, being very looſe, gives liberty to the parts of the cells that are incloſed within the outward rings to ſtrike againſt the ſides of them, and ſo to cauſe the rattling noiſe which is heard when the ſnake ſhakes its tail. This is the moſt inactive and ſlow moving of all the ſnakes, and is never the aggreſſor except in what it preys upon. The above naturaliſt is of opinion that no remedy is yet diſcovered for the bite of this animal. He had frequently acceſs to ſee Indians bit by it, and always thought that thoſe who recovered were cured more though the force of nature, or by reaſon of the ſlightneſs of the bite, than by the remedies uſed. He tells us, that the Indians know their deſtiny the moment they are bit; and if the bite happens to be on any of the large veins, they apply no remedies, as knowing them to be entirely uſeleſs. He believes the reports of the faſcinating power of this ſerpent, though he never had an opportunity of ſeeing it. See the articles POISON and SERPENT.

CROTALYSTRIÆ, in antiquity, a kind of morice dances, admitted to entertainments, in order to divert the company with their dancing and playing on an inſtrument called *crotalum*, whence they had their name.

CROTCHET, in muſic, one of the notes or characters of time, equal to half a minim, and double that of a quaver.

CROTCHETS are alſo marks or characters, ſerving to incloſe a word or ſentence which is diſtinguiſhed from the reſt, being generally in this form [ ].

CROTON, WILD RICINUS; a genus of the monadelphia order, belonging to the monœcia claſs of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The male calyx is cylindrical and quinquedentated; the corolla is pentapetalous; the ſtamina from 10 to 15. The female calyx is polyphyllous; no corolla; three bifid ſtyles; the capſule trilocular; one ſeed. There are 21 ſpecies; of which the moſt remarkable are, 1. The *tinctorium*, or plant from which the French turnſole is made. This grows naturally in the ſouth of France: it is an annual plant, riſing about 9 inches high, with an herbaceous branching ſtalk, garniſhed with irregular or rhomboidal figured leaves, which are near two inches long and an inch and a quarter wide in their wideſt part. Theſe ſtand upon ſlender footſtalks near four inches long. The flowers are produced in ſhort ſpikes from the ſides of the ſtalks, at the end of the branches; the upper part of the ſpike is compoſed of male flowers, having many ſtamina which coaleſce at the bottom; the lower part hath female flowers, which have each a roundiſh, three-cornered germen; theſe afterwards become a roundiſh capſule with three lobes, having three cells, each including one roundiſh ſeed. This flowers in July; but unleſs the plants are brought forward on a hot-bed, they do not ripen ſeeds in this country. From this plant is made the turnſole uſed for colouring wines and jellies. It is made of the juice which is lodged between the empalement and the ſeeds; which, if rubbed on cloths, at firſt appears of a lively green, but afterwards changes to a blueiſh purple colour. If theſe cloths are put into water, and afterwards wrung, they will dye the water to a claret colour. The rags thus dyed are brought to this country, and ſold in the druggiſts'-ſhops under the name of *turnſole*. 2. The *ſebifera*, or tallow-tree, with rhomboidal egg-ſhaped leaves, pointed, ſmooth and very entire. It is about the height of a cherry-tree; its leaves in form of a heart, of a deep ſhining red colour, and its bark very ſmooth. Its fruit is encloſed in a kind of pod, or cover, like a cheſnut, and conſiſts of three round white grains, of the ſize and form of a ſmall nut, each having its peculiar capſula, and within that a little ſtone. This ſtone is encompaſſed with a white pulp, which has all the properties of true tallow, as to conſiſtence, colour, and even ſmell: and accordingly the Chineſe make their candles of it; which would doubtleſs be as good as thoſe in Europe, if they knew how to purify their vegetable tallow as well as we do our animal kind, and to make their wicks as well. 3. The *aromaticum*, with heart-ſhaped ſerrated leaves, and an arboreſcent ſtem. The bark of this tree is the ſame as the caſcarilla and eleutheria; though theſe have been conſidered by ſome as diſtinct barks, and ſold in the ſhops as different productions. It is a hot, acrid, aromatic bitter, reſembling in appearance the Peruvian bark, but is more bitter and pungent, though not ſo rough and aſtringent. It was firſt introduced into Europe about the end of the laſt century, and ſeems firſt to have been uſed in Germany, where it is ſtill in very high eſteem. There it is frequently employed in intermittent fevers, in preference to the Peruvian bark, as being leſs ſubject to ſome inconveniences, to which the latter is deemed liable. It is alſo ſaid to have been employed with great ſucceſs in ſome very dangerous epidemic fevers attended with petechiæ; and it is frequently employed with advantage in dyſenteries, diarrhœas, &c. In Britain it has alſo been uſed by ſome practitioners. Its virtues are partially extracted by water, and totally by rectified ſpirit, but it is moſt effectual when given in ſubſtance. 4. The *caſcarilla*, deſcribed by Linnæus as producing the officinal bark of that name, is, according to Dr. Wright, the wild roſemary ſhrub of Jamaica, the bark of which has none of the ſenſible qualities of

the true cafcarilla or eleutheria above defcribed. For his account fee the *Medical Journal*, vol. viii.

CROTONA, a town of Italy, in the kingdom of Naples, feated on the gulph of Taranto, with a bifhop's fee and citadel. E. long. 17. 27. N. lat. 39. 10.

CROTOPHAGA, in ornithology, a genus of birds belonging to the order of picæ; the characters of which are: The bill is thin, compreffed, greatly arched, half oval, and cultrated at top; the noftrils are round; the tongue flat, and pointed at the end; the tail confifts of ten feathers; and the toes are placed two and two. See Plate 81. The moft remarkable fpecies is the *ani*, which is about the fize of a blackbird: the colour of the whole bird is black, in fome parts gloffed with purple, and about the neck faintly tinged with green on the margins: the bafe of the bill is furnifhed with black briftles, which turn forwards: the eye-lids have long hair-like eyelafhes: the tail is fix inches long, and much cuneated; and the legs are black. This fpecies is found in Jamaica, St. Domingo, and other iflands in the Weft Indies; alfo at Cayenne and other parts of South America. Contrary to all other birds, they have the fingularity of many lying in the fame neft; to make which, they all unite in concert, and after laying their eggs, fit on them clofe to each other to hatch them, each unanimoufly ftriving to do the beft for the general good; and when the young are hatched, the parents, without referve, do the beft to feed the whole flock. Still a greater fingularity occurs, which is, that as foon as each female lays her eggs fhe covers them with leaves, doing the fame thing whenever fhe is obliged to leave the neft for food: this might be neceffary in a cold climate; but why it fhould be wanted in a hot one feems not clear, efpecially as it has not been obferved in other birds. The female has two broods in a year, except accidents happen; in which cafe fhe has been known to make three nefts. The eggs are about the fize of thofe of a pigeon, of a fea-green colour, fpotted at the ends. Their food is various; worms, infects, fruits, and grain, according to the feafon. There is a variety called the greater ani, which is about the fize of a jay, differing no otherwife from the former but in fize. They ought, however, to be confidered as two diftinct fpecies: for they never mix together; though each have the fame manners, with this difference only, that the fmaller frequent the open favannas, the larger only the falt-marfhes near the fea-coafts. It is faid that they are eafily made tame, and will learn to talk like parrots. The male and female are both alike. Both fpecies are eafy to be fhot, not being fo wild as many other birds; but are known to chatter much on the fight of a man, though they do not fly to a great diftance; hence are not well relifhed by fportfmen, as, like the jays in England, they are the occafion of hindering his fport in refpect to other game, without making him amends in their own flefh, which is never fought after for food, being rank and unfavoury.

CROUCHED FRIARS. See CROISIERS.

CROUP, in medicine. See MEDICINE.

CROUP *of a Horfe*, in the manege, the extremity of the reins above the hips.

CROUPADE, in the manege, a leap, in which the horfe pulls up his hind legs, as if he drew them up to his belly.

CROUTE, SOUR CROUTE, or KROUTE. As this preparation of cabbage has been found of fovereign efficacy as a prefervative in long voyages from the fea-fcurvy, it may not be unacceptable to give a concife account of the procefs for making it: The foundeft and moft folid cabbages are felected for this ufe, and cut crofswife very fmall, commonly with an inftrument made for this purpofe, not unlike the plain which is ufed in this country for flicing cucumbers. A knife is ufed when the preparation is made with greater nicety. The cabbage thus fliced is put into a barrel in layers, hand high, and over each is ftrewed a handful of falt and carraway-feeds; in this manner it is rammed down with a rammer *ftratum fuper ftratum*, till the barrel be full; when a cover is put over it and preffed down with a heavy weight. After ftanding fome time in this ftate it begins to ferment; and it is not till the fermentation has entirely fubfided that the head is fitted to it, and the barrel is finally fhut up and preferved for ufe. There is not a drop of vinegar employed in this preparation. The Germans write this preparation in the following manner: *Sauer kraut*, or *fauer kohl*; that is, in their language, "four herb, or four cabbage."

CROUSAZ (John Peter de), a learned philofopher and mathematician, was born in 1663: having made great progrefs in the mathematics and the philofophy of Des Cartes, he travelled to Geneva, Holland, and France; was fucceffively profeffor in feveral univerfities; and at length was chofen governor to Prince Frederic of Heffe-Caffel, nephew to the king of Sweden. He wrote many works; the moft efteemed of which are, 1. His Logic, the beft edition of which is that of 1741, in 6 vols. 8vo. 2. A Treatife on Beauty. 3. A Treatife on the Education of Children, 2 vols 12mo. 4. Several Treatifes on Philofophical and Mathematical Subjects, &c. He died at Laufanne in 1748.

CROW, in ornithology. See CORVUS.

CROW, in mechanics, a kind of iron lever, with a claw at one end and a fharp point at the other; ufed for heaving or purchafing great weights.

CROW'S *Bill*, among furgeons, a kind of forceps for drawing bullets and other foreign bodies out of wounds.

CROW'S *Feet*, in the military art, machines of iron, having four points, each about three or four inches long, fo made, that whatever way they fall there is ftill a point up: they are thrown upon breaches, or in paffes where the enemy's cavalry are to march, proving very troublefome, by running into the horfe's feet and laming them.

CROW-*Foot*, on fhip board, a complication of fmall cords fpreading out from a long block, like the fmaller parts which extend from the back-bone of a herring. See Plate 87. It is ufed to fufpend the *awnings*; or to keep the top-fails from ftriking violently, and fretting againft the tops.

CROW-*Net*, is an invention for catching wild-fowl in the winter feafon, and may be ufed in the day time. This net is made of double thread, or fine pack-thread; the mefhes fhould be two inches wide, the length about ten yards, and the depth three; it muft be verged on the fide with good ftrong cord, and ftretched out very ftiff on long poles prepared for that purpofe. When you come to the place where you would fpread your net, open it, and lay it out at its full length and breadth; then faften the lower end of the net all along the ground, fo as only to move it up and down; the upper end of the net muft ftand extended on the long cord; the further end thereof being ftaked firft to the earth by a ftrong cord about five yards diftant from the net. Place this cord in an even line with the lower edge of the net. The other end muft be at leaft 25 yards diftant to reach into fome natural or artificial fhelter, by the means of which you may lie concealed from the fowl, otherwife no good fuccefs can be expected. The net muft be placed in fuch exact order that it may give way to play on the fowl on the leaft pull of the cord, which muft be done fmartly, left the fowl fhould prove too quick for you. This net may be ufed for pigeons, crows, or other birds, on corn-fields newly fown; as alfo in ftubble-fields, provided the ftubble conceals the net from the birds.

CROWD, in the fea-language, is to carry an extraordinary force of fail upon a fhip, in order to accelerate her courfe on fome important occafion; as in purfuit of, or flight from, an enemy; to efcape any immediate danger, &c.

CROWLAND, a town in Lincolnfhire, with a market on Saturday. It is feated in the Fens, and had formerly an abbey

of great note. There is no coming at it but by narrow cauſeways, which will not admit a cart. It has three ſtreets, ſeparated from each other by water-courſes, whoſe banks are ſupported by piles and ſet with willow-trees. The chief trade is in fiſh and wild-fowl, which are in great plenty in the adjacent pools and marſhes. It is 11 miles N. of Peterborough, and 93 N. by W. of London. W. lon. 0. 10. N. lat. 52. 41.

CROWN, an ornament worn on the head by kings, ſovereign princes, and noblemen, as a mark of their dignity. In ſcripture there is frequent mention of crowns, and the uſe of them ſeems to have been very common among the Hebrews. The high prieſt wore a crown, which was a fillet of gold placed upon the forehead, and tied with a ribbon of hyacinth colour, or azure blue. It ſeems alſo as if private prieſts, and even common Iſraelites, wore alſo a ſort of crown, ſince God commanded Ezekiel not to take off his crown, nor aſſume the marks of one in mourning. This crown was no more than a ribbon or fillet, with which the Jews and ſeveral people in the eaſt girt their heads. And indeed the firſt crowns were no more than a bandelet drawn round the head, and tied behind, as we ſtill ſee it repreſented on medals round the heads of Jupiter, the Ptolemies, and kings of Syria. Afterwards they conſiſted of two bandelets; by degrees they took branches of trees of divers kinds; at length they added flowers, inſomuch that Claudius Saturninus ſays, there was not any plant whereof crowns had not been made. The woods and groves were ſearched to find different crowns for the ſeveral deities; and they were uſed not only in the ſtatues and images of the gods, by the prieſts in ſacrificing, and by kings and emperors, but alſo on altars, temples, doors of houſes, ſacred veſſels, victims, ſhips, &c.

The Roman emperors had four kinds of crowns, ſtill ſeen on medals, viz. a crown of laurel, a radial or radiating crown, a crown adorned with pearls and precious ſtones, and the fourth a kind of bonnet or cap, ſomething like the mortier. The Romans had alſo various kinds of crowns, which they diſtributed as rewards of military achievements; as, 1. The *oval* crown, made of myrtle, and beſtowed upon generals, who were entitled to the honours of the leſſer triumph, called *ovation*. 2. The *naval* or roſtral crown, compoſed of a circle of gold, with ornaments repreſenting beaks of ſhips, and given to the captain who firſt grappled, or the ſoldiers who firſt boarded an enemy's ſhip. 3. The crown called in Latin *vallaris*, or *caſtrenſis*, a circle of gold raiſed with jewels or paliſades; the reward of him who firſt forced the enemy's entrenchments. 4. The *mural* crown, a circle of gold indented and embattled; given to him who firſt mounted the wall of a beſieged place, and there lodged a ſtandard. 5. The *civic* crown, made of the branch of a green oak, and given him who had ſaved the life of a citizen. 6. The *triumphal* crown, conſiſting at firſt of wreaths of laurel, but afterwards made of gold; proper to ſuch generals as had the honour of a triumph. 7. The crown called *obſidionalis*, or *graminea*, made of graſs growing on the place; the reward of a general who had delivered a Roman army from a ſiege. 8. The *radial* crown, given to princes at their tranſlation among the gods. We meet alſo with the corona aurea, often beſtowed on ſoldiers, without any other additional term; athletic crowns, and crowns of laurel, deſtined to crown victors at the public games, poets, orators, &c. All theſe crowns were marks of nobility to the wearers; and upon competitions with rivals for rank and dignities, often determined the preference in their favour, ſee plate 79. For an account of modern crowns, ſee Heraldry.

Crown, is alſo uſed to ſignify the poſſeſſions and dignity of a king. The crown of England, according to Sir William Blackſtone, is, by common law and conſtitutional cuſtom, hereditary; and this in a manner peculiar to itſelf: but the right of inheritance may from time to time be changed or limited by act of parliament, under which limitations the crown ſtill continues hereditary. See Succession.

Pleas of the Crown. See Pleas.

Crown, in commerce, is a general name for coins, both foreign and domeſtic, of or near the value of five ſhillings Sterling. In its limited ſenſe, crown is only applicable to that popular Engliſh coin which bears the name, and which is equivalent to ſixty Engliſh pence or five ſhillings, or to ſix livres French money. But, in its extenſive ſenſe, it takes in ſeveral others; as the French ecu, which we call the French crown, ſtruck in 1641 for ſixty ſols, or three livres; alſo the patagon, dollar, ducatoon, rixdollar, and piaſtre or piece of eight.

Crown, in an eccleſiaſtical ſenſe, is uſed for the clerical tonſure; which is the mark or character of the Romiſh eccleſiaſtics. This is a little circle of hair ſhaved off from the crown of the head; more or leſs broad, according to the quality of the orders received. That of a mere clerk is the ſmalleſt; that of prieſts and monks the largeſt. The clerical crown was anciently a round liſt of hair, ſhaved off around the head, repreſenting a real crown: this is eaſily obſervable in ſeveral ancient ſtatues, &c. The religious of St. Dominic and St. Francis ſtill retain it.

Crown, among jewellers, the upper work of the roſe diamond, which all centres in the point at the top, and is bounded by the horizontal ribs.

Crown-*Office*, an office belonging to the king's-bench court, of which the king's coroner or attorney is commonly maſter. In this office, the attorney-general and clerk of the crown ſeverally exhibit informations for crimes and miſdemeanours at common law, as in the caſe of batteries, conſpiracies, libelling, &c. on which the offender is liable to pay a fine to the king.

Crown-*Glaſs*, denotes the fineſt ſort of window-glaſs. See Glass.

Crown-*Scabs*, in farriery. See Farriery.

Crown-*Wheel of a Watch*, the upper wheel next the balance, which by its motion drives the balance, and in royal pendulums is called the *ſwing-wheel*.

Crown-*Imperial*, in botany. See Fritillaria.

Crown-*Work*, in fortification, is an out-work running into the field; deſigned to keep off the enemy, gain ſome hill or advantageous poſt, and cover the other works of the place. The crown-work conſiſts of two demi-baſtions at the extremes, and an entire baſtion in the middle, with curtains.

CROWNE (John), a celebrated dramatic writer, born in Nova Scotia, where his father was a miniſter. Being impatient of the gloomy reſtraint of that country, he came to England, where he was reduced to enter into the ſervice of an old lady; of which he was ſoon as weary as he had been of America. He had then recourſe to his pen, which quickly procured him favour at court; but this kind of ſubſiſtence proving precarious, he ventured to ſolicit Charles II. for ſome eſtabliſhment. Charles promiſed to provide for him. but inſiſted firſt on having another comedy; and ſuggeſted to him the plan of a Spaniſh play, from which Crowne produced the comedy of *Sir Courtly Nice*: but the ſudden death of the king on the laſt day of the rehearſal, plunged him at once from his pleaſing expectations into diſappointment and diſtreſs, and left him no reſource but his wits. He died ſome time about the year 1703; and left behind him 17 tragedies and comedies, ſome of which are acted with great ſucceſs. His chief excellency lay in comedy; yet his tragedies are far from being contemptible. His plots are for the moſt part his own invention: his characters are in general ſtrongly coloured and highly finiſhed; and his dialogue lively and ſpirited, attentively diverſified, and well adapted to the ſeveral ſpeakers: ſo that, on the whole, he may aſſuredly be

allowed to ſtand at leaſt in the third rank of our dramatic writers.

CROWNING, in architecture, is underſtood in the general, of any thing that terminates or finiſhes a member or decoration. Thus, a corniche, a pediment, &c. are called *crownings*. Thus alſo the abacus is ſaid to crown the capital; and thus any member or moulding is ſaid to be crowned when it has a fillet over it; and a niche is crowned when it is covered with a capital.

CROWNING, in ſea-language, denotes the finiſhing part of a knot made at the end of a rope. It is performed by interweaving the ends of the different ſtrands artfully amongſt each other, ſo as that they may not become looſened or untwiſted. Crownings are uſeful in all kinds of ſtoppers.

CROWTH, or CRUTH. See CRUTH.

CROXAL (Samuel), an ingenious Engliſh divine, who in his youth wrote the celebrated poem entitled *The Fair Circaſſian*. He had the livings of Hampton in Middleſex; and the united pariſhes of St. Mary Somerſet, and St. Mary Mounthaw, in London; both which he held till his death in 1751. He publiſhed many other poems and tranſlations, with an entire Engliſh edition of Æſop's Fables. In conſequence of his attachment to Whig principles, he enjoyed ſome other preferments, and was made chaplain in ordinary to George II.

CROYDON, a large town in Surry, with a market on Saturday. Its ſituation is low, near the ſource of the Wandle. It has a large handſome church, and an hoſpital and free-ſchool, founded by archbiſhop Whitgift. In the church are many fine monuments of the archbiſhops of Canterbury, to whom the manor belonged ever ſince the Conqueſt, and who had here an ancient palace, which was alienated from the ſee, by virtue of an act of parliament, in 1780: the building, and adjoining premiſes, are now occupied by ſome manufactories. Croydon is 9 miles S. of London. W. long. 0. 1. N. lat. 51. 20.

CRUCIAL INCISION, in ſurgery, an inciſion made in the form of a croſs.

CRUCIANELLA, PETTY MADDER; a genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 47th order, *Stellatæ*. The corolla is monopetalous and funnel-ſhaped, with the tube filiform and the limb unguiculated, or having an inflexed ſegment on the top of each ſegment; the calyx is diphyllous, and there are two linear ſeeds. There are five ſpecies, natives of the ſouthern parts of Europe; but none of them poſſeſſed of any remarkable quality.

CRUCIBLE, a chemical veſſel made of earth, and ſo tempered and baked as to endure the greateſt fire. Crucibles are uſed to melt metals, and to flux minerals, ores, &c. See Pl. 72, fig. 1.

CRUCIFIX, a croſs upon which the body of Chriſt is faſtened in effigy, uſed by the Roman Catholics to excite in their minds a ſtrong idea of our Saviour's paſſion. They eſteem it an eſſential circumſtance of the religious worſhip performed at the altar; and on Good Friday they perform the ceremony of adoring it; when the whole congregation bow with great reverence, and devoutly kiſs the holy wood.

CRUCIFIXION, a capital puniſhment by nailing the criminal to a croſs. See CROSS.

CRUCIFORM, in general, ſomething diſpoſed croſs ways; but more eſpecially uſed by botaniſts, for flowers conſiſting of four petals diſpoſed in the form of a croſs.

CRUCITA, in botany, a genus of the digynia order, belonging to the tetrandria claſs of plants, and in the natural method ranking with thoſe the order of which is doubtful. The interior calyx is tetraphyllous, the exterior calyx triphyllous; there is no corolla, and only one ſeed.

CRUDE, an epithet given to ſuch ſubſtances as are in an impure and unrefined ſtate.

CRUDITY, among phyſicians, is a term chiefly applied to undigeſted ſubſtances in the ſtomach.

CRUISE, from the German *kruiſs*, "acroſs," ſignifies to croſs to and fro, to ſail up and down within a certain ſpace of the ſea, called the *cruiſing* latitude, in queſt of veſſels, or fleets of an enemy, &c.

CRUISERS, in the navy, are ſmall men of war made uſe of to and fro in the channel, and elſewhere, to ſecure our merchant ſhips and veſſels from the enemy's ſmall frigates and privateers. They are generally ſuch as ſail well, and are commonly well manned: and indeed the ſafety of the trade in the channel, and up and down the ſoundings, and other places, abſolutely requires the conſtant keeping out ſuch ſhips at ſea.

CRUMENTATA, among the zoologiſts, animals furniſhed with a pouch or bag, wherein they receive their young in time of danger; as the opoſſum. See DIDELPHUS.

CRUOR, ſometimes ſignifies the blood in general; ſometimes only the venous blood; and ſometimes extravaſated or coagulated blood; but is moſt frequently uſed for the red globules of the blood, in contradiſtinction to the limpid or ſerous part.

CRUPPER, in the manege, the buttocks of a horſe, the rump; alſo a thong of leather put under a horſe's tail, and drawn up by a ſtrap to the buckle behind the ſaddle, ſo as to keep him from caſting the ſaddle forwards on his neck.

CRURÆUS, or CRUREUS, *Muſculus*, in anatomy, a fleſhy maſs, covering almoſt all the foreſide of the os femoris, between the two vaſti, which likewiſe cover the edges of this muſcle on each ſide. See ANATOMY, *Table of the Muſcles*.

CRURAL, in anatomy, an epithet given to the artery which conveys the blood to the crura or legs, and to the vein by which this blood returns towards the heart. See ANATOMY, page 196.

CRUS, in anatomy, all that part of the body contained between the buttocks and the toes.

CRUSADO, in commerce, a Portugueſe coin, ſtruck under Alphonſus V. about the year 1457, at the time when pope Calixtus ſent thither the bull for a croiſade againſt the infidels. This coin has a croſs on one ſide, and the arms of Portugal on the other.

CRUSCA, an Italian term ſignifying *bran*, is in uſe amongſt us to denote that celebrated academy called *della Cruſca*, eſtabliſhed at Florence for purifying and perfecting the Tuſcan language. The academy took its name from its office, and the end propoſed by it; which was, to refine the language, and as it were to ſeparate the bran from it. Accordingly its device is a ſieve; and its motto, *Il piu bel fior ne coglie*; that is, "It gathers the fineſt flour thereof." In the hall or apartment where the academy meets, M. Moneonis informs us, that every thing bears an alluſion to the name and device; the ſeats are in form of a baker's baſket; their backs like a ſhovel for moving of corn; the cuſhions of grey ſattin, in form of ſacks or wallets; and the branches where the lights are placed reſembling ſacks. The vocabulary *Della Cruſca* is an excellent Italian dictionary, compoſed by this academy.

CRUSTA LACTEA, in medicine, the ſame with ACHOR.

CRUSTACEOUS FISH, in natural hiſtory, are thoſe covered with ſhells, conſiſting of ſeveral pieces or ſcales; as thoſe of crabs, lobſters, &c. Theſe are uſually ſofter than the ſhells of the teſtaceous kind, which conſiſt of a ſingle piece, and generally are thicker and ſtronger than the former; ſuch as thoſe of the oyſter, ſcallop, cockle, &c. Dr. Woodward obſerves, in his Natural Hiſtory, that of all the ſhells found in beds of all the different matters dug out of the earth, there are ſcarce any of the cruſtaceous kind: the reaſon he gives for it is, that theſe being much lighter than the reſt, muſt have floated on the ſurface at the time of the deluge, when all the ſtrata were formed; and there have corrupted and periſhed.

CRUTH, or Crowth, a kind of mufical inftrument formerly in ufe among the common people in Wales. It is of the fidicinal kind, fomewhat refembling a violin, 12 inches in length, and an inch and an half in thicknefs. It has fix ftrings fupported by a bridge, and is played on with a bow: the bridge differs from that of a violin, in that it is flat and not convex at the top; a circumftance from which it is to be inferred, that the ftrings are to be ftruck at the fame time, fo as to afford a fucceffion of concords. The bridge is not placed at right angles with the fides of the inftrument, but in an oblique direction; and, which is further to be remarked, one of the feet of the bridge goes through one of the found-holes, which are circular, and refts on the infide of the back; the other foot, which is proportionably fhorter, refting on the belly before the other round-hole. Of the ftrings, the four firft are conducted from the bridge down the finger-board, as in a common violin; but the fifth and fixth, which are about an inch longer than the others, leave the fmall end of the neck about an inch to the right. The whole fix are wound up either by wooden pegs in the form of the letter T, or by iron pins, which are turned with a wreft like thofe of a harp or fpinet. Of the tuning, it is to be remarked, that the fifth and fixth ftrings are the unifon and octave of G; the fourth and fifth, the fame of C; and the fecond and firft, the fame of D; fo that the fecond pair of ftrings are a fourth, and the third a fifth, to the firft. See Plate 87. Concerning the antiquity of this inftrument, there is but little written evidence to carry it further back than the time of Leland; neverthelefs the opinion of its high antiquity is fo ftrong among the inhabitants of the country where it was ufed, as to afford a probable ground of conjecture, that the cruth might be the prototype of the whole fidicinal fpecies of mufical inftruments. Another evidence of its antiquity, but which tends alfo to prove that it was not peculiar to Wales, arifes from a difcovery lately made and communicated to the fociety of antiquarians, refpecting the abbey-church of Melrofe in Scotland, fuppofed to have been built about the time of Edward II. It feems that among the outfide ornaments of that church there is the reprefentation of a cruth, very little different from the defcription given above. The inftrument is now difufed, in fo much that Sir John Hawkins, from whom we extract, tells us, that there is but one perfon in the whole principality of North Wales that can play upon it; and as he was at that time near 60 years of age, the fucceffion of performers is probably at an end.

CRUX, or St. Croix, one of the Caribbee Iflands, fituated about 60 miles fouth-eaft of Porto Rico, and fubject to Denmark. From being a perfect defert, it has begun to flourifh exceedingly, being made a free port, and receiving great encouragement from government. W. long. 64. 0. N. lat. 17. 30.

CRYMODES, among phyficians, a kind of feverifh paroxyfm, attended with a fhivering and inflammation of the internal parts of the body.

CRYPTA, a fubterraneous cell or vault, efpecially under a church, for the interment of particular families or perfons. S. Ciampini, defcribing the outfide of the Vatican, fpeaks of the *cryptæ* of St. Andrew, St. Paul, &c. The word is formed of κρυπτω, *abfcondo*, "I hide;" whence κρυπτη, *crypta*. Vitruvius ufes the word *crypta* for a part of a building, anfwering nearly to our cellar; Juvenal for a *cloaca*. Hence *crypto porticus*, a fubterraneous place arched or vaulted, ufed as an under-work or paffage in old walls. The fame is alfo ufed for the decoration at the entry of a grotto.

Crypta is alfo ufed by fome of our ancient writers for a chapel or oratory under ground.

Cryptæ, in anatomy, a name given by Ruyfch to glands fituated on the back of the tongue, and to glands of the inteftines.

CRYPTOGAMIA, from κρυπτος, *occultus*, "concealed," and γαμος, *nuptia*, "nuptials," the 24th clafs in the Linnæan fyftem, comprehending thofe plants whofe fructifications are concealed, either through minutenefs, or within the fruit. See Botany, p. 47.

CRYPTOGRAPHY, the art of writing in cipher, or with fympathetic ink. See Cipher and Ink.

CRYSTAL, a fpecies of ftones of the quartz kind, belonging to the filiceous clafs. It always appears, when there has been no interruption to its cryftallization, in hexagonal prifms pointed at both ends. It is found of different kinds and colours. 1. Opaque or femitranfparent, and white or of a milk colour. 2. Opaque and red, or of a carnelian colour, from Oran in Barbary. 3. Opaque and black, from the fame place. 4. Clear. The fpecific gravity of thefe kinds of cryftals is from 2650 to 2700. Profeffor Bergman extracted from them about fix parts of argilla and one of calcareous earth per hundred weight; but Mr. Gerhard found fome fo pure as to contain neither. 5. Clear and blackifh brown, the fmoky topaz, or *rauch topaz* of the Germans. It is found at Egan in Norway, and at Lovifa in Finland. Thefe cryftals are faid to become clear by boiling them in tallow. 6. Clear and yellow; found in Bohemia, and fold inftead of topazes. 7. Clear and violet-coloured; the amethyft, from Saxony, Bohemia, and Dannemore in Upland. The moft tranfparent of thefe are called falfe diamonds. Briftol, Kerry ftones, Alençon diamonds, &c. 8. Colourlefs rock cryftal, properly fo called, found in Bohemia, the province of Jemtland, and many other places. 9. Pyramidal cryftal with one or two points. Thefe have no prifmatic fhape, but either ftand upon a bafe in cavities of quartz veins, have only a fingle pyramid, and are of various colours; or they lie in a clayey earth, and have both pyramids, but no prifm. They are found at Blackenburg upon the Hartz, and at Morferofh in the Silverland in Tranfylvania.

The coloured tranfparent cryftals derive their tinge from an exceedingly fmall portion of metallic calces, but lofe them entirely when ftrongly heated. They are called *falfe gems*; viz. the red from Oran in Barbary, falfe rubies; the yellow from Saxony, falfe topazes; the green from Dauphiny, very rare, falfe emeralds or prafes; the violet from Vil in Catalonia, falfe amethyfts; the blue from Puy in Valay in France, falfe fapphires. There are likewife opal or rainbow cryftals, the various colours of which are thrown out in zones acrofs the furface. They make a very fine appearance, though they never fhine like the oriental opal.

M. Fourcroy makes a remarkable difference between the cryftals and quartz, affirming that the former are unalterable in the fire, in which they neither lofe their hardnefs, tranfparency, nor colour, while the quartz lofes the fame qualities, and is reduced by it to a white and opaque earth. He claffes the rock cryftals, I. according to their form, viz. 1. Infulated hexagonal cryftals ending in pyramids of fix faces, which have a double refraction, or fhow two images of the fame object when looked through. 2. Hexagonal cryftals united, having one or two points. 3. Tetrahedral, dodecahedral, flatted cryftals; and which, though hexagonal, have neverthelefs their planes irregular. 4. Cryftals in large maffes, from the ifland of Madagafcar, which have a fimple refraction. II. With regard to their colour, as being either diaphanous, reddifh, fmoky, or blackifh. III. With regard to accidental changes, fome are hollow; fome contain water within one or more cavities: fome are cafed one within the other; fome are of a round form, as the pebbles of the Rhine; fome have a cruft of metallic calces or of a pyrites; fome are found cryftallized in the infide of a cavity;

while ſome ſeem to contain amianthus or aſbeſtos; and others contain ſhirls. The ſame author reckons among the cryſtals the oriental topaz, the hyacinth, the oriental ſapphire, and the amethyſt. Mr. Daubenton has always looked upon this laſt as a quartz of a cryſtal.

When the rock-cryſtals are ſemitranſparent or intermixed with opaque veins, they are called by the Swediſh lapidaries *milk-cryſtals*. When they are found in the form of round pebbles, which is occaſioned by their being toſſed about and rubbed againſt one another by floods or by the ſea, they are called by the Engliſh lapidaries *pebble-cryſtals*. They come from the Indies, Siberia, and other places.

According to Bomare, the rocky-cryſtals are generally formed upon or among quartz, which ſhows their great affinity, and are to be found in all parts of the world. The greateſt quantity of them is brought from Mount Saint Gothard in Switzerland. Large pieces of theſe, weighing from 5 to 800 pounds, were found there at Grimſelberg; another about 1200 pounds weight was found ſome years ago at Fiſbach in the Wallais; and a piece ſix feet long, four wide, and equally thick, was found in the iſland of Madagaſcar, where theſe natural productions are of the moſt extraordinary ſize and perfection.

In the imperial collection at Vienna, there is a pyramidal cryſtal vaſe two ells in height, cut wholly out of one piece. It is uſual with the largeſt cryſtals of the German mountains to be full of cracks and flaws, and to be ſo conſtructed internally as to ſhow all the priſmatic colours; but the above mentioned ones were quite free from theſe blemiſhes, and reſembled columns of the pureſt glaſs, only much clearer than any glaſs can be made. Cryſtal is alſo found in many parts of Britain and Ireland. About Briſtol it is found of an amethyſtine tinge. In Sileſia and Bohemia in Germany it is found ſtained with the colours of the ruby, ſapphire, emerald, and topaz; in which caſe jewellers take great advantage of it, ſelling it under the name of *accidental ſapphire*.

The names of the pure cryſtal are three: The firſt is perfect columnar cryſtals, with double pyramids, compoſed of 18 planes, in an hexangular column, terminated by an hexangular pyramid at each end: the ſecond order is that of perfect cryſtals, with double pyramids, without a column, compoſed either of 12 or of 16 planes, in two hexangular pyramids, joined cloſely baſe to baſe, without the intervention of any column: the third order is that of the imperfect cryſtals, with ſingle pyramids, compoſed either of 12 or 10 planes, in an hexangular or pentangular column, affixed irregularly at one end to ſome ſolid body, and terminated at the other by an hexangular or pentangular pyramid. Theſe are all the general forms into which cryſtal, when pure, is found concreted: but under theſe there are almoſt infinite varieties in the number of angles, and the length, thickneſs, and other accidents of the columns and pyramids.

When cryſtal is blended with metalline particles at the time of its formation, it aſſumes a variety of figures wholly different from theſe, conſtituting a fourth order, under the name of *metalline cryſtals*: when that metal is lead, the cryſtal aſſumes the form of a cube; when it is tin, of a quadrilateral pyramid, with a broad baſe; when iron, the cryſtal is found concreted in rhomboidal figures: theſe cryſtals are very common about mines; but the common ſpars, which are liable to be influenced in the ſame manner by the metals, and to appear in the very ſame form, are to be carefully diſtinguiſhed from them. There is one very eaſy teſt for this purpoſe, which is, that all ſpars are ſubject to be diſſolved by nitrous acid, and effervеſce violently only on its touching them: but it has no ſuch effect on cryſtal.

The pebble-cryſtal is common enough in all parts of the world; but that which is formed of hexangular columns, affixed to a ſolid baſe at one end, and terminated by a hexangular column at the other, is infinitely more ſo: this is what we call *ſprig* or *rock-cryſtal*, and is of the ſpecies deſcribed by moſt authors under the name of *cryſtal of the ſhops*, or that formerly kept for medicinal uſes.

With regard to the formation of cryſtals, it is certain that they muſt have been once in a ſoft ſtate, ſince ſome are found to have water in their cavities. Profeſſor Bergman obtained 13 regular formed cryſtals, by ſuffering the powder of quartz to remain in a veſſel with fluor acid for two years. Theſe were about the ſize of ſmall peas, and were leſs hard than quartz. Mr. Magellan informs us, that he received from Mr. Achard two cryſtals, one of the ſparry kind, and the other as hard and tranſparent as rock-cryſtal. The firſt he procured by means of calcareous earth, and the latter from the earth of alum, both diſſolved in water impregnated with fixed air, the water filtrating very ſlowly through the porous bottom of baked clay. The apparatus is deſcribed by the author in the *Journal de Phyſique* for January 1778: but though the proceſs was attempted by Mr. Magellan, and afterwards a ſecond time by Mr. Archard himſelf, neither of them were able to ſucceed. Mr. Morveau, however, in the firſt volume of the Dijon Memoirs for 1785, aſſerts that he has produced a very ſmall artificial cryſtal; and gives the proper method for ſucceeding in the proceſs.

Natural cryſtal may be reduced by calcination into a ſtate proper for making glaſs with alkaline ſalts, and thus becomes a very valuable fritt. The method of doing it is as follows: calcine natural cryſtal in a crucible; when it is red-hot, throw it into cold water. Repeat this eight times, covering the crucible that no duſt or aſhes may get in among the cryſtal. Dry this calcined maſs, and reduce it to an impalpable powder.

Colouring Crystal, for the imitation of gems. See Doublet.

Crystal is alſo uſed for a factitious body, caſt in glaſs houſes, called *cryſtal-glaſs*; being in fact no more than glaſs carried, in the compoſition and manufacture, to a greater perfection than the common glaſs. The beſt kind of glaſs-cryſtal is that called *Venice-cryſtal*, made at Moran near Venice. See Glass.

Iſland or *Iceland* Crystal, a tranſparent foſſile ſtone, brought from Iceland, ſoft as talc, clear as rock-cryſtal, and without colour, remarkable for its unuſual refractions. It is there found in great abundance all over the country, but is particularly plentiful in a mountain, not far from the bay of Roezfiord, where the fineſt and moſt pellucid pieces are found on digging. The mountain lies in 65 degrees latitude, and has its whole outſide made up of it; but though this makes a very bright and glittering appearance, it is not ſo fine as that which lies at a little depth, and is met with on opening the ſurface. This is generally taken up out of the earth in maſſes a foot long, and its corners very frequently are terminated in theſe large maſſes, by a ſort of cryſtals, very different in figure and qualities from the reſt of the maſs. The ſtone itſelf is of a parallelopiped figure; but theſe excreſcences are either ſingle pyramids, affixed to columns like common cryſtal, or double pyramids with or without columns between. The ſtone itſelf is ſoft; theſe are hard, and cut glaſs; the ſtone calcines to lime in the fire; theſe run into glaſs: in ſhort, the ſtone itſelf is true ſpar, and theſe are true cryſtal. Beſide theſe, there ſometimes grows out of the end of the larger maſſes a pure fine aſbeſtos. This likewiſe is the caſe ſometimes in the ſpar found about Barege in France, and ſhows how nearly together the formation of bodies, wholly different from one another, may happen. The general figure of the ſtone is parallelopiped; or, as ſome

exprefs it, rhomboide; and it retains this not only while whole, but alfo while broken to pieces; every fragment it naturally falls into, though ever fo fmall, being truly of that fhape. But it is remarkable, that in fome parts of this mountain, the fame fort of matter is found in form of triangular pyramids, all which have the fame property of the double refraction with the parallelopipeds of the fame fubftance; fo that the original error of fuppofing its qualities owing to its fhape, is refuted by this, as well as by the trials made with other pellucid bodies of the fame figure, which do not fhow this remarkable property.

The Iceland cryftal is electrical, and when rubbed will draw up ftraws, feathers, and other light fubftances, in the fame manner that amber does.

The vaft maffes of white fpar which are found in the lead mines of Derbyfhire, though they are not externally of the parallelopiped figure of the Iceland cryftal, nor have any thing of its brightnefs or tranfparence in the general lump; yet when they are broken they feparate into rhomboidal fragments, and fome of thefe are found to be tolerably pellucid; all thofe which are fo have the property of the Iceland cryftal; and being laid upon paper where a black line is drawn, they all fhow that line double in the fame manner as the real Iceland cryftal does.

Iceland cryftal bears a red heat without lofing its tranfparency; and in a very intenfe heat calcines without fufion: fteeped a day or two in water, it lofes its natural polifh. It is very foft and eafily fcratched with the point of a pin; it will not give fire on being ftruck againft fteel; and ferments and is perfectly diffolved in aquafortis. It is found in Iceland, from whence it has its name; and in France, Germany, and many other places. In England fragments of other fpars are very often miftaken for it, many of them having in fome degree the fame property. It has none of the diftinguifhing characters of cryftal; and is plainly a genus of fpars, called from their figure *parallelopipedia*, which, as well as fome other bodies of a different genus, have the fame properties. Bartholine, Huygens, and Sir Ifaac Newton, have defcribed the body at large, but have accounted it either a cryftal or a talc; errors which could not have happened, had the criterions of foffils been at that time fixed; fince Sir Ifaac Newton has recorded its property of making an ebullition with aquafortis, which alone muft prove that it is neither talc nor cryftal, both thofe bodies being wholly unaffected by that menftruum. It is always found in form of an oblique parallelopiped, with fix fides, and is found of various fizes, from a quarter of an inch to three inches or more in diameter. It is pellucid, and not much lefs bright than the pureft cryftal, and its planes are all tolerably fmooth, though when nicely viewed they are found to be waved with crooked lines made by the edges of imperfect plates. What appears very fingular in the ftructure of this body is, that all the furfaces are placed in the fame manner, and confequently it will fplit off into thin plates, either horizontally or perpendicularly; but this is found, on a microfcopic examination, to be owing to the regularity of figure, fmoothnefs of furface, and nice joining of the feveral fmall parallelopiped concretions, of which the whole is compofed, and to the fame caufe is probably owing its remarkable property in refraction.

The phenomena of this ftone are very remarkable, were firft fuggefted by Bartholine, and have been examined with great accuracy by M. Huygens and Sir Ifaac Newton. 1. In other pellucid bodies there is only one refraction, in this there are two; fo that objects viewed through it appear double. 2. In other tranfparent bodies, a ray falling perpendicularly on the furface, paffes ftraight through, without fuffering any refraction; and an oblique ray is always divided; in Iceland cryftal, every ray, whether perpendicular or oblique, becomes divided into two, by means of the double refraction. One of thefe refractions is, according to the ordinary rule, the fine of incidence out of air into cryftal, being to the fine of refraction as five to three; but the other is perfectly new. The like double refraction is alfo obferved in cryftal of the rock, though much lefs fenfibly.

CRYSTALLINE, in general, fomething compofed of, or refembling, cryftal. See CRYSTAL.

CRYSTALLINE *Humour*. See ANATOMY, p. 211.

CRYSTALLINÆ, or CRYSTALLINES, in medicine, are puftules filled with water, and fo called on account of their tranfparency.

CRYSTALLIZATION: whenever the parts of bodies are feparated from each other, and fufpended in a medium or folvent, in which they can freely move, they either remain at a diftance from each other by virtue of their attraction to the folvent, or they come together by their own mutual attraction, and form confiftent maffes. See ATTRACTION.

From the facts there appears to be juft ground to conclude that the particles of bodies demand certain relative pofitions at like diftances, in order that the energy of their attraction may be the greateft poffible; in a manner fimilar to what we obferve in the attractions of magnetifm and electricity. This polarity of the particles deducible by mathematical reafoning from their fuppofed figures, but no doubt in a great meafure dependent on their component parts likewife, will caufe the aggregate maffes to affume fome determinate figure, in fimilar circumftances or fituations, and this figure will be modified in a great variety of ways accordingly as thofe circumftances are changed. If the particles are fufpended or kept fluid, either by a due quantity of folvent, or by heat, or by both of thefe agents, a feparation will enfue, whenever the quantity of the folvent or of the heat is diminifhed. If this diminution be fudden, it will be attended with a confiderable fhare of inteftine motion, by which the particles muft be irregularly moved, and will eventually come together with fuch fides or faces prefented to each other, as might not have been prefented if the irregularity of motion had not interfered. In fuch cafes the particles will form a folid, poffeffing little or no fymmetry in its figure. This is called confufed cryftallization.

On the other hand it may happen, that by gradual evaporation, or cooling, the diminution of the quantities of folvent, or of heat, may take place fo flowly as to occafion a degree of motion altogether inconfiderable among the parts of the fluid. In this cafe, the particles which are about to feparate will approach each other with extreme flownefs, and no circumftance will interfere to prevent their applying fuch fides or faces towards each other as are beft adapted to the governing laws of attraction. As foon as the particles have arrived to a diftance lefs than is fufficient for their mutual attraction to overcome the power of the fluid which fufpends them, they will rufh together, and form fymmetrical bodies poffeffing figures originating in, and dependent on the properties or nature of the particles which form them, and the fymmetry will be more perfect the lefs the cryftallization is influenced by difturbing caufes. This is called regular cryftallization, and the fymmetrical bodies are called cryftals.

As the agitation arifing from the caufes juft mentioned is fufficient to prevent the regular formation of cryftals, fo likewife it is found that mechanical agitation is ftill more deftructive of their regularity. Slow cryftallization produces fugar-candy; a quicker cryftallization affords loaf-fugar. When a balloon fome years ago was inflated at Moorfields by inflammable air, extricated by the action of vitriolic acid upon zinc, the white vitriol of commerce was afforded in beautiful tranfparent cryftals, which the fhops refufed to purchafe; but when

by subsequent solution and mechanical agitation, a white mass of confused crystals was obtained, the shop-keepers recognized the *white vitriol* they had been used to deal in. The presence or absence of external impulse is of so much consequence in crystallization, that it may be doubted whether the action of light, which considerably impedes the formation of regular crystals, may not be attributed to this cause.

The permanent texture of bodies, their fracture, and other like circumstances, appear to depend upon the state of crystallization at the time of assuming the solid form. In metals, for example, the crystals are smaller and more confused the hastier the cooling. Thus steel suddenly cooled breaks with a granular fracture, possesses a diminished specific gravity, and is very hard, whereas the same steel, more slowly cooled, will be denser, softer, difficult to be broken asunder, and when broken exhibits a very different internal texture. The crystals of other metals may be obtained by fusing them in a crucible with a hole in its bottom closed by a stopper, which is to be drawn out after the vessel has been removed from the fire, and the surface of the metal has begun to congeal. The same effect may be observed if the metal be poured into a plate or dish, a little inclined, which is to be suddenly inclined in the opposite direction, as soon as the metal begins to congeal round its edges. In the first method, the fluid part of the metal runs out of the hole, leaving a kind of cup lined with crystals: in the latter way the superior part, which is fluid, runs off, and leaves a plate of metal studded over with crystals.

There is scarcely any experiment in chemistry which does not afford some appearance of a curious nature, referable to crystallization.

When bodies dissolved in any fluid are separated by crystallization, they are always found to retain a part of the fluid. The water thus retained by saline crystals is called the water of crystallization. This water appears to be essential to the transparent crystalline form of salts, and is no doubt retained by virtue of their attraction for that fluid. From some experiments, in which a much greater degree of cooling was produced by the solution of crystallized soda, than of such as had lost its water of crystallization, it may be inferred, that this water exists in crystals in the congealed or solid state, and perhaps much denser than mere ice. Most salts may be deprived of their water of crystallization by mere heat. Some lose it in the common temperature of the atmosphere, and fall into a pulverulent mass, called an efflorescence. Other salts attract water so strongly that they draw it from the atmosphere, and gradually become fluid, a phenomenon distinguished by the name of deliquescence. Mr. Baumé affirms that the water of crystallization in all neutral salts with bases of fixed alkali is pure, and they are not capable of taking up a redundancy of either principle in their crystals. This however may be doubted.

The crystallization of salts is usually effected by evaporating part of the water; but it may likewise be made to take place by abstraction of the water in the way of chemical affinity. Thus if strong ardent spirit be added to an equal volume of a strong solution of nitre, the spirit combines with the water, and almost the whole of the nitre separates in an instant in the crystalline form. There is no doubt but appearances of this kind of separation have misled chemists on various occasions.

The operation of crystallizing, or crystallization, is of great utility in the purifying of various saline substances. Most salts are suspended in water in greater quantities at more elevated temperatures, and separate more or less by cooling. In this property, and likewise in the quantity of salt capable of being suspended in a given quantity of water, they differ greatly from each other. It is therefore practicable in general to separate salts from each other, by due management of the temperature and evaporation. For example, if a solution of nitre and common salt be evaporated over the fire, and a small quantity be now and then taken out for trial, it will be found, at a certain period of the concentration, that a considerable portion of salt will separate by cooling, and that this salt is for the most part pure nitre. When this is seen, the whole fluid may be cooled to separate part of the nitre, after which, evaporation may be proceeded upon as before. This manipulation depends upon the different properties of the two salts with regard to their solubility and crystallization in like circumstances. For nitre is considerably more soluble in hot than in cold water, while common salt is scarcely more soluble in the one case than in the other. The common salt consequently separates in crystals as the evaporation of the heated fluid goes on, and is taken out with a ladle from time to time, whereas the nitre is separated by successive coolings at proper periods.

Those chemists who consider heat as a peculiar substance and not a modification of matter, are in general inclined to reckon the fluid state a solution of this matter; and the crystallization of bodies merely fused, is by them accounted for by the abstraction of this supposed solvent.

It was natural for the earlier mineralogists and chemists to distinguish bodies by their symmetrical figures. Subsequent experience has however shewn that the crystallization of bodies is variable, by so many and such minute circumstances, that a considerable dependance on this single attribute must necessarily be productive of error. Modern chemists, as the methods of analysis became more perfect, seem to have adopted a prejudice of the contrary nature, by almost totally rejecting the external figures of bodies as indications of their component parts. Romé de Lisle in his Crystallographie, Bergman in one of his Essays, and the abb. Haüy, have treated expressly and scientifically upon the formation of those geometrical figures which constitute crystals; but the subject is very far from being enough simplified to admit of any ready application. The miner, the mineralogist, and the chemist will perceive a number of circumstances in natural and artificial bodies relative to their configuration, grouping, colour, fracture, specific gravity, &c. by means of which he may form very probable conjectures as to their contents, and the experiments requisite to be instituted upon them: but in the present state of science, there is no method which can be substituted instead of actual inspection, and the attentive consideration of minerals and chemical products whose contents are previously known.

CRYSTALS, in chemistry, salts or other matters shot or congealed in the manner of crystal. See CHEMISTRY; and CRYSTALLIZATION.

CTESIAS, a native of Cnidos, who accompanied Cyrus the son of Darius in his expedition against his brother Artaxerxes; by whom he was taken prisoner. But curing Artaxerxes of a wound he received in the battle, he became a great favourite at the court of Persia, where he continued practising physic for 17 years, and was employed in several negociations. He wrote the History of Persia in 23 books, and a History of the Indies: but these works are now lost, and all we have remaining of them is an abridgment compiled by Photius. The most judicious among the ancients looked upon Ctesias as a fabulous writer; yet several of the ancient historians and modern Christian writers have adopted in part his chronology of the Assyrian kings.

CTESIBIUS, a mathematician of Alexandria, about 120 years before Christ. He was the first who invented the pump. He also invented a clepsydra, or water-clock. This invention of measuring time by water was wonderful and ingenious. Water was let drop upon wheels which it turned: the wheels communicated their regular motion to a small wooden image, which by a gradual rise pointed with a stick to the proper hours

and months, which were engraved on a column near the machine. This artful invention gave rise to many improvements; and the modern manner of meafuring time with an hour-glafs is in imitation of the clepfydra of Ctefibius.

CTESIPHON, the name of feveral noted perfons of antiquity. 1. An Athenian, who advifed his fellow-citizens to crown publicly Demofthenes with a golden crown for his probity and virtue. This was oppofed by the orator Æfchines, the rival of Demofthenes, who accufed Ctefiphon of feditious views. Demofthenes undertook the defence of his friend, in a celebrated oration ftill extant, and Æfchines was banifhed. 2. A Greek architect, who made the plan of Diana's temple at Ephefus. 3. An elegiac poet, whom king Attalus fet over his poffeffions in Æolia. 4. A Greek hiftorian, who wrote an hiftory of Bœotia.

CUB, a bear's whelp. Among hunters, a fox and martcon of the firft year are alfo called *cubs*. See URSUS.

CUBA, an ifland of the W. Indies, at the entrance of the gulf of Mexico, about 700 miles in length, and 87 in breadth. It was difcovered by Columbus, in 1494. The Spaniards are entirely mafters of it, having extirpated the natives. The foil is not extremely fertile; but there are paftures fufficient to feed a great number of fheep, and hogs, which were originally brought hither. There are feveral forts of mines in the mountains, and forefts full of game. The produce is fugar-canes, ginger, caffia, wild cinnamon, and very good tobacco, called by the Spaniards Cigarros. The hills run through the middle of the Ifland from E. to W. but, near the coaft, the land is generally level. Here are many rivulets, which run from the hills to the N. and S. The air is temperate and wholefome, and here are cedar trees fo large, that canoes made of them will hold 50 men. Havanna is the capital. The galleons that return annually to Spain, rendezvous at Havanna. This ifland was taken by the Englifh in 1761, but reftored by the peace of 1763. It is 75 miles N. of Jamaica.

CUBE, in geometry, a folid body confifting of fix equal fides. See GEOMETRY.

CUBE-*Root of any Number or Quantity*, is fuch a number or quantity, which, if multiplied into itfelf, and then again, the product thence arifing by that number or quantity, being the cube root, this laft product fhall be equal to the number or quantity whereof it is the cube-root; as 2 is the cube-root of 8; becaufe two times 2 is 4, and two times 4 is 8; and $a + b$ is the cube root of $a^3 + 3aab + 3aab + b^3$. See ALGEBRA.

CUBEBS, in the materia medica, a fmall dried fruit refembling pepper, but often fomewhat longer, brought into Europe from the ifland of Java. In aromatic warmth and pungency, they are far inferior to pepper.

CUBIC EQUATION. See ALGEBRA.

CUBIDIA, a genus of fpars. The word is derived from κυβος, "a die;" and is given them from their being of the fhape of a common die, or of a cubic figure. Thefe bodies owe their fhape to an admixture of lead, and there are only two known fpecies of the genus. 1. A colourlefs cryftalline one, with thin flakes, found in the lead-mines of Yorkfhire, and fome other parts of the kingdom; and 2. A milky white one with thicker crufts. This is found in the lead-mines of Derbyfhire and Yorkfhire, but is ufually fmall, and is not found plentifully.

CUBIT, in the menfuration of the ancients, a long meafure, equal to the length of a man's arm, from the elbow to the tip of the fingers. Dr Arbuthnot makes the Englifh cubit equal to 18 inches; the Roman cubit equal to 1 foot 5.406 inches; and the cubit of the fcripture equal to 1 foot 9.888 inches.

CUBITÆUS MUSCLES, the name of two mufcles of the hand. See ANATOMY, *Table of the Mufcles*.

CUBITUS, in anatomy, a bone of the arm, reaching from the elbow to the wrift; otherwife called *ulna*, or the *greater foffile*. Some ufe the word for all that part of the arm between the elbow and the wrift; including the *ulna* or *cubitus*, properly fo called, and the *radius*.

CUBOIDES, or *Os* CUBIFORME, in anatomy, the feventh bone of the foot; fo called from its being in form of a cube or die.

CUCKING-STOOL, an engine invented for punifhing fcolds and unquiet women, by ducking them in water; called in ancient times a *tumbrel*, and fometimes a *trebucket*. In Domefday, it is called *cathedra ftercoris*: and it was in ufe even among the Saxons, by whom it was defcribed to be *cathedra in qua rixofæ mulieres fedentes aquis demergebantur*. It was anciently alfo a punifhment inflicted upon brewers and bakers tranfgreffing the laws; who were thereupon in fuch a ftool immerged over head and ears *in ftercore*, fome ftinking water. Some think it a corruption from *ducking-ftool*; others from *choaking-ftool*, *quia hoc modo demerfæ aquis fere fuffocantur*. See CASTIGATORY.

CUCKOW, in ornithology. See CUCULUS.

CUCKOW-*Spit*, the fame with froth-fpit. See FROTH-*Spit*, and CICADA.

CUCUBALUS, BERRY-BEARING CHICKWEED; a genus of the trigynia order, belonging to the decandria clafs of plants; and in the natural method ranking under the 22d order, *Caryophyllei*. The calyx is inflated; the petals unguiculated without a nectariferous corona at the throat; the capfule is trilocular. There are 13 fpecies, the moft remarkable of which are, 1. The *behen*, Swedifh lychnis, or gumfepungar, is a native of feveral parts of Europe. The empalement of its flower is curioufly wrought like a network, and is of a purplifh colour. The leaves have fomewhat of the flavour of peafe, and proved of great ufe to the inhabitants of Minorca in 1685, when a fwarm of locufts had deftroyed the harveft. The Gothlanders apply the leaves to eryfipelatous eruptions. Horfes, cows, fheep, and goats, eat this plant. 2. The *noctiflora*, or night-flowering lychnis, grows naturally in Spain and Italy. It is a perennial plant, rifing with an upright branching ftalk, a foot and an half high, garnifhed with very narrow leaves placed oppofite. The upper part of the ftalk branches very much; the flowers ftand upon long naked footftalks, each fupporting three or four flowers which have long tubes with ftriped empalements: the petals are large, deeply divided at top, and of a pale blueifh colour. The flowers are clofed all the day; but when the fun leaves them, they expand, and then emit a very agreeable fcent. It may be propagated by feeds fown in the fpring on a bed of light earth; and when the plants are fit to remove, they fhould be planted in a nurfery-bed at about four inches diftance, where they may remain till autumn. They may then be planted in the borders where they are to remain, and will flower the following year. 3. The *otites*, or catch-fly, is a native of Britain, and other European countries. It hath a thick, flefhy, perennial root, whick ftrikes into the ground, from whence rifes a jointed ftalk three or four feet high. At the joints there exfudes a vifcous clammy juice, that fticks to the fingers when handled; and the fmall infects which fettle upon thofe parts of the ftalks are thereby fo faftened that they cannot get off. The flowers are fmall, and of a greenifh colour. The plant is propagated by feeds.

CUCULUS, the CUCKOW, in ornithology, a genus belonging to the order of picæ: the characters of which are: The bill is fmooth, and more or lefs bending; the noftrils are bounded by a fmall rim; the tongue is fhort and pointed: the feet and toes formed for climbing. See Plate 81. The moft remarkable *fpecies* are:

1. The *canorus*, or common cuckow, weighs about five ounces; and is in length 14 inches, in breadth 25. The bill is

black, and about two thirds of an inch in length. The head, hind part of the neck, coverts of the wings and rump, are of a dove colour; darker on the head and paler on the rump. The throat and upper part of the neck are of a pale grey; the breaſt and belly white, croſſed elegantly with undulated lines of black. The tail conſiſts of ten feathers of unequal lengths; the two middle tail feathers are black tipped with white; the others are marked with white ſpots on each ſide their ſhafts. The legs are ſhort; and the toes diſpoſed two backwards and two forwards, like thoſe of the wood pecker, though it is never obſerved to run up the ſides of trees. The female differs in ſome reſpects. The neck before and behind is of a browniſh red; the tail barred with the ſame colour and black, and ſpotted on each ſide the ſhaft with white. The young birds are brown mixed with black, and in that ſtate have been deſcribed by ſome authors as old ones.

This bird appears in our country early in the ſpring, and makes the ſhorteſt ſtay with us of any bird of paſſage. It is directed here, as Mr. Stillingfleet obſerves, by that conſtitution of the air which cauſes the fig-tree to put forth its fruit; though it has been ſuppoſed that ſome of theſe birds do not quit this iſland during the winter; but that they ſeek ſhelter in hollow trees and lie torpid, unleſs animated by unuſually warm weather. Mr. Pennant gives two inſtances of their being heard in February; one in 1771, in the end of that month; the other in 1769, on the 4th day; but after that they were heard no more, being probably chilled into torpidity. There is a remarkable coincidence between the ſong of theſe birds and the mackarels continuing in full roe; that is, from about the middle of April to the latter end of June. The cuckow is ſilent for ſome time after his arrival; his note is a call to love, and uſed only by the male, who ſits perched generally on ſome dead tree or bare bough, and repeats his ſong, which he loſes as ſoon as the amorous ſeaſon is over. His note is ſo uniform, that his name in all languages ſeems to have been derived from it; and in all countries it is uſed in the ſame reproachful ſenſe.

On the natural hiſtory of this ſingular bird, we have a very curious paper by Dr. Jenner, publiſhed in the Philoſophical Tranſactions for 1788, Part II. art. 14. The firſt appearance of cuckows in the county of Glouceſter, is about the middle of April. The ſong of the male, which is well known, ſoon proclaims its arrival. The ſong of the female (if the peculiar notes of which it is compoſed may be ſo called) is widely different, and has been ſo little attended to, that perhaps few are acquainted with it: the cry of the dab-chick bears ſome reſemblance to it.

Unlike the generality of birds, cuckows do not pair. When a female appears on the wing, ſhe is often attended by two or three males, who ſeem to be earneſtly contending for her favours. From the time of her appearance till after the middle of ſummer the neſts of the birds ſelected to receive her egg are to be found in great abundance; but, like the other migrating birds, ſhe does not begin to lay till ſome weeks after her arrival.

It is on all hands allowed, that the cuckow does not hatch its own eggs; for which different reaſons have been given, as will be afterwards noticed. The hedge-ſparrow, the water-wagtail, the titlark, the red-breaſt, the yellow hammer, the green linnet, or the winchat, is generally the nurſe of the young cuckow: but Buffon enumerates 20 ſorts of neſts at leaſt in which they have depoſited their eggs. It may be ſuppoſed, that the female cuckow lays her egg in the abſence of the bird in whoſe neſt ſhe intends to depoſite; as it has been known, that on ſight of one of theſe a redbreaſt and its mate jointly attacked her on approaching the neſt, putting her to flight; and ſo effectually drove her away, that ſhe did not dare to return. Among the birds above mentioned, it generally, according to Dr. Jenner's obſervations, ſelects the three firſt, but ſhows a much greater partiality to the hedge-ſparrow. This laſt commonly takes up four or five days in laying her eggs. During this time (generally after ſhe has laid one or two) the cuckow contrives to depoſite her egg among the reſt, leaving the future care of it entirely to the hedge-ſparrow. This intruſion often occaſions ſome diſcompoſure: for the old hedge-ſparrow at intervals, whilſt ſhe is ſitting, not unfrequently throws out ſome of her own eggs, and ſometimes injures them in ſuch a way that they become addle; ſo that it more frequently happens that only two or three hedge-ſparrow's eggs are hatched with the cuckow's than otherwiſe. But whether this be the caſe or not, ſhe ſits the ſame length of time as if no foreign egg had been introduced, the cuckow's egg requiring no longer incubation than her own.

When the hedge-ſparrow has ſat her uſual time, and diſengaged the young cuckow and ſome of her own offſpring from the ſhell, her own young ones, and any of her eggs that remain unhatched, are ſoon turned out, the young cuckow remaining poſſeſſor of the neſt, and ſole object of her future care. The young birds are not previouſly killed, nor are the eggs demoliſhed; but all are left to periſh together, either entangled about the buſh which contains the neſt, or lying on the ground under it.

"The early fate of the young hedge-ſparrows (Dr. Jenner obſerves) is a circumſtance that has been noticed by others, but attributed to wrong cauſes. A variety of conjectures have been formed upon it. Some have ſuppoſed the parent cuckow the author of their deſtruction; while others, as erroneouſly, have pronounced them ſmothered by the diſproportionate ſize of their fellow-neſtling. Now the cuckow's egg being not much larger than the hedge-ſparrow's, it neceſſarily follows, that at firſt there can be no difference in the ſize of the birds juſt burſt from the ſhell. Of the fallacy of the former aſſertion alſo I was ſome years ago convinced, by having found that many cuckows' eggs were hatched in the neſts of other birds after the old cuckow had diſappeared, and by ſeeing the ſame fate then attend the neſtling ſparrows as during the appearance of old cuckows in this country." But before he enters on the facts relating to the death of the young ſparrows, our author proceeds to ſtate various examples of the incubation of the egg, and the rearing of the young cuckow; a point which had been controverted by the Hon. Daines Barrington, and diſbelieved by others. For theſe however, on account of their great length, we refer the reader to the original paper.

It appears a little extraordinary, that two cuckows' eggs ſhould ever be depoſited in the ſame neſt, as the young one produced from one of them muſt inevitably periſh; yet two inſtances of this kind fell under our author's obſervation, one of which he thus relates: "June 27, 1787. Two cuckows and a hedge-ſparrow were hatched in the ſame neſt this morning; one hedge-ſparrow's egg remained unhatched. In a few hours after, a conteſt began between the cuckows for the poſſeſſion of the neſt, which continued undetermined till the next afternoon, when one of them, which was ſomewhat ſuperior in ſize, turned out the other, together with the young hedge-ſparrow and the unhatched egg. This conteſt was very remarkable. The combatants alternately appeared to have the advantage, as each carried the other ſeveral times nearly to the top of the neſt, and then ſunk down again, oppreſſed by the weight of its burden; till at length, after various efforts, the ſtrongeſt prevailed, and was afterwards brought up by the hedge-ſparrows."

But the principal circumſtance that has agitated the mind of the naturaliſt reſpecting the cuckow is, Why, like other birds, it ſhould not build a neſt, incubate its eggs, and rear its own young? There is no apparent reaſon, Dr. Jenner thinks, why this bird, in common with others, ſhould not perform all theſe ſeveral offices; for it is in every reſpect perfectly formed for

collecting materials and building a neft. Neither its external fhape nor internal ftructure prevent it from incubation; nor is it by any means incapacitated from bringing food to its young. It would be needlefs to enumerate the various opinions of authors on this fubject from Ariftotle to the prefent time. Thofe of the ancients appear to be either vifionary or erroneous; and the attempts of the moderns towards its inveftigation have been confined within very narrow limits: for they have gone but little further in their refearches than to examine the conftitution and ftructure of the bird; and having found it poffeffed of a capacious ftomach with a thin external covering, concluded that the preffure upon this part, in a fitting pofture, prevented incubation. They have not confidered that many of the birds which incubate have ftomachs analogous to thofe of cuckows. The ftomach of the owl, for example, is proportionably capacious, and is almoft as thinly covered with external integuments. Nor have they confidered, that the ftomachs of neftlings are always much diftended with food; and that this very part, during the whole time of their confinement to the neft, fupports in a great degree the weight of the whole body: whereas, in a fitting bird, it is not nearly fo much preffed upon, for the breaft in that cafe fills up chiefly the cavity of the neft; for which purpofe, from its natural convexity, it is admirably well fitted. Thefe obfervations fufficiently fhow, that the cuckow is not rendered incapable of fitting through any peculiarity either in the fituation or formation of the ftomach.

In confidering to what caufes may be attributed the fingularities of the cuckow, Dr. Jenner fuggefts the following as the moft probable: "*The fhort refidence this bird is allowed to make in the country where it is deftined to propagate its fpecies; and the call that nature has upon it, during that fhort refidence, to produce a numerous progeny.*" The cuckow's firft appearance here is about the middle of April, commonly on the 17th. Its egg is not ready for incubation till fome weeks after its arrival, feldom before the middle of May. A fortnight is taken up by the fitting-bird in hatching the egg. The young bird generally continues three weeks in the neft before it flies, and the fofter-parents feed it more than five weeks after this period; fo that if a cuckow fhould be ready with an egg much fooner than the time pointed out, not a fingle neftling, even one of the earlieft, would be fit to provide for itfelf before its parent would be inftinctively directed to feek a new refidence, and be thus compelled to abandon its young one; for old cuckows take their final leave of this country the firft week in July.

There feems to be no precife time fixed for the departure of young cuckows. Our author believes they go off in fucceffion, probably as foon as they are capable of taking care of themfelves; for although they ftay here till they become nearly equal in fize and growth of plumage to the old cuckow, yet in this very ftate the foftering care of the hedge-fparrow is not withdrawn from them.

It is fuppofed, that there are more male cuckows than females; fince two are often feen in difpute where a third has been in fight; which, no doubt, was of the oppofite fex. Mr. Pennant obferved, that five male birds were caught in a trap in one feafon; and Mr. Latham fays, that "out of at leaft half a dozen that I have attended to, my chance has never directed me to a female; and it is to be wifhed, that future obfervations may determine whether our obfervations have rifen only in chance, or are founded on the general circumftance." He believes that the male birds are more liable to be fhot, their note directing the gunner where to take aim, while the female is fecured by her filence.

Cuckows may be, and often are, brought up tame, fo as to become familiar. They will eat in this ftate bread and milk, fruits, infects, eggs, and flefh either cooked or raw; but in a ftate of nature, chiefly live on caterpillars, of the fmooth kind. Some have fed on vegetable matter, beetles, and fmall ftones. When fat, they are faid to be as good eating as a land rail. The French and Italians eat them to this day. The ancient Romans admired them greatly as food, and Pliny fays that there is no bird which can be compared to them for delicacy.

In migrating, the major part of thefe birds are fuppofed to go into Africa, fince they are obferved to vifit the ifland of Malta twice in a year, in their paffage backwards and forwards, as is fuppofed, to that part of the world. The cuckow is well known alfo at Aleppo. To the north, it is faid to be common in Sweden; but not to appear fo early by a month as with us. Ruffia is not deftitute of this bird; and Mr. Latham has feen a fpecimen brought from Kamtfchatka, now in the poffeffion of Sir Jofeph Banks.

2. The *Americanus*, or cuckow of Carolina. It is about the fize of a blackbird, the upper mandible of the bill black, the lower yellow; the large wing-feathers are reddifh; the reft of the wing, and all the upper part of the body, head and neck, is of an afh-colour; all the under part of the body, from the bill to the tail, white; the tail long and narrow, compofed of fix long and four fhorter feathers; the legs fhort and ftrong. Their note is very different from the cuckow of this country, and not fo fingular as to be taken notice of. It is a folitary bird, frequenting the darkeft receffes of woods and fhady thickets. They retire on the approach of winter.

3. The *indicator*, or honey-guide, is a native of America. See Plate 81. The following defcription is given of it by Dr. Sparrman in the Philofophical Tranfactions for 1777. "This curious fpecies of cuckow is found at a confiderable diftance from the Cape of Good Hope, in the interior parts of Africa, being entirely unknown at that fettlement. The firft place I heard of it was in a wood called the *Groot-Vaader's Bofch*, "the Grand-father's Wood," fituated in a defert near the river which the Hottentots call *T'kaut'kai*. The Dutch fettlers thereabouts have given this bird the name of *boniguyzer*, or "honey-guide," from its quality of difcovering wild honey to travellers. Its colour has nothing ftriking or beautiful. Its fize is confiderably fmaller than that of our cuckow in Europe: but in return, the inftinct which prompts it to feek its food in a fingular manner is truly admirable. Not only the Dutch and Hottentots, but likewife a fpecies of quadruped named *ratel* (probably a new fpecies of badger), are frequently conducted to wild bee-hives by this bird, which, as it were, pilots them to the very fpot. The honey being its favourite food, its own intereft prompts it to be inftrumental in robbing the hive, as fome fcraps are commonly left for its fupport. The morning and evening are its times of feeding, and it is then heard calling in a fhrill tone, *cherr, cherr:* which the honey-hunters carefully attend to as the fummons to the chace. From time to time they anfwer with a foft whiftle; which the bird hearing always continues its note. As foon as they are in fight of each other, the bird gradually flutters towards the place where the hive is fituated, continually repeating its former call of *cherr, cherr:* nay, if it fhould happen to have gained a confiderable way before the men (who may eafily be hindered in the purfuit by bufhes, rivers, or the like), it returns to them again, and redoubles its note, as it were to reproach them with their inactivity. At laft the bird is obferved to hover for a few moments over a certain fpot; and then filently retiring to a neighbouring bufh or refting place, the hunters are fure of finding the bees' neft in that identical fpot; whether it be in a tree or in the crevice of a rock, or, (as is moft commonly the cafe) in the earth. Whilft the hunters are bufy in taking the honey, the bird is feen looking on attentively to what is going forward, and waiting for its fhare of the fpoil. The bee-hunters never fail to leave a fmall portion for their conductor: but commonly take care not to leave fo much as would fatisfy his hunger. The bird's appetite being whetted by this par-

fimony, he is obliged to commit a fecond treafon, by difcovering another bees' neft, in hopes of a better falary. It is further obferved, that the nearer the bird approaches the hidden hive, the more frequently it repeats its call, and feems the more impatient. I have had frequent opportunities of feeing this bird, and have been witnefs to the deftruction of feveral republics of bees by means of its treachery. I had, however, but two opportunities of fhooting it, which I did to the great indignation of my Hottentots. It is about feven inches in length, and is of a rufty brown colour on the back, with a white breaft and belly." A neft, which was fhown to Dr. Sparrman for that of this bird, was compofed of flender filaments of bark, woven together in the form of a bottle; the neck and opening hung downwards, and a ftring, in an arched fhape, was fufpended acrofs the opening faftened by the two ends, perhaps for the bird to perch on.

4. The *Cape* Cuckow *(Buff.)* is a trifle fmaller than ours: the bill a deep brown; the upper part of the body greenifh brown: throat, cheeks, fore part of the neck, and upper wing coverts, of a deep rufous colour: tail-feathers rufous, but paler, tipped with white: the breaft, and all the under parts of the body, white, croffed with lines of black: the legs reddifh brown. It inhabits the Cape of Good Hope; and is moft likely the fame bird which is called *Edolio*, from its pronouncing that word frequently in a low melancholy tone. Voyagers alfo mention another cuckow, which is common to Loango in Africa. It is bigger than ours, but of the fame colour; and repeats the word *cuckow* like that bird, but in a different inflexion of voice. It is faid that the male and female together go through the whole eight notes of the gamut; the male beginning by itfelf, founds the three firft, after which he is accompanied by the female through the reft of the octave.

5. The *honoratus*, or facred cuckow, is fomewhat lefs than our cuckow: the general colour is blackifh afh on the upper parts, marked with two fpots of white on each feather; beneath white, tranfverfely fpotted with afh-colour: the quills are cinerous, tranfverfely fpotted with white: the tail is much cuneated, five inches and a half long, and of the fame colour as the quills; the outer feather only three inches long: the legs and claws are of a pale afh-colour. This fpecies inhabits Malabar, where the natives hold it facred. It feeds on reptiles, which, perhaps, may be fuch as are the moft noxious; if fo, this feeming fuperftition may have rifen from a more reafonable foundation than many others of the like fort.

6. The *fhining* cuckow is the fize of a fmall thrufh: the bill is blueifh: the upper part of the body green, with a rich gilded glofs; the under parts are white, tranfverfely waved with green gold: the under tail-coverts almoft white; the quills and tail dufky brown; the legs are blueifh. This inhabits New-Zealand, where it is called *Poopo-arowro*. See plate 81.

7. The *vetula* is a trifle bigger than a blackbird: the bill above an inch and a half long: the upper mandible black; the lower whitifh: crown of the head brown, the feathers of it foft and filky: the upper parts of the body and the quills cinerous olive: throat and fore part of the neck whitifh; the reft of the under parts rufous: the tail is much cuneated; the two middle feathers cinerous olive, the others dufky black tipped with white; the outer feather very fhort: legs blue-black. This fpecies inhabits Jamaica, where it is frequent in the woods and hedges all the year round. It feeds on feeds, fmall worms, and caterpillars, and is very tame. This bird has the name *tacco* from its cry, which is like that word; the firft fyllable of this is pronounced hardly, the other following in a full octave lower than the firft. It has alfo another cry like *qua, qua, qua*; but that only when alarmed by an enemy. Befides infects, it will alfo eat lizards, fmall fnakes, frogs, young rats, and fometimes even fmall birds. The fnakes they fwallow head foremoft, letting the tail hang out of the mouth till the fore parts are digefted. This bird, it is moft likely, might be eafily tamed, as it is fo gentle as to fuffer the negro children to catch it with their hands. Its gait is that of leaping, like a magpie; being frequently feen on the ground; and its flight but fhort, chiefly from bufh to bufh. At the time when other birds breed, they likewife retire into the woods, but their nefts have never yet been found: from which one fhould be inclined to think, that they were indebted to other birds for the rearing their young in the manner of the common cuckow. It has the name of *rain bird*, as it is faid to make the greateft noife before rain. It is common all the year at Jamaica. In another fpecies or variety, common in Jamaica, the feathers on the throat appear like a downy beard, whence probably the name of *old-man rain bird*, given it there, and by Ray, Sloane, and others.

8. The *nævius*, fpotted cuckow, or rail bird, is about the fize of a field-fare: the bill three quarters of an inch; the upper mandible black on the top, and rufous on the fides: the under wholly rufous: the general colour of the plumage is rufous in two fhades; the under parts rufous white: the feathers on the crown are of a deep brown, and pretty long, with rufous tips, and fome of them margined with rufous: the hind part of the neck is a rufous grey; down the fhafts deep brown: back and rump the fame; each feather tipped with a rufous fpot: on each feather of the throat and neck is a tranfverfe brownifh line near the end: the under tail-coverts are rufous; the quills are grey brown, edged with rufous, and a fpot of the fame at the tips: the tail is near fix inches long, much cuneated; the outer feathers only half the length of the middle ones; colour of it the fame as the quills; fome of the upper coverts reach to near two-thirds of the length of the tail: the legs are afh-colour; the claws greyifh brown. It inhabits Cayenne. Buffon mentions a variety of this by the name of *rail bird*. It is much the fame in fize, but has lefs rufous, being grey in the place of that colour: the fide tail feathers have white tips: the throat is pale grey; under the body white; the tail a trifle longer than in the other. Whether a variety or different fex is not known. This is common at Cayenne and Guiana; and is feen often perched upon gates and rails, whence its name; and when in this fituation continually moves its tail. Thefe are not very wild birds, yet do not form themfelves into troops, although numbers are often found in the fame diftrict: nor do they frequent the thick woods like many of the genus.

9. The *cayanus*, or Cayenne cuckow, is the fize of a blackbird; the bill is grey brown, above an inch long, and a little bent at the tip: the plumage on the upper parts of the body is purplifh chefnut; beneath, the fame, but paler: the quills are the fame as the upper parts, tipped with brown: the tail is the fame; near the end black, and tipped with white; it is much cuneated, and above ten inches long: the legs and claws are grey brown. This inhabits Cayenne, where it goes by the name of *piaye*, or *devil*. The natives give it that name as a bird of ill omen. The flefh they will not touch; and indeed not without reafon, as it is very bad and lean. It is a very tame fpecies, fuffering itfelf to be almoft touched by the hand before it offers to efcape. Its flight is almoft like that of a king's-fifher; and it frequents the borders of rivers, on the low branches; feeds on infects; often wagging its tail on changing place.

There are 37 other fpecies, which inhabit different parts of the globe, and are principally diftinguifhed by the fhape of the tail and variations in colour.

CUCUMBER, in botany. See Cucumis.

CUCUMIS, the Cucumber; a genus of the fyngenefia order, belonging to the monœcia clafs of plants; and in the natural method ranking under the 34th order, *Cucurbitaceæ*. The male calyx is quinquedentated, the corolla quinquepartite; the filaments three. The female calyx is quinquedentated, the co-

rolla quinquepartite, the piftil trifid; the fides of the apple fharp-pointed. In this genus Linnæus includes alfo the Melon. (See that article.) There are 11 fpecies, of which the following are the moft remarkable.

1. The *fativa*, or common cucumber, hath roots compofed of numerous, long, flender, white fibres; long flender ftalks, very branchy at their joints, trailing on the ground, or climbing by their clafpers, adorned at every joint by large angular leaves on long erect footftalks, with numerous and monopetalous bell-fhaped flowers of a yellow colour, fucceeded by oblong rough fruit. The varieties of this kind are, 1. The common rough green prickly cucumber; a middle-fized fruit, about fix or feven inches long, having a dark-green rough rind, clofely fet with very fmall prickles; the plant is of the hardeft fort, but does not fhow its fruit early. 2. The fhort green prickly cucumber is about three or four inches long, the rind rather fmooth, and fet with fmall prickles. It is valuable chiefly for being one of the earlieft and hardieft forts. 3. The long green prickly cucumber, grows from fix to nine inches in length, and is rather thinly fet with prickles. And as there is an early and late cucumber, it is confiderably the beft variety for the main crops, both in the frames and hand-glafs, as well as in the open ground for picklers. Of this there is another variety with white fruit. 4. The early green clufter cucumber is a fhortifh fruit, remarkable for growing in clufters, and appearing early. 5. The long fmooth green Turkey cucumber, is a fmooth green-rinded fruit, growing from 10 to 15 inches in length, without prickles. The plants are ftrong growers, with very large leaves. 6. The long fmooth white Turkey cucumber, is a fmooth rinded fruit, from 10 to 15 inches long without prickles. 7. The large fmooth green Roman cucumber is a very large and long fmooth green fruit produced from a ftrong growing plant. 8. The long white prickly Dutch cucumber, is a white fruit 8 or 10 inches long, fet with fmall black prickles; the plants are but bad bearers in this country.

2. The *chata*, or round-leaved Egyptian cucumber. According to Mr. Haffelquift, this grows in the fertile earth near Cairo after the inundation of the Nile, and not in any other place in Egypt, nor does it grow in any other foil. It ripens with the water-melons. The fruit is a little watery; the flefh almoft of the fame fubftance with the melons; it taftes fomewhat fweet and cool; but is far from being as cool as the water-melons. This the grandees and Europeans in Egypt eat as the moft pleafant fruit they find, and that from which they have the leaft to apprehend. It is the moft excellent fruit of this tribe of any yet known.

The four firft varieties of the cucumis fativa are thofe chiefly cultivated in this country. They are raifed at three different feafons of the year: 1. on hot-beds, for early fruit; 2. under bell, or hand-glaffes, for the middle crop; 3. on the common ground, which is for a late crop, or to pickle. The cucumbers which are ripe before April are unwholefome; being raifed wholly by the heat of the dung without the affiftance of the fun. Thofe raifed in April are good, and are raifed in a manner with which all our gardeners are well acquainted.

Befide the above mentioned fpecies, which are proper for the table, this genus affords alfo two articles for the materia medica. 1. The *elaterium* of the fhops, is the infpiffated fæcula of the juice of a kind of wild cucumber, called alfo the afs's cucumber. It comes to this country from Spain and the fouthern parts of France, where the plant is very common. It is brought to us in fmall flat whitifh lumps or cakes that are dry, and break eafily between the fingers. It is of an acrid, bitter and naufeous tafte, and has a ftrong offenfive fmell when newly made: but thefe, as well as its other qualities, it lofes after being kept fome time. Elaterium is a very violent purge and vomit, and is now very feldom ufed. The plant is commonly called fpirting cucumber, from its cafting out its feeds with great violence, together with the vifcid juice in which they are lodged, if touched when ripe; from this circumftance it has obtained the appellation of *noli me tangere*, or *touch-me-not*. 2. The *colocynthis*, colocynth, coloquintida, or bitter apple of the fhops, is brought to us from Aleppo and the ifland of Crete. The leaves of the plant are large, placed alternate, almoft round, and ftand upon footftalks four inches long. The flowers are white; and are fucceeded by a fruit of the gourd kind, of the fize of a large apple, and which is yellow when ripe. The fhelly or hufky outfide inclofes a bitter pulp interfperfed with flattifh feeds. If a hole is made in one of thefe ripe gourds, and a glafs of rum poured in, and fuffered to remain 24 hours, it proves a powerful purgative. The pulp itfelf dried and powdered is commonly ufed as a purgative in this country, but is one of the moft draftic, and if taken in a large dofe, fomewhat hazardous.

CUCURBIT, the name of a chemical veffel employed in diftillation, when covered with its head. Its name comes from its lengthened fhape, by which it refembles a gourd: fome cucurbits, however, are fhallow and wide-mouthed. They are made of copper, tin, glafs, and ftone ware, according to the nature of the fubftances to be diftilled. A cucurbit, provided with its capital, conftitutes the veffel for diftillation called an *alembic*.

CUCURBITA, the Gourd, and Pompion; a genus of the fyngenefia order, belonging to the monœcia clafs of plants; and in the natural method ranking under the 34th order, *Cucurbitaceæ*. The calyx of the male is quinquedentated; the corolla quinquefid; the filaments three. The calyx of the female is quinquedentated; the corolla quinquefid; the piftil quinquefid; the feeds of the apple with a tumid margin.

There are five fpecies, viz. 1. The *lagenaria*, or bottle gourd, rifes with thick trailing downy ftalks, branching into many fpreading runners. Thefe extend along the ground fometimes 15 or 20 feet in length. The leaves are large, roundifh, heart-fhaped, indented, and woolly. The flowers are large and white, fucceeded by long incurvated whitifh yellow fruit, obtaining from about two to five or fix feet in length, and from about 9 to 24 inches in circumference, having a ligneous and durable fhell. 2. The *papo* or pompion, commonly called pumpkin, hath ftrong, trailing, rough ftalks, branching into numerous runners. Thefe are much larger than the former, extending from 10 to 40 or 50 feet each way. Thefe are garnifhed with large, roundifh, lobated, rough leaves, and yellow flowers. The flowers are fucceeded by large, round, fmooth fruit, of different forms and fizes; fome as big as a peck, others as big as half a bufhel meafure; fome confiderably lefs, and others not exceeding the bulk of an orange; ripening to a yellow, and fometimes to a whitifh colour. This fpecies is the moft hardy of any, as well as the moft extenfive in their growth. A fingle plant, if properly encouraged, will overfpread 10 or 15 roods of ground, and produce a great number of fruit, which, when young, are generally a mixture between a deep blue and pale white, but change as they increafe in bulk. 3. The *verrucofa*, or warted gourd, hath trailing ftalks very branchy, and running upon the ground 10 or 15 feet each way; large lobated leaves, and yellow flowers, fucceeded by roundifh, knobby, warted white fruit, of a moderate fize. 4. The *melopepo*, erect gourd, or fquafh. This rifes with an erect ftrong ftalk feveral feet high, rarely fending forth fide-runners, but becoming bufhy upward. It is adorned with large lobated leaves; and the flowers are fucceeded by depreffed knotty fruit, both white and yellow, commonly of a moderate fize. 5. The *lignofa*, ligneous fhelled gourd, often called calabafh. This hath trailing ftalks, branching into runners, which extend far every way; the leaves are large, lobated, and rough; the flowers yellow, and are fucceeded by roundifh fmooth fruit of a moderate fize, with hard woody fhells. Of

all theſe ſpecies there are a great many varieties, and the fruit of every ſpecies is obſerved to be ſurpriſingly apt to change its form.

All the ſpecies of gourds and pompions, with their reſpective varieties, are raiſed from ſeed ſown annually in April or the beginning of May, either with or without the help of artificial heat. But the plants forwarded in a hot-bed till about a month old, produce fruit a month or ſix weeks earlier on that account, and ripen proportionably ſooner. The firſt ſpecies particularly will ſcarce ever produce tolerably ſized fruit in Britain, without the treatment above mentioned.

In this country theſe plants are cultivated only for curioſity; but in the places where they are natives, they anſwer many important purpoſes. In both the Indies, bottle-gourds are very commonly cultivated and ſold in the markets. They make the principal food of the common people, particularly in the warm months of June, July, and Auguſt. The Arabians call this kind of gourd *charrab*. It grows commonly on the mountains in theſe deſerts. The natives boil and ſeaſon it with vinegar; and ſometimes, filling the ſhell with rice and meat, make a kind of pudding of it. The hard ſhell is uſed for holding water, and ſome of them are capacious enough to contain 22 gallons; theſe, however, are very uncommon. The fruit of the pompion conſtitutes a great part of the food of the common people during the hot months, in thoſe places where they grow. If gathered when not much bigger than a hen or gooſe egg, and properly ſeaſoned with butter, vinegar, &c. they make a tolerable good ſauce for butcher's meat, and are alſo uſed in ſoups. In England they are ſeldom uſed till grown to maturity. A hole is then made in one ſide, through which the pulp is ſcooped out; after being diveſted of the ſeeds, it is mixed with ſliced apples, milk, ſugar, and grated nutmeg, and thus a kind of pudding is made. The whole is then baked in the oven, and goes by the name of a *pumkin pye*. For this purpoſe the plants are cultivated in many parts of England by the country people, who raiſe them upon old dung-hills. The third ſpecies is alſo uſed in North America for culinary purpoſes. The fruit is gathered when about half grown, boiled, and eaten as ſauce to butcher's meat. The ſquaſhes are alſo treated in the ſame manner, and by ſome people eſteemed delicate eating.

CUCURBITACEÆ, the name of the 34th order in Linnæus's fragments of a natural method, conſiſting of plants which reſemble the gourd in external figure, habit, virtues, and ſenſible qualities. This order contains the following genera, viz. gronovia, melothria, paſſiflora, anguria, bryonia, cucumis, cucurbita, fevillea, momordica, ſicyos, trichoſanthes.

CUCURUCU, in zoology, the name of a ſerpent found in America, growing 10 or 12 feet long. It is alſo very thick in proportion to its length, and is of a yellowiſh colour, ſtrongly variegated with black ſpots, which are irregularly mixed among the yellow, and often have ſpots of yellow within them. It is a very poiſonous ſpecies, and greatly dreaded by the natives; but its fleſh is a very rich food, and much eſteemed among them, when properly prepared.

CUD, ſometimes means the inſide of the throat in beaſts; but generally the food that they keep there, and chew over again. See Comparative *Anatomy*, p. 649.

CUDDALORE, a town of the peninſula of Hindooſtan, on the coaſt of Coromandel, belonging to the Engliſh, very near the place where Fort St. David once ſtood. It was taken by the French in 1781; and, in 1783, it ſtood a ſevere ſiege againſt the Engliſh, which was ended by the intelligence received from Europe of the peace. It is 80 miles S. of Madras. E. lon. 79. 45. N. lat. 11. 41.

CUDDY, in a firſt-rate man of war, is a place lying between the captain-lieutenant's cabin and the quarter-deck; and divided into partitions for the maſter and other officers. It denotes alſo a kind of cabin near the ſtern of a lighter or barge of burden.

CUDWEED, in botany. See Gnaphalium.

CUE, an *item* or *inuendo*, given to the actors on the ſtage what or when to ſpeak. See Prompter.

CUENZA, a town of Spain, in New Caſtile, and in the territory of the Sierra, with a biſhop's ſee. It was taken by Lord Peterborough in 1706, but retaken by the Duke of Berwick. It is ſeated on the river Xucar, in W. lon. 1. 45. N. lat. 40. 10.

CUERENHERT (Theodore Van), a very extraordinary perſon, was a native of Amſterdam, where he was born in 1522. It appears, that early in life he travelled into Spain and Portugal; but the motives of his journey are not aſcertained. He was a man of ſcience, and, according to report, a good poet. The ſiſter arts at firſt he conſidered as an amuſement only; but in the end he was, it ſeems, obliged to have recourſe to engraving alone for his ſupport. And though the different ſtudies in which he employed his time prevented his attachment to this profeſſion being ſo cloſe as it ought to have been, yet at laſt the marks of genius are diſcoverable in his works. They are ſlight, and haſtily executed with the graver alone; but in an open careleſs ſtyle, ſo as greatly to reſemble deſigns made with a pen. He was eſtabliſhed at Haerlem; and there purſuing his favourite ſtudies in literature, he learned Latin, and was made ſecretary to that town, from whence he was ſent ſeveral times as ambaſſador to the Prince of Orange, to whom he addreſſed a famous manifeſto, which that prince publiſhed in 1566. Had he ſtopped here, it had been well; but directing his thoughts into a different channel, he undertook an argument as dangerous as it was abſurd. He maintained, that all religious communications were corrupted; and that, without a ſupernatural miſſion, accompanied with miracles, no perſon had a right to adminiſter in any religious office: he therefore pronounced that man to be unworthy the name of a Chriſtian who would enter any place of public worſhip. His works were publiſhed in three volumes folio in 1630; and though he was ſeveral times impriſoned, and at laſt ſentenced to baniſhment, yet he does not appear to have altered his ſentiments. He died at Dergoude in 1590, aged 68 years.

CUERPO. To *walk in cuerpo*, is a Spaniſh phraſe for going without a cloak; or without all the formalities of a full dreſs.

CUJAVIA, a territory of Great Poland, having on the north the duchy of Pruſſia, on the weſt the palatinate of Kaliſk, and on the ſouth thoſe of Licici and Rava, and on the weſt that of Bloczko. It contains two palatinates, the chief towns of which are Inowloez and Breſt; as alſo Uladiſlaw, the capital of the diſtrict.

CUIRASS, a piece of defenſive armour, made of iron plate, well hammered, ſerving to cover the body, from the neck to the girdle, both before and behind. Some derive the word, by corruption, from the Italian *cuore*, "heart;" becauſe it covers that part; others from the French *cuir*, or the Latin *corium*, "leather;" whence *coriaceous*: becauſe defenſive arms were originally made of leather. The cuiraſs was not brought into uſe till about the year 1300, though they were known both to the ancient Greeks and Romans in different forms.

CUIRASSIERS, cavalry armed with cuiraſſes, as moſt of the Germans are. The French have a regiment of cuiraſſiers; but we have had none in the Britiſh army ſince the revolution.

CULDEES, in church-hiſtory, a ſort of monkiſh prieſts formerly inhabiting Scotland and Ireland. Being remarkable for the religious exerciſes of preaching and praying, they were called, by way of eminence, *cultores Dei*; from whence is derived the word *culdees*. They made choice of one of their own fraternity

to be their ſpiritual head, who was afterwards called the *Scots biſhop*.

CULEMBACH, a town of Germany, in the circle of Franconia, capital of the margravate of the ſame name, with a citadel. It is ſeated on the Maine, 25 miles N. E. of Bamberg. E. lon. 11. 33. N. lat. 50. 11.

CULEUS, in Roman antiquity, the largeſt meaſure of capacity for things liquid, containing 20 amphoræ, or 40 urnæ. It contained 143 gallons 3 pints, Engliſh wine-meaſure, and was 11.095 ſolid inches.

CULEX, the GNAT; a genus of inſects belonging to the order of diptera. The mouth is formed by a flexible ſheath, incloſing briſtles pointed like ſtings. The antennæ of the males are filiform; thoſe of the females feathered. There are ſeven ſpecies. See plate 71. Theſe inſects, too well known by the ſevere punctures they inflict, and the itchings thence ariſing, afford a moſt intereſting hiſtory. Before they turn to flying inſects, they have been in ſome meaſure fiſhes, under two different forms. "You may obſerve in ſtagnate waters," ſays Barbut, "from the beginning of May till winter, ſmall grubs with their heads downwards, their hinder parts on the ſurface of the water; from which part ariſes ſideways a kind of vent-hole, or ſmall hollow tube like a funnel, and this is the organ of reſpiration. The head is armed with hooks, that ſerve to ſeize on inſects, and bits of graſs on which it feeds. On the ſides are placed four ſmall fins, by the help of which the inſect ſwims about, and dives to the bottom. Theſe larvæ retain their form during a fortnight or three weeks, after which period they turn to chryſalids. All the parts of the winged inſect are diſtinguiſhable through the outward robe that ſhrouds them. The chryſalids are rolled up into ſpirals. The ſituation and ſhape of the windpipe is then altered; it conſiſts of two tubes near the head, which occupy the place of the ſtigmata, through which the winged inſect is one day to breathe. Theſe chryſalids, conſtantly on the ſurface of the water in order to draw breath, abſtain now from eating; but upon the leaſt motion are ſeen to unroll themſelves, and plunge to the bottom, by means of little paddles ſituated at their hinder-part. After three or four days ſtrict faſting, they paſs to the ſtate of gnats. A moment before, water was its element; but now, become an aërial inſect, he can no longer exiſt in it. He ſwells his head, and burſts his incloſure. The robe he lately wore turns to a ſhip, of which the inſect is the maſt and ſail. If at the inſtant the gnat diſplays his wings there ariſes a breeze, it proves to him a dreadful hurricane; the water gets into the ſhip, and the inſect, who is not yet looſened from it, ſinks and is loſt. But in calm weather, the gnat forſakes his ſlough, dries himſelf, flies into the air, ſeeks to pump the alimentary juice of leaves, or the blood of men and beaſts. The ſting, which our naked eye diſcovers, is but a tube, containing five or ſix ſpicula of exquiſite minuteneſs; ſome dentated at their extremity like the head of an arrow, others ſharp-edged like razors. Theſe ſpicula, introduced into the veins, act as pump-ſuckers, into which the blood aſcends by reaſon of the ſmallneſs of the capillary tubes. The inſect injects a ſmall quantity of liquor into the wound, by which the blood becomes more fluid, and is ſeen through the microſcope paſſing through thoſe ſpicula. The animal ſwells, grows red, and does not quit his hold till it has gorged itſelf. The liquor it has injected cauſes by its irritation that diſagreeable itching which we experience, and which may be removed by volatile alkali, or by ſcratching the part newly ſtung, and waſhing it with vinegar; for later, the venom ferments, and you would only encreaſe the tumour and the itching. Rubbing one's ſelf at night with fuller's earth and water, leſſens the pain and inflammation. Gnats perform their copulation in the air. The female depoſits her eggs on the water, by the help of her moveable hinder part and her legs, placing them one by the ſide of another in the form of a little boat. This veſſel, compoſed of two or three hundred eggs, ſwims on the water for two or three days, after which they are hatched. If a ſtorm ariſes, the boats are ſunk. Every month there is a freſh progeny of theſe inſects. Were they not devoured by ſwallows, other birds, and by ſeveral carnivorous inſects, the air would be darkened by them."

Gnats in this country, however troubleſome they may be, do not make us feel them ſo ſeverely as the muſketo-flies *(culex pipiens)* do in foreign parts. In the day-time or at night theſe come into the houſes; and when the people are gone to bed, they begin their diſagreeable humming, approach always nearer to the bed, and at laſt ſuck up ſo much blood that they can hardly fly away. The bite cauſes bliſters in people of a delicate conſtitution. When the weather has been cool for ſome days, the muſketoes diſappear; but when it changes again, and eſpecially after rain, they gather frequently in ſuch quantities about the houſes, that their number is aſtoniſhing. In ſultry evenings they accompany the cattle in great ſwarms, from the woods to the houſes or to town; and when they are driven before the houſes, the gnats fly in wherever they can. In the greateſt heat of ſummer, they are ſo numerous in ſome places, that the air ſeems to be quite full of them, eſpecially near ſwamps and ſtagnate waters, ſuch as the river Morris in New Jerſey. The inhabitants therefore make a fire before their houſes to expel theſe diſagreeable gueſts by the ſmoke.

CULIACAN, a town of N. America, in Mexico, capital of a province of the ſame name. It is oppoſite the S. end of California. W. lon. 108. 5. N. lat. 24. 0.

CULLIAGE, a barbarous and immoral practice, whereby the lords of manors anciently aſſumed a right to the firſt night of their vaſſal's brides.

CULLEN, a parliament-town in Scotland, ſituated on the ſea-coaſt of Banff-ſhire. W. long. 2. 12. and N. lat. 57. 38.

CULLODEN MUIR, a wide heath, in Scotland, three miles E. of Inverneſs, near which the duke of Cumberland gained a deciſive victory over the rebels, in 1746.

CULM, or CULMUS, among botaniſts, a ſtraw or haulm; defined by Linnæus to be the proper trunk of the graſſes, which elevates the leaves, flower, and fruit. This ſort of trunk is tubular or hollow, and has frequently knots or joints diſtributed at proper diſtances through its whole length. The leaves are long, ſleek, and placed either near the roots in great numbers, or proceed ſingly from the different joints of the ſtalk, which they embrace at the baſe, like a ſheath or glove. The haulm is commonly garniſhed with leaves; ſometimes, however, it is naked; that is, devoid of leaves, as in a few ſpecies of cypreſs-graſs. Moſt graſſes have a round cylindrical ſtalk; in ſome ſpecies of ſchœnus, ſcirpus, cypreſs-graſs, and others, it is triangular. The ſtalk is ſometimes entire, that is, has no branches; ſometimes branching, as in *ſchœnus aculeatus & capenſis*; and not ſeldom conſiſts of a number of ſcales, which lie over each other like tiles. Laſtly, in a few graſſes, the ſtalk is not interrupted with joints, as in the greater part. The ſpace contained betwixt every two knots or joints, is termed by botaniſts *internodium*, and *articulus culmi*. This ſpecies of trunk often affords certain marks of diſtinction in diſcriminating the ſpecies. Thus in the genus eriocaulon, the ſpecies are ſcarce to be diſtinguiſhed but by the angles of the culmus or ſtalks. Theſe in ſome ſpecies are in number 5, in others 6, and in others 10.

CULMIFEROUS PLANTS (from *culmus*, a ſtraw or haulm): plants ſo called, which have a ſmooth jointed ſtalk, uſually hollow, and wrapped about at each joint with ſingle, narrow, ſharp-pointed leaves, and the ſeeds contained in chaffy huſks; ſuch are oats, wheat, barley, rye, and the other plants of the natural family of the GRASSES.

CULMINATION, in aſtronomy, the paſſage of any hea-

venly body over the meridian, or its greateſt altitude for that day.

CULPRIT, a term uſed by the clerk of the arraignments, when a perſon is indicted for a criminal matter.

CULROSS, a royal borough of Scotland, on the frith of Forth, in a tract of country between Clackmannanſhire and Kinroſsſhire, which is reckoned an appendage of the county of Perth. It is remarkable for an ancient palace or abbey, ſaid to have been built by Canmorn. W. lon. 3. 34. N. lat. 56. 4.

CULVERIN, a long ſlender piece of ordnance or artillery, ſerving to carry a ball to a great diſtance. Manege derives the word from the Latin *colubrina*; others from *coluber*, "ſnake;" either on account of the length and ſlenderneſs of the piece, or of the ravages it makes. There are three kinds of culverins, viz. the extraordinary, the ordinary, and the leaſt ſized. 1. The culverin extraordinary has $5\frac{1}{2}$ inches bore; its length 32 calibers, or 13 feet; weighs 4800 pounds; its load above 12 pounds; carries a ſhot $5\frac{1}{4}$ inches diameter, weighing 20 pounds weight. 2. The ordinary culverin is 12 feet long; carries a ball of 17 pounds 5 ounces; caliber $5\frac{1}{2}$ inches; its weight 4500 pounds. 3. The culverin of the leaſt ſize, has its diameter 5 inches; is 12 feet long; weighing about 4000 pounds; carries a ſhot $3\frac{3}{4}$ inches diameter, weighing 14 pounds 9 ounces.

CULVERTAILED, among ſhipwrights, ſignifies the faſtening or letting of one timber into another, ſo that they cannot ſlip out, as the corlings into the beams of a ſhip.

CUMBERLAND, a county of England, bounded on the N. by Scotland; on the E. by Northumberland, Durham, and Weſtmorland; on the S. by Lancaſhire; and on the W. by the Iriſh Sea and Solway Frith. It is 70 miles in length from S. W. to N. E. and 50 in breadth from E. to W. where it is broadeſt. It contains one city, 14 market-towns, and 90 pariſhes. It lies in the dioceſes of Cheſter and Carliſle, and ſends ſix members to parliament; two for the county, two for Carliſle, and two for Cockermouth. The air is cold and piercing, yet leſs than might be expected from its being ſituated ſo far north. The mountains feed large flocks of ſheep, whoſe fleſh is particularly ſweet and good, and the vallies produce corn, &c. There are mines of coal, lead, copper, lapis calaminaris, and black lead; the latter of which is almoſt peculiar to this county, which contains more than is ſufficient to ſupply all Europe. Here are likewiſe wild fowl, ſalmon, pearls, &c. The laſt are found in muſcles, at the mouth of a brook called the Irt, which diſcharges itſelf into the ſea a little to the N. of Ravenglaſs. The Skiddaw is the principal mountain; and the chief rivers are the Eden and the Derwent. This county, and the adjoining one of Weſtmorland, are celebrated for their lakes, and the beautiful romantic ſcenery which their banks and the adjacent country exhibit. Theſe majeſtic and diverſified appearances of nature were firſt recommended to public notice by the late Dr. Brown, and have ſince been repeatedly deſcribed by the pen and pencil. The lakes in Cumberland are Derwent-water, Baſſenthwaite-water, Buttermere-water, Cromack-water, Lowes-water, Ulls-water, Weſt-water, Ennerdale-water, Elder-water, Broad-water, &c. In viſiting the lakes of both counties, if the *touriſt's* time be ſhort, he may leave the S. W. which is not equal to the other, either in grandeur or beauty: his route will then be from Lancaſter to Burton, Kendal, Bowneſs, Ambleſide, Keſwick, Ulls-water, Penrith, Shap, and Kendal. When at Keſwick, if he has time, he will find much pleaſure in viſiting Buttermere and Cromack-water, and in riding down the ſide of Baſſenthwaite-water.

CUMINUM, CUMMIN; a genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The fruit is ovate and ſtriated; there are four partial umbels, and the involucra are quadrifid. There is but one ſpecies, *viz.* the cyminum. It is an annual plant, periſhing ſoon after the ſeed is ripe. It riſes 9 or 10 inches high in the warm countries where it is cultivated; but ſeldom riſes above four in this country. It has ſometimes flowered very well here, but never brings its ſeeds to perfection. The leaves are divided into long narrow ſegments, like thoſe of fennel, but much ſmaller: they are of a deep green, and generally turned backward at their extremity: the flowers grow in ſmall umbels at the top of the ſtalks: they are compoſed of five unequal petals, of a pale blueiſh colour, which are ſucceeded by long, channeled, aromatic ſeeds. The plant is propagated for ſale in the iſland of Malta. In this country the ſeeds muſt be ſown in ſmall pots, and plunged in a very moderate hot-bed to bring up the plants. Theſe, after having been gradually inured to the open air, turned out of the pots, and planted in a warmer border of good earth, preſerving the balls of earth to their roots, will flower pretty well, and may perhaps even perfect a few ſeeds in warm ſeaſons. Theſe ſeeds have a bitteriſh warm taſte, accompanied with an aromatic flavour, not of the moſt agreeable kind. They are retained in the reviſed pharmacopoeia of the college; particularly in the *Emplaſtrum Cumini*.

CUNÆUS (Peter), born in Zealand in 1586, was diſtinguiſhed by his knowledge in the learned languages, and his ſkill in the Jewiſh antiquities. He alſo ſtudied law, which he taught at Leyden in 1615; and read politics there till his death in 1638. His principal work is a treatiſe, in Latin, on the republic of the Hebrews.

CUNEIFORM, in general, an appellation given to whatever reſembles a wedge.

CUNEIFORM *Bone*, in anatomy, the ſeventh bone of the cranium, called alſo *os baſilare*, and *os ſphenoides*. See ANATOMY, p. 163.

CUNEUS, in antiquity, a company of infantry drawn up in form of a wedge, the better to break through the enemy's ranks.

CUNICULUS, in Zoology. See LEPUS.

CUNICULUS, in mining, a term uſed by authors in diſtinction from *puteus*, to expreſs the ſeveral ſorts of paſſages and cuts in theſe ſubterranean works. The *cuniculi* are thoſe direct paſſages in mines where they walk on horizontally; but the putei are the perpendicular cuts or deſcents. The miners in Germany call theſe by the name *ſtollen*, and *ſchachts*; the firſt word expreſſing the horizontal, and the ſecond the perpendicular cuts.

CUNILA, in botany; a genus of the monogynia order, belonging to the monandria claſs of plants; and in the natural method ranking under the 42d order *Verticillatæ*. The corolla is ringent, with its upper lip erect and plain; there are two filaments, caſtrated, or wanting antheræ; the ſeeds are four. There are three ſpecies, none of which has any remarkable property.

CUNINA, in mythology, a goddeſs who had the care of little children.

CUNITZ (Mary), one of the greateſt geniuſes in the 17th century, was born in Sileſia. She learned languages with amazing facility; and underſtood Poliſh, German, French, Italian, Latin, Greek, and Hebrew. She attained a knowledge of the ſciences with equal eaſe: ſhe was ſkilled in hiſtory, phyſic, poetry, painting, muſic, and playing upon inſtruments; and yet theſe were only an amuſement. She more particularly applied herſelf to the mathematics, and eſpecially to aſtronomy, which ſhe made her principal ſtudy, and was ranked in the number of the moſt able aſtronomers of her time. Her Aſtronomical Tables acquired her a prodigious reputation: ſhe printed them in Latin and German, and dedicated them to the

emperor Ferdinand III. She married Elias de Lewin, M. D. and died at Piftehen in 1664.

CUNNINGHAM, one of the four bailiwicks in Scotland; and one of the three into which the fhire of Air is fubdivided. It lies north-eaft of Kyle. Its chief town is Irvine.

CUNNINGHAM (Alexander), author of a Hiftory of Great Britain from the revolution to the acceffion of George I. was born in the fouth of Scotland about the year 1654, in the protectorate of Oliver Cromwell. His father was minifter at Ettrick, in the prefbytery and fhire of Selkirk. He was educated, as was the cuftom among the Scottifh prefbyterian gentlemen of thofe times, in Holland; where he imbibed his principles of government, and lived much with the Englifh and Scots refugees at the Hague before the revolution, particularly with the earls of Argyle and Sunderland. He came over to England with the prince of Orange, and enjoyed the confidence and intimacy of many leading men among the whig party. He was employed, at different times, in the character of a travelling companion and tutor; firft, to the earl of Hyndford, and his brother Mr. William Carmichael, folicitor general, in the reign of queen Anne, for Scotland; fecondly, with the lord Lorne, afterwards fo well known under the name of *John Duke of Argyle;* and thirdly, with the lord vifcount Lonfdale. In his travels, we find him, at the German courts, in company with the celebrated Mr. Jofeph Addifon, whofe virtues he celebrates, and whofe fortune, like that of our author, compelled him to

"———— become for hire
"A trav'ling tutor to a fquire."

Mr. Cunningham's political friends, Argyle, Sunderland, Sir Robert Walpole, &c. on the acceffion of George I. fent him as Britifh envoy to the republic of Venice. He arrived in that city in 1715; and continued there, in the character of refident, till the year 1720, when he returned again to London. He lived many years after, which he feems chiefly to have paffed in a ftudious retirement. In 1735 he was vifited in London by lord Hyndford, by the direction of his lordfhip's father, to whom he had been tutor, when he appeared to be very old. He feems to have lived about two years after; for the body of an Alexander Cunningham lies interred in the vicar chancel of St. Martin's church, who died in the 83d year of his age, on the 15th day of May 1737; and who was probably the fame perfon.

Mr. Cunningham has been fuppofed to be the fame perfon with Alexander Cunningham who publifhed an edition of Horace at the Hague, in two volumes 8vo, in 1721, which is highly efteemed. But they were certainly different perfons; though both lived at the fame time, both had been travelling tutors, both were deemed eminent for their fkill at the game of chefs, and both lived to a very advanced age. The editor of Horace is generally faid to have died in Holland, where he taught both the civil and canon laws, and where he had collected a very large library, which was fold in that country.

CUNOCEPHALI, in mythology, from κυων, a dog, and κεφαλη, head, a kind of baboons, or animals with heads like thofe of dogs, which were wonderfully endowed, and were preferved with great veneration by the Egyptians in many of their temples. It is related, that by their affiftance, the Egyptians found out the particular periods of the fun and moon; and that one half of the animal was often buried, while the other half furvived: and that they could read and write. This ftrange hiftory, Dr. Bryant imagines, relates to the priefts of Egypt, ftyled *cahen*, to the novices in their temples, and to the examinations they were obliged to undergo, before they could be admitted to the priefthood. The Egyptian colleges were fituated upon rocks or hills, called *caph*, and from their confecration to the fun, *caph-el*; whence the Greeks deduced κεφαλη, and from *cahen-caph-el* they formed κυνοκεφαλος. So that *cahen-caph-el* was fome royal feminary in Upper Egypt, whence they drafted novices to fupply their colleges and temples. By this etymology he explains the above hiftory. The death of one part, while the other furvived, denoted the regular fucceffion of the Egyptian priefthood. The *cunocephali* are alfo found in India and other parts of the world. Thefe and the *acephali* were thus denominated from their place of refidence, and from their worfhip.

CUNODONTES, a people mentioned by Solinus and Ifidorus, and by them fuppofed to have the teeth of dogs. They were probably denominated, fays Dr. Bryant, from the object of their worfhip, the deity Chan-Adon, which the Greeks expreffed Κυνοδων, and thence called his votaries *Cunodontes.*

CUNONIA, in botany; a genus of the digynia order, belonging to the decandria clafs of plants; and in the natural method ranking with thofe of which the order is doubtful. The corolla is pentapetalous; the calyx pentaphyllous; the capfule bilocular, acuminated, polyfpermous; the ftyles longer than the flower.

CUOGOLO, in natural hiftory, the name of a ftone much ufed by the Venetians in glafs-making, and found in the river Tefino. It is a fmall ftone of an impure white, of a fhattery texture, and is of the fhape of a pebble.

CUP, a veffel of capacity, of various forms and materials, chiefly to drink out of. In the German Ephemeris we have a defcription of a cup made of a common pepper-corn by Ofwald Nerlinger, which holds 1200 other ivory cups, having each its feveral handle, all gilt on the edges; with room for 400 more.

CUP, in botany. See CALYX.

CUP-*Galls*, in natural hiftory, a name given by authors to a very fingular kind of galls, found on the leaves of the oak and fome other trees. They are of the figure of a cup, or drinking-glafs without its foot, being regular cones adhering by their point or apex to the leaf; and the top or broad part is hollowed a little way, fo that it appears like a drinking-glafs with a cover, which was made fo fmall as not to clofe it at the mouth, but fall a little way into it. This cover is flat, and has in the centre a very fmall protuberance, refembling the nipple of a woman's breaft. This is of a pale green, as is alfo the whole of the gall, excepting only its rim that runs round about the top: this latter is of a fcarlet colour, and that very beautiful. Befides this fpecies of gall, the oak-leaves furnifh us with feveral others, fome of which are oblong, fome round, and others flatted; thefe are of various fizes, and appear on the leaves at various feafons of the year. They all contain the worm of fome fmall fly; and this creature paffes all its changes in this its habitation, being fometimes found in the worm, fometimes in the nymph, and fometimes in the fly-ftate, in the cavity of it.

CUPANIA, in botany; a genus of the monadelphia order, belonging to the monœcia clafs of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The calyx of the male is triphyllous; the corolla pentapetalous; the ftamina five. The calyx of the female triphyllous; the corolla tripetalous; the ftyle trifid: and a pair of feeds. There is but one fpecies, a native of America, which poffeffes no remarkable property.

CUPEL, in metallurgy, a fmall veffel which abforbs metallic bodies when changed by fire into a fluid fcoria; but retains them as long as they continue in their metallic ftate. One of the moft proper materials for making a veffel of this kind is the afhes of animal bones; there is fcarcely any other fubft which fo ftrongly refifts vehement fire, which fo readil metallic fcoriæ, and which is fo little difpofed to be v

them. For want of these, some make use of vegetable ashes, freed by boiling in water from their saline matter, which would cause them to melt in the fire.

The bones, burnt to perfect whiteness, so as that no particle of coally or inflammable matter may remain in them, and well washed from filth, are ground into moderately fine powder; which, in order to its being formed into cupels, is moistened with just as much water as is sufficient to make it hold together when strongly pressed between the fingers; some direct glutinous liquids, as whites of eggs or gum-water, in order to give the powder a greater tenacity: but the inflammable matter, however small in quantity, which accompanies these fluids, and cannot be easily burnt out from the internal part of the mass, is apt to revive a part of the metallic scoria that has been absorbed, and to occasion the vessel to burst or crack. The cupel is formed in a brass ring, from three quarters of an inch to two inches diameter, and not quite so deep, placed upon some smooth support: the ring being filled with moistened powder, which is pressed close with the fingers; a round-faced pestle, called a *monk*, is struck down into it with a few blows of a mallet, by which the mass is made to cohere, and rendered sufficiently compact, and a shallow cavity formed in the middle: the figure of the cavity is nearly that of a sphere, that a small quantity of metal melted in it may run together into one bead. To make the cavity the smoother, a little of the same kind of ashes levigated into an impalpable powder, and not moistened, is commonly sprinkled on the surface, through a small fine sieve made for this purpose, and the monk again struck down upon it. The ring or mould is a little narrower at bottom than at top; so that by pressing it down on some of the dry powder spread upon a table, the cupel is loosened, and forced upwards a little; after which it is easily pushed out with the finger, and is then set to dry in a warm place free from dust.

CUPELLATION, the act of refining gold or silver by means of a cupel. For this purpose another vessel called a *muffle*, is made use of, within which one or more cupels are placed. The muffle is placed upon a grate in a proper furnace, with its mouth facing the door, and as close to it as may be. The furnace being filled up with fuel, some lighted charcoal is thrown on the top, and what fuel is afterwards necessary is supplied through a door above. The cupels are set in the muffle; and being gradually heated by the successive kindling of the fuel, they are kept red-hot for some time, that the moisture which they strongly retain may be completely dissipated: for if any vapours should issue from them after the metal is put in, they would occasion it to sputter, and a part of it to be thrown off in little drops. In the sides of the muffle are some perpendicular slits, with a knob over the top of each, to prevent any small pieces of coals or ashes from falling in. The door, or some apertures in it, being kept open, for the inspection of the cupels, fresh air enters into the muffle, and passes off through these slits: by laying some burning charcoal on an iron plate before the door, the air is heated before its admission; and by removing the charcoal, or supplying more, the heat in the cavity of the muffle may be somewhat diminished or increased more speedily than can be effected by suppressing or exciting the fire in the furnace on the outside of the muffle. The renewal of the air also is necessary for promoting the scorification of the lead.

The cupel being of a full red heat, the lead cast into a smooth bullet, that it may not scratch or injure the surface, is laid lightly in the cavity; it immediately melts; and then the gold or silver to be cupelled are cautiously introduced either by means of a small iron ladle, or by wrapping them in paper, and dropping them on the lead with a pair of tongs. The quantity of lead should be at least three or four times that of the fine metal: but when gold is very impure, it requires 10 or 12 times its quantity of lead for cupellation. It is reckoned that copper requires for its scorification about 10 times its weight of lead; that when copper and gold are mixed in equal quantities, the copper is so much defended by the gold, as not to be separable with less than 20 times its weight of lead; and that when copper is in very small proportion, as a 20th or 30th part of the gold or silver, upwards of 60 parts of lead are necessary for one of the copper. The cupel must always weigh at least half as much as the lead and copper; for otherwise it will not be sufficient for receiving half the scoria: there is little danger, however, of cupels being made too small for the quantity of a gold assay.

The mixture being brought into thin fusion, the heat is to be regulated according to the appearances; and in this consists the principal nicety of the operation. If a various coloured skin rises at the top, which liquefying, runs off to the sides, and is there absorbed by the cupel, visibly staining the parts it enters; if a fresh scoria continually succeeds, and is absorbed nearly as fast as it is formed, only a fine circle of it remaining round the edge of the metal; if the lead appears in gentle motion, and throws up a fume a little way from the surface; the fire is of the proper degree, and the process goes on successfully.

Such a fiery brightness of the cupel as prevents its colour from being distinguished, and the fumes of the lead rising up almost to the arch of the muffle, are marks of too strong a heat: though it must be observed, that the elevation of the fumes is not always in proportion to the degree of heat; for if the heat greatly exceeds the due limits, both the fumes and ebullition will entirely cease. In these circumstances the fire must necessarily be diminished: for while the lead boils and smokes vehemently, its fumes are apt to carry off some part of the gold; the cupel is liable to crack from the hasty absorption of the scoria, and part of the gold and silver is divided into globules, which lying discontinued on the cupel after the process is finished, cannot easily be collected; if there is no ebullition or fumes, the scorification does not appear to go on. Too weak a heat is known by the dull redness of the cupel; by the fume not rising from the surface of the lead; and the scoria like bright drops in languid motion, or accumulated, or growing consistent all over the metal. The form of the surface affords also an useful mark of the degree of heat; the stronger the fire, the more convex is the surface; and the weaker, the more flat; in this point, however, regard must be had to the quantity of metal; a large quantity being always flatter than a small one in an equal fire.

Towards the end of the process, the fire must be increased; for the greatest part of the fusible metal lead being now worked off, the gold and silver will not continue melted in the heat that was sufficient before. As the last remains of the lead are separating, the rainbow colours on the surface become more vivid, and variously intersect one another with quick motions. Soon after, disappearing all at once, a sudden luminous brightness of the button of gold and silver shows the process to be finished. The cupel is then drawn forwards towards the mouth of the muffle; and the button, as soon as grown fully solid, taken out.

CUPELLING FURNACE. See *Cupelling* FURNACE.

CUPID, in Pagan mythology, the god of love. There seems to have been two Cupids; one the son of Jupiter and Venus, whose delight it was to raise sentiments of love and virtue; and the other the son of Mars and the same Goddess, who inspired base and impure desires. The first of these, called Eros, or true love, bore golden arrows, which caused real joy, and a virtuous affection; the other, called Anteros, had leaden arrows, that raised a passion founded only on desire, which ended in satiety and disgust. Cupid was always drawn with wings,

to reprefent his inconftancy; and naked, to fhow that he has nothing of his own. He was painted blind, to denote love fees no fault in the object beloved; and with a bow and quiver of arrows, to fhow his power over the mind. Sometimes he is placed between Hercules and Mercury, to fhow the prevalence of eloquence and valour in love; and at other times near Fortune, to fignify that the fuccefs of lovers depends on that inconftant goddefs. Sometimes he is reprefented with an helmet on his head and a fpear on his fhoulder, to fignify that love difarms the fierceft men; he rides upon the backs of panthers and lions, and ufes their manes for a bridle, to denote that love tames the moft favage beafts. He is likewife pictured riding upon a dolphin, to fignify that his empire extends over the fea no lefs than land.

CUPOLA, in architecture, or the round top of the dome of a church, in the form of a cup inverted. See DOME.

CUPPING, in furgery, the operation of applying cupping glaffes for the difcharge of blood from the fkin. See SURGERY.

CUPRESSUS, the CYPRESS-TREE; a genus of the monadelphia order, belonging to the monœcia clafs of plants; and in the natural method ranking under the 51ft order, *Coniferæ*. The male calyx is a fcale of the catkin; there is no corolla; the antheræ are four, feffile, and without filaments. The calyx of the female is a fcale of the ftrobilus, and uniflorous; inftead of the ftyles there are hollow dots; the fruit is an angulated nut. There are fix fpecies; the moft remarkable are the following: 1. The *femper-virens*, with an upright ftraight ftem, clofely branching all round, almoft from the bottom upwards, into numerous quadrangular branches; rifing in the different varieties from 15 to 40 or 50 feet in height, and very clofely garnifhed with fmall, narrow, erect evergreen leaves, placed imbricatim; and flowers and fruit from the fides of the branches. 2. The *thyoides*, or evergreen American cyprefs, commonly called white cedar, hath an upright ftem branching out into numerous two-edged branches, rifing 20 or 30 feet high, ornamented with the flat evergreen leaves, imbricated like arbor vitæ, and fmall blue cones the fize of juniper-berries. 3. The *difticha*, or deciduous American cyprefs, hath an erect trunk, retaining a large bulk, branching wide and regular; grows 50 or 60 feet high, fully garnifhed with fmall fpreading deciduous leaves, arranged diftichous, or along two fides of the branches. All thefe fpecies are raifed from feeds, and will fometimes alfo grow from cuttings; but thofe raifed from feeds prove the handfomeft plants. The feeds are procured in their cones from the feedfmen, and by expofing them to a moderate heat, they readily open, and difcharge their feeds freely. The feafon for fowing them is any time in March; and they grow freely on a bed of common light earth; efpecially the firft and third fpecies.

The wood of the firft fpecies is faid to refift worms, moths, and putrefaction, and to laft many centuries. The coffins in which the Athenians were ufed to bury their heroes, were made, fays Thucydides, of this wood; as were likewife the chefts containing the Egyptian mummies. The doors of St. Peter's church at Rome were originally of the fame materials. Thefe, after lafting upwards of 600 years, at the end of which they did not difcover the fmalleft tendency to decay, were removed by order of pope Eugenius IV. and gates of brafs fubftituted in their place. The fame tree has been extolled as a remedy in pulmonic difeafes from its fuppofed property of meliorating the air by its balfamic exhalations; upon which account many ancient phyficians of the eaftern countries ufed to fend their patients to the ifland of Candia, where thefe trees grew in great abundance. In that ifland, fays Miller, the cyprefs trees were fo lucrative a commodity, that the plantations were called *dos filiæ*; the felling of one of them being reckoned a daughter's portion. Cyprefs, fays Mr. Pococke, is the only tree that grows towards the top of mount Lebanon, and being nipped by the cold, grows like a fmall oak. Noah's ark is commonly fuppofed to have been made of this kind of wood.

CUPRUM, or COPPER. See COPPER.

CUPRUM AMMONIACALE, called, in the revifed pharmacopoeia of the London college, *Cuprum Ammoniatum*. This preparation is recommended in epilepfies and various fpafmodic difeafes. It is ufually given in the dofe of one or two grains; but the late Dr. Cullen has given to the amount of five grains.

CURACAO, or CURASSOW, an ifland of S. America, to the N. of Terra Firma, fubject to the Dutch. It is 25 miles in length, and 12 in breadth, and its trade confifts in fugar and fkins. The principal town, which bears the fame name, has a good harbour and a fort.

CURATE, the loweft degree in the church of England; he who reprefents the incumbent of a church, parfon or vicar, and performs divine fervice in his ftead: for, in cafe of pluralities of livings, or where a clergyman is old and infirm, it is requifite there fhould be a curate to perform the cure of the church. He is to be licenfed, and admitted by the bifhop of the diocefe, or by an ordinary having epifcopal jurifdiction; and when a curate hath the approbation of the bifhop, he ufually appoints the falary too; and in fuch cafe, if he be not paid, the curate hath a proper remedy in the ecclefiaftical court, by a fequeftration of the profits of the benefice; but if the curate is not licenfed by the bifhop, he is put to his remedy at common law, where he muft prove the agreement, &c. A curate having no fixed eftate in his curacy, not being inftituted and inducted, may be removed at pleafure by the bifhop or incumbent. But there are perpetual curates as well as temporary, who are appointed where tithes are impropriate, and no vicarage endowed: thefe are not removeable, and the impropriators are obliged to find them; fome whereof have certain portions of the tithes fettled on them. Every clergyman that officiates in a church (whether incumbent or fubftitute) in the liturgy is called a *curate*. Curates muft fubfcribe the declaration according to the act of uniformity, or are liable to imprifonment, &c.

CURATELLA, in botany; a genus of the digynia order, belonging to the polyandria clafs of plants; and in the natural method ranking with thofe of which the order is doubtful. The calyx is pentaphyllous; the petals four; the ftyles two; the capfules bipartite, with the cells difpermous.

CURATOR, among the Romans, an officer under the emperors, who regulated the price of all kinds of merchandize and vendible commodities in the cities of the empire. They had likewife the fuperintendance of the cuftoms and tributes; whence alfo they were called *logiftæ*.

CURATOR, among civilians, a truftee or perfon nominated to take care of the affairs and interefts of a perfon emancipated or interdicted. In countries where the Roman law prevails, between the age of 14 and 24 years, minors have curators affigned them; till 14, they have tutors.

CURATOR *of an Univerfity*, in the United Provinces, is an elective office, to which belongs the direction of the affairs of the univerfity; as, the adminiftration of the revenues, the infpection of the profeffors, &c. The curators are chofen by the ftates of each province: the univerfity of Leyden has three; the burghermafters of the city have a fourth.

CURB, in the manege, a chain of iron made faft to the upper part of the branches of the bridle in a hole called the *eye*, and running over the horfe's beard. It confifts of thefe three parts; the hook, fixed to the eye of the branch; the chain of SS's or links; and the two rings or mailes. Large curbs, provided they be round, are always moft gentle: but care is to be taken, that it reft in its proper place, a little above the beard, otherwife the mouth-bit will not have the effect that may be expected from it. Englifh watering bits

have no curbs; the Turkish bits, called *genettes*, have a ring that serves instead of a curb. See GENETTES.

CURB, in farriery, is a hard and callous swelling on the hind part of the hock, attended with stiffness, and sometimes with pain and lameness. See SPAVIN.

CURCAS, a name given in Egypt to an esculent root, approaching to the taste and virtues of the colocasia. It is also a name used in Malabar for a small fruit of the shape and size of an hazel nut. Both these drugs have the credit of being strong provocatives; and it is very probable that the curcas of the East Indies may be the fruit called *bel* by Avicenna, and said to possess the same virtues. Garcias has been led into a very great error by this similarity of names and virtues; and supposes the curcas of Egypt the same with that of the East Indies.

CURCULIO, in zoology, a genus of insects belonging to the order of coleoptera. See plate 71. The feelers are subclavated, and rest upon the snout, which is prominent and horny. These insects are divided into the following families: 1. Those which have the rostrum longer than the thorax, and whose thighs are simple. 2. Those which have the rostrum longer than the thorax, and the thighs thicker and made for leaping. 3. Those which have the rostrum longer than the thorax, and the thighs dentated. 4. Those which have dentated thighs, and a rostrum shorter than the thorax. 5. Those whose thighs are without teeth or spines, and the rostrum shorter than the thorax. There are no less than 95 species, principally distinguished by their colour.

The larvæ of the curculiones differ not from those of most coleopterous insects. They bear a resemblance to oblong soft worms. They are provided anteriorly with six scaly legs, and the head is likewise scaly. But the places where those larvæ dwell, and their transformations, afford some singularities. Some species of them, that are dreaded for the mischief they do in granaries, find means to introduce themselves, while yet small, into grains of corn, and there make their abode. It is very difficult to discover them, as they lie concealed within the grain. There they grow at leisure, enlarging their dwelling-place as they grow, at the expence of the interior meal of the grain on which they feed. Corn lofts are often laid waste by these insects, whose numbers are sometimes so great as to devour and destroy all the grain. When the insect, after having eat up the meal, is come to its full size, it remains within the grain, hidden under the empty husk, which subsists alone; and there transformed, it becomes a chrysalis, nor does it leave it till a perfect insect, making its way through the husk of the grain. It is no easy matter to discover by the eye the grains of corn thus attacked and hollowed out by these insects, as they outwardly appear large and full: but the condition the curculio has reduced them to, renders them much lighter; and if you throw corn infested by these insects into water, all the spoiled grains will swim, and the rest sink to the bottom. Other larvæ of curculiones are not so fond of corn, but fix in the same manner on several other seeds. Beans, pease, and lentils, that are preserved dry, are liable to be eaten by these little animals, which prey upon the inward part of the grain, where they have taken up their habitation, and do not come forth till they have completed their transformation, by breaking through the outward husk of the grain: this is discoverable by casting those grains into water; those that swim are generally perforated by the curculiones. Other species are lodged in the inside of plants. The heads of artichokes and thistles are often bored through and eaten away by the larvæ of large curculiones. Another species smaller, but singular, pierces and inwardly consumes the leaves of elms. It frequently happens that almost all the leaves of an elm appear yellow, and as it were dead towards one of their edges, while the whole remainder of the leaf is green. Upon inspecting those leaves, the dead part appears to form a kind of bag or small bladder. The two laminæ or outward pellicles of the leaf, as well above as below, are entire, but distant and separated from each other, whilst the parenchyma that lies between them has been consumed by several small larvæ of the curculio, that have made themselves that dwelling, in which they may be met with. After their transformation they come forth, by piercing a kind of bladder, and give being to a curculio that is brown, small, and hard to catch, by reason of the nimbleness with which it leaps. The property of leaping, allotted to this single species, depends on the shape and length of its hinder legs.

CURCUMA, TURMERIC; a genus of the monogynia order, belonging to the monandria class of plants; and in the natural method ranking under the eighth order, *Scitamineæ*. It has four barren stamina, with a fifth fertile. The species are, 1. The *rotunda*, with a round root, having a fleshy-jointed root like that of ginger, but round; which sends up several spear-shaped oval leaves, that rise upwards of a foot high, and of a sea-green colour. From between these arise the flower-stalks, supporting a loose spike of flowers of a pale-yellowish colour, inclosed in several different spathæ, or sheaths, which drop off. The flowers are never succeeded by seeds in this country. 2. The *longa*, hath long fleshy roots of a deep yellow colour, which spread under the surface of the ground like those of ginger; they are about the thickness of a man's finger, having many round knotty circles, from which arise four or five large spear-shaped leaves, standing upon long footstalks. The flowers grow in loose scaly spikes on the top of the footstalks, which rise from the larger knobs of the roots, and grow about a foot high; they are of a yellowish red colour, and shaped somewhat like those of the Indian reed. These plants grow naturally in India, from whence the roots are brought to Europe for use. They are very tender, so will not live in this country, unless kept constantly in a stove. They are propagated by parting the roots. The root communicates a beautiful but perishable yellow dye, with alum, to woollen, cotton, or linen. In medicine it is esteemed an aperient, and emmenagogue; and of singular efficacy in the jaundice.

CURDISTAN, a country of Asia, seated between the Turkish empire and Persia, lying along the eastern coast of the river Tigris, and comprehending great part of the ancient Assyria. Some of the inhabitants live in towns and villages, and others rove from place to place, having tents like the wild Arabs, and being robbers like them. Their religion is partly Christianity and partly Mahometanism.

CURDLING, the coagulating or fixing of any fluid body, particularly milk. See the article CHEESE. Pausanias says, that Aristæus, son of Apollo, and Cyrene, daughter of the river Peneus, were the first who found the secret of curdling milk. At Florence they curdle their milk for the making of cheese with artichoke flowers, in lieu of the rennet used for the same purpose among us. The Bisaltæ, a people of Macedonia, Rochfort observes, live wholly upon curdled milk, i. e. on curds. He adds, that curds are the whole food of the people of Upper Auvergne in France, and whey their only drink.

CURETES, in antiquity, a sort of priests or people of the isle of Crete, called also *Corybantes*. The Curetes are said to have been originally of mount Ida in Phrygia; for which reason they were also called *Idæi Dactyli*. See DACTYLI. Lucian and Diodorus Siculus represent them as very expert in casting of darts; though other authors give them no weapons but bucklers and pikes: but all agree in furnishing them with tabors and castanettas; and relate, that they used to dance much to the noise and clashing thereof. By this noise, it is said, they prevented Saturn from hearing the cries of young Jupiter, whereby he was saved from being destroyed. Some authors, however, give a different account of the Curetes. According

to Pezron and others, the Curetes were, in the times of Saturn, &c. and in the countries of Crete and Phrygia, what the Druids were afterwards among the Gauls, &c. i. e. they were priests who had the care of what related to religion and the worship of the gods. Hence, as in those days, it was supposed there was no communication with the gods but by divinations, auguries, and the operations of magic; the Curetes passed for magicians and enchanters: to these they added the study of the stars, of nature, and poesy; and so were philosophers, astronomers, &c. Vossius, *(De Idolat.)* distinguishes three kinds of Curetes; those of Ætolia, those of Phrygia, and those of Crete, who were originally derived from the Phrygians. The first, he says, took their name from κουρα, *tonsure*; in regard, from the time of a combat wherein the enemy seized their long hair, they always kept it cut. Those of Phrygia and Crete, he supposes, were so called from κουρος, *young man*, in regard they were young, or because they nursed Jupiter when he was young.

CURFEW, or Courfew, a signal given in cities taken in war, &c. to the inhabitants to go to bed. Pasquin says, it was so called, as being intended to advertise the people to secure themselves from the robberies and debaucheries of the night. The most noted curfew in England was that established by William the Conqueror, who appointed, under severe penalties, that, at the ringing of a bell at eight o'clock in the evening, every one should put out their lights and fires, and go to bed: whence, a bell rung about that time was long called a *curfew-bell*.

CURIA, in Roman antiquity, was used for the senate-house. There were several curiæ in Rome; as the *curia calabra*, said to be built by Romulus; the *curia hostilia*, by Tullus Hostilius; and the *curia pompeia*, by Pompey the Great.

Curia also denoted the places where the curiæ used to assemble. Each of the 30 curiæ of old Rome had a temple or chapel assigned to them for the common performance of their sacrifices, and other offices of their religion; so that they were not unlike our parishes. Some remains of these little temples seem to have subsisted many ages after on the Palatine-hill, where Romulus first built the city, and always resided.

Curia, among the Romans, also denominated a portion, or division of a tribe. In the time of Romulus, a tribe consisted of ten curiæ, or a thousand men; each curia being one hundred. That legislator made the first division of his people into thirty curiæ. We read also, *curia* or *domus curialis*, because used for the place where each curia held its assemblies. Hence also curia passed to the senate-house; and it is from hence the moderns came to use the word *curia*, "court," for a place of justice, and for the judges, &c. there assembled. Varro derives the word from *cura*, "care," q. d. an assembly of people charged with the care of public affairs. Others deduce it from the Greeks, maintaining, that at Athens they called κυρια the place where the magistrate held his assizes, and the people used to assemble: κυρια, again, may come from κυρος, *authority, power*; because it was here the laws were made.

Curia, in our ancient customs. It was usual for the kings of England to summon the bishops, peers, and great men of the kingdom, to some particular place, at the chief festivals in the year; and this assembly is called by our historians *curia*; because there they consulted about the weighty affairs of the nation; whence it was sometimes also called *solemnis curia, generalis curia, augustalis curia*, and *curia publica*, &c. See Witena-*Mot*.

Curia *Baronum*. See Court-*Baron*.

Curia *Claudenda*, is a writ that lies against him who should fence and inclose the ground, but refuses or defers to do it.

CURIATII, three brothers of Alba, maintained the interest of their country against the Romans, who had declared war against those of Alba. The two armies being equal, three brothers on each side were chosen to decide the contest: the Curiatii by those of Alba, and the Horatii by the Romans. The three first were wounded, and two of the latter killed: but the third joining policy to valour, ran away; and having thus tired the Curiatii, he took them one after another, and killed them all three.

CURING, a term used for the preserving fish, flesh, and other animal substances, by means of certain additions of things, to prevent putrefaction. One great method of doing this, is by smoking the bodies with the smoke of wood, or rubbing them with common salt, nitre, &c.

CURIO, the chief and priest of a curia. Romulus, upon dividing the people into curiæ, gave each division a chief, who was to be priest of that curia, under the title of *curio* and *flamen curialis*. His business was to provide and officiate at the sacrifices of the curia, which were called *curionia*; the curia furnishing him with a sum of money on that consideration, which pension or appointment was called *curionium*. Each division had the election of its curia; but all these particular curios were under the direction of a superior or general, called *curio maximus*, who was the head of the body, and elected by all the curios assembled in the comitia curialis. All these institutions were introduced by Romulus, and confirmed by Numa, as Halicarnasseus relates.

CURIOSUS, an officer of the Roman empire during the middle age, appointed to take care that no frauds or irregularities were committed; particularly no abuses in what related to the posts, the roads, &c. and to give intelligence to the court of what passed in the provinces. This made the curiosi people of importance, and put them in a condition of doing more harm than they prevented; on which account Honorius cashiered them, at least in some parts of the empire, *anno* 415. The curiosi came pretty near to what we call *controllers*. They had their name from *cura*, "care;" *quod curis agendis & evectionibus cursus publici inspiciendis operam darent*.

CURLEW, in ornithology. See Scopolax.

CURMI, a name given by the ancients to a sort of malt liquor or ale. It was made of barley, and was drunk by the people of many nations instead of wine, according to Dioscorides's account. He accuses it of causing pains in the head, generating bad juices, and disordering the nervous system. He also says, that in the western part of Iberia, and in Britain, such a sort of liquor was in his time prepared from wheat instead of barley.

CURNOCK, a measure of corn containing four bushels, or half a quarter.

CURRANTS, the fruit of a species of grossularia. See Grossularia. The white and red sort are mostly used; for the black, and chiefly the leaves, upon first coming out, are in use to flavour English spirits, and counterfeit French brandy. The jelly of black currants is reckoned very efficacious in curing inflammations of the throat. Currants also signify a smaller kind of grapes, brought principally from Zante and Cephalonia. They are gathered off the bushes, and laid to dry in the sun, and so put up in large butts. They are used for culinary purposes chiefly.

CURRENT, a term used to express the present time. Thus the year 1796 is the current year, the 20th current is the 20th day of the month now running. With regard to commerce, the price current of any merchandise is the known and ordinary price accustomed to be given for it. The term is also used for any thing that has course or is received in commerce; in which sense we say, *current coin*, &c.

Current, in navigation, a certain progressive movement of the water of the sea, by which all bodies floating therein are

compelled to alter their courſe or velocity, or both, and ſubmit to the laws impoſed on them by the current. In the ſea, currents are either natural and general, as ariſing from the diurnal rotation of the earth about its axis; or accidental and particular, cauſed by the waters being driven againſt promontories, or into gulphs and ſtraits, where, wanting room to ſpread, they are driven back, and thus diſturb the ordinary flux of the ſea. Currents are various, and directed towards different parts of the ocean, of which ſome are conſtant, others periodical. The moſt extraordinary current of the ſea, is that by which part of the Atlantic or African Ocean moves about Guinea from Cape Verd towards the curvature or bay of Africa, which they call *Fernando Poo*; viz. from weſt to eaſt, contrary to the general motion: and ſuch is the force of the current, that when ſhips approach too near the ſhore, it carries them violently towards that bay, and deceives the mariners in their reckoning. There is a great variety of ſhifting currents, which do not laſt, but return at certain periods; and theſe do, moſt of them, depend upon and follow the anniverſary winds or monſoons, which by blowing in one place may cauſe a current in another. Varenius informs us, that at Java, in the ſtraits of Sunda, when the monſoons blow from the weſt, viz. in the month of May, the currents ſet to the eaſtward, contrary to the general motion. Between the iſland of Celebes and Madura, when the weſtern monſoons ſet in, viz. in December, January, and February, or when the winds blow from the north-weſt, or between the north and weſt, the currents ſet to the ſouth-eaſt, or between the ſouth and eaſt. At Ceylon, from the middle of March to October, the currents ſet to the ſouthward, and in the other parts of the year to the northward; becauſe at this time the ſouthern monſoons blow, and at the other the northern. Between Cochin-China and Malacca, when the weſtern monſoons blow, viz. from April to Auguſt, the currents ſet eaſtward againſt the general motion; but the reſt of the year they ſet weſtward, the monſoon conſpiring with the general motion. They run ſo ſtrongly in theſe ſeas, that unexperienced ſailors miſtake them for waves that beat upon the rocks, uſually known by the name of *breakers*. So for ſome months after the 15th of February, the currents ſet from the Maldives towards India on the eaſt, againſt the general motion of the ſea. On the ſhore of China and Cambodia, in the months of October, November, and December, the currents ſet to the north-weſt; and from January to the ſouth-weſt, when they run with ſuch rapidity about the ſhoals of Parcel, that they ſeem ſwifter than an arrow. At Pulo Condore, upon the coaſt of Cambodia, though the monſoons are ſhifting, yet the currents ſet ſtrongly towards the eaſt, even when they blow to a contrary point. Along the coaſts of the Bay of Bengal, as far as the Cape Romania, at the extreme point of Malacca, the current runs ſouthward in November and December. When the monſoons blow from China to Malacca, the ſea runs ſwiftly from Pulo Cambi to Pulo Condore on the coaſt of Cambodia. In the Bay of Sans Bras, not far from the Cape of Good Hope, there is a current particularly remarkable, where the ſea runs from eaſt to weſt to the landward; and this more vehemently, as it is oppoſed by winds from a contrary direction. The cauſe is undoubtedly owing to ſome adjacent ſhore which is higher than this. In the ſtraits of Gibraltar, the currents almoſt conſtantly drive to the eaſtward, and carry ſhips into the Mediterranean: they are alſo found to drive the ſame way into St. George's channel.

The ſetting or progreſſive motion of the current may be either quite down to the bottom, or to a certain determinate depth. As the knowledge of the direction and velocity of currents is a very material article in navigation, it is highly neceſſary to diſcover both, in order to aſcertain the ſhip's ſituation and courſe with as much accuracy as poſſible. The moſt ſucceſsful method which has been hitherto practiſed by mariners for this purpoſe, is as follows: A common iron pot, which may contain four or five gallons, is ſuſpended by a ſmall rope faſtened to its ears or handles, ſo as to hang directly upright, as when placed upon the fire. This rope, which may be from 70 to 100 fathoms in length, being prepared for the experiment, is coiled in the boat, which is hoiſted out of the ſhip at a proper opportunity, when there is little or no wind to ruffle the ſurface of the ſea. The pot being then thrown overboard into the water, and immediately ſinking, the line is ſlackened till about 70 or 80 fathoms of the line is run out; after which the line is faſtened to the boat's ſtern, by which ſhe is accordingly reſtrained and rides as at an anchor. The velocity of the current is then eaſily tried by the log and half-minute glaſs, the uſual method of diſcovering the rate of a ſhip's ſailing at ſea. The courſe of the ſtream is next obtained by the compaſs provided for this operation. Having thus found the ſetting and drift of the current, it next remains to apply this experiment to the purpoſes of NAVIGATION; for which ſee that article.

Under-CURRENTS are diſtinct from the upper or apparent, and in different places ſet or drive a contrary way. Dr. Smith makes it highly probable, that, in the Downs, in the ſtraits of Gibraltar, &c. there is an under-current, whereby as much water is carried out as is brought in by the upper currents. This he argues from the offing between the north and ſouth Foreland, where it runs tide and half-tide, i. e. it is ebb or flood in that part of the Downs three hours before it is ſo out at ſea: a certain ſign, that though the tide of flood runs aloft, yet the tide of ebb runs under-foot, i. e. cloſe by the ground; and ſo at the tide of ebb it will flow under-foot. This he confirms by an experiment in the Baltic ſound, communicated to him by an able ſeaman preſent at the making it. From the principle of an under-current, it is eaſy to account for that continual in-draught of water out of the Atlantic into the Mediterranean through the ſtraits of Gibraltar, a paſſage about 20 miles broad; yet without any ſenſible riſing of the water along the coaſts of Barbary, &c. or any overflowing of the land, which there lies very low. Dr. Halley, however, ſolves the currents ſetting in at the ſtraits, without overflowing the banks, by the great evaporation, without ſuppoſing any under-current.

CURRICULUS, in our ancient writers, denotes the year or courſe of a year. *Actum eſt hoc annorum Dominicæ incarnationis quater quinquagenis & quinquies quinis luſtris, & tribus curriculis*; i. e. In the year 1028: for four times fifty make two hundred, and five times two hundred make one thouſand; five luſtres are twenty-five years, and three curriculi are three years.

CURRIERS, thoſe who dreſs and colour leather after it comes from the tan-yard. See TANNING.

CURRODREPANUS, formed of *currus*, "chariot," and δρεπανον, "ſcythe" or "ſickle," in antiquity, a kind of chariot armed with ſcythes. The driver of this chariot was obliged to ride on one of the horſes, as there was no other ſeat for him; the uſual place for him being all armed with knives, as was likewiſe the hinder part of the chariot. There were no ſcythes pointing down to the earth, either from the beam or axletree; but theſe were fixed at the head of the axle-tree in ſuch a manner as to be moveable by means of a rope, and thereby could be raiſed or let down, and drawn forward or let fall backward, by relaxing the rope.

CURRYING, the method of preparing leather with oil, tallow, &c. The chief buſineſs is to ſoften and ſupple cow and calve-ſkins, which make the upper-leathers and quarters of ſhoes, covering of ſaddles, coaches, and other things which muſt keep out water. 1. Theſe ſkins, after coming from the tanner's yard, having many fleſhy fibres on them, the currier ſoaks them ſome time in common water. 2. He takes them out and ſtretches them on a very even wooden horſe; then with a paring-knife he ſcrapes off all the ſuperfluous fleſh, and puts

them in to soak again. 3. He puts them wet on a hurdle, and tramples them with his heels till they begin to grow soft and pliant. 4. He soaks them in train-oil, which by its unctuous quality is the best liquor for this purpose. 5. He spreads them on large tables, and fastens them at the ends. There, with the help of an instrument called a *pummel*, which is a thick piece of wood, the under side of which is full of furrows crossing each other, he folds, squares, and moves them forwards and backwards several times, under the teeth of this instrument, which breaks their too great stiffness. This is what is properly called *currying*. The order and number of these operations are varied by different curriers, but the material part is always the same. 6. After the skins are curried, there may be occasion to colour them. The colours are black, white, red, yellow, green, &c. the other colours are given by the skinners, who differ from curriers in this, that they apply their colours on the flesh side; the curriers on the hair side. In order to whiten skins, they are rubbed with lumps of chalk or whiting, and afterwards with pumice-stone. 7. When a skin is to be made black, after having oiled and dried it, he passes over it a puff dipt in water impregnated with iron; and after his first wetting, he gives it another in a water prepared with soot, vinegar, and gum-arabic. These different dyes gradually turn the skin black, and the operations are repeated till it be of a shining black. The grain and wrinkles, which contribute to the suppleness of calves and cows leather, are made by the reiterated folds given to the skin in every direction, and by the care taken to scrape off all hard parts on the colour side.

CURSING AND SWEARING, an offence against God and religion, and a vice of all others the most extravagant and unaccountable, as having no benefit or advantage attending it. By the last statute against this crime, 19 Geo. II. which repeals all former ones, every labourer, sailor, or soldier, profanely cursing or swearing, shall forfeit 1s.; every other person under the rank of a gentleman, 2s.; and every gentleman or person of superior rank, 5s. to the poor of the parish; and, on a second conviction, double; and, for every subsequent offence, treble the sum first forfeited, with all charges of conviction: and, in default of payment, shall be sent to the house of correction for ten days. Any justice of the peace may convict upon his own hearing, or the testimony of one witness; and any constable or peace-officer, upon his own hearing, may secure any offender and carry him before a justice, and there convict him. If the justice omits his duty, he forfeits 5l. and the constable 40s. And the act is to be read in all parish-churches and public chapels the Sunday after every quarter-day, on pain of 5l. to be levied by warrant from any justice. Besides this punishment for taking God's name in vain in common discourse, it is enacted, by stat. 3 Jac. I. c. 21. that if in any stage-play, interlude, or show, the name of the Holy Trinity, or any of the persons therein, be jestingly or profanely used, the offender shall forfeit 10l. one moiety to the king, and the other to the informer.

CURSITOR, a clerk belonging to the court of chancery, whose business it is to make out original writs. In the statute 1 Edw. III. they are called *clerks of course*, and are 24 in number, making a corporation of themselves. To each of them is allowed a division of certain counties, into which they issue out the original writs required by the subject.

CURTATE DISTANCE, in astronomy, the distance of a planet from the sun to that point, where a perpendicular let fall from the planet meets with the ecliptic.

CURTATION, in astronomy, is the interval between a planet's distance from the sun and the curtate distance.

CURTEYN, CURTANA, was the name of Edward the Confessor's sword, which is the first sword carried before the kings of England at their coronation; and it is said the point of it is broken as an emblem of mercy.

CURTIN, CURTAIN, or *Courtin*, in fortification, is that part of the rampart of a place, which is betwixt the flanks of two bastions, bordered with a parapet five feet high, behind which the soldiers stand to fire upon the covered way and into the moat.

CURTIUS (Marcus), a Roman youth, who devoted himself to the gods' manes for the safety of his country, about 360 years before the Augustan age. A wide gap had suddenly opened in the forum, and the oracle had said that it never would close before Rome threw into it whatever it had most precious. Curtius immediately perceived that no less than an human sacrifice was required. He armed himself, mounted his horse, and solemnly threw himself into the gulf, which instantly closed over his head.

CURTIUS (Quintus), a Latin historian, who wrote the life of Alexander the Great in 10 books, of which the two first are not indeed extant, but are so well supplied by Freinshemius, that the loss is scarcely regretted. Where this writer was born, or even when he lived, are points no one pretends to know. By his style he is supposed to have lived in or near the Augustan age; while some are not wanting, who imagine the work to have been composed in Italy about 300 years ago, and the name of *Quintus Curtius* to be fictitiously added to it. Cardinal du Perron was so great an admirer of this work, as to declare one page of it to be worth 30 of Tacitus; yet M. le Clerc, at the end of his Art of Criticism, has charged the writer with great ignorance and many contradictions. He has nevertheless many qualities as a writer, which will always make him admired and applauded.

CURVATURE OF A LINE, is the peculiar manner of its bending or flexure, by which it becomes a curve of such and such peculiar properties.

CURVE, in geometry, a line which running on continually in all directions, may be cut by one right line in more points than one. See CONIC SECTIONS and FLUXIONS.

CURVET, or CORVET, in the manege, an air in which the horse's legs are raised higher than in the demi-volt; being a kind of leap-up, and a little forwards, wherein the horse raises both his fore-legs at once, equally advanced (when he is going straight forward, and not in a circle); and as his fore-legs are falling, he immediately raises his hind-legs, equally advanced, and not one before the other: so that all his four legs are in the air at once; and as he sets them down, he marks but twice with them.

CURVILINEAR, or CURVILINEAL, is said of figures bounded by curves or crooked lines.

CURVIROSTRA, in ornithology. See LOXIA.

CURULE CHAIR, in Roman antiquity, a chair adorned with ivory, wherein the great magistrates of Rome had a right to sit and be carried. The curule magistrates were the ædiles, the prætors, censors, and consuls. This chair was fitted in a kind of chariot, whence it had its name. The senators who had borne the offices of ædiles, prætors, &c. were carried to the senate-house in this chair, as were also those who triumphed, and such as went to administer justice, &c. See ÆDILE, &c.

CURZOLA, an island in the gulf of Venice, lying on the coast of Dalmatia. It is about 20 miles long, and has a small town of the same name, with a bishop's see. It belongs to the Venetians. E. long. 17. 15. N. lat. 43. 6.

CUSA (Nicholas de), a learned cardinal, born of mean parentage, and named from Cusa, the place of his birth. He was made a Cardinal in 1448; and being appointed governor of Rome by Pope Pius II. during his absence at Mantua, he was the chief concerter and manager of the war against the Turks. He founded a church, and a noble library of Greek and Latin authors, at Cusa; and left many excellent works behind him, which were collected and published in three volumes at Bazil in

1565. In these he has made no scruple to detect the lying traditions and sophistries of the Roman church.

CUSCO, a large and handsome town of South America, in Peru, formerly the residence of the Incas. It is seated at the foot of a mountain, and is built in a square form, in the middle of which is the best market in all America; four large streets terminate in the square, which are all as straight as a line. It contains eight large parishes, and five religious houses, and the number of the inhabitants is about 50,000, of which three-fourths are the original Americans. Streams of water run through the town, which are a great convenience in so hot a country, where it never rains. It is 325 miles south of Lima. W. long. 73. 47. S. lat. 12. 0.

CUSCUTA, DODDER; a genus of the digynia order, belonging to the tetrandria class of plants; and in the natural method ranking under those of which the order is doubtful. The calyx is quadrifid; the corolla monopetalous; the capsule bilocular. There are two species; one of which is a native of Britain, viz. the Europæa, dodder, hell-weed, or devil's guts. This is a very singular plant, almost destitute of leaves, parasitical, creeping, fixing itself to whatever is next to it. It decays at the root, and afterwards is nourished by the plant which supports it. Hops, flax, and nettles, are its common support; but principally the common nettle. Its blossoms are white. As soon as the shoots have twined about an adjacent plant, they send out from their inner surface a number of little vesicles or papillæ, which attach themselves to the bark or rind of the plant. By degrees the longitudinal vessels of the stalk, which appear to have accompanied the vesicles, shoot from their extremities, and make their way into the softer plant, by dividing the vessels, and insinuating themselves into the tenderest part of the stalk; and so intimately are they united with it, that it is easier to break than to disengage them from it. The whole plant is bitter. It affords a pale reddish colour. Cows, sheep, and swine, eat it; horses refuse it; goats eat it reluctantly.

CUSH, the eldest son of Ham, and father of Nimrod; the other sons of Cush were Seba, Havilah, Sabtah, Raamah, and Sabtecha. Gen. x. 6—8. Though we know of no other person of scripture that is called by this name, yet there are three countries described in the scriptures under this name. Whether the same man may have dwelt in them all at different times, or that there were some other men of this name, we are ignorant. The Vulgate, Septuagint, and other interpreters, both ancient and modern, generally translate Cush, *Ethiopia*: but there are many passages wherein this translation cannot take place.

Cuth is the same as Cush. The Chaldees generally put the *tau* where the Hebrews use the *schin*: they say *cuth*, instead of *cush*.

CUSHION, in engraving, is a bag of leather, filled with sand, commonly about nine inches square, and three or four thick, used for supporting the plate to be engraved.

CUSHION, in gilding, is made of leather, fastened to a square board, from 14 inches square to 10, with a handle. The vacuity between the leather and board is stuffed with fine tow or wool, so that the outer surface may be flat and even. It is used for receiving the leaves of gold from the paper, in order to its being cut into proper sizes and figures.

CUSI, in natural history, a name given by the people of the Philippine islands to a very small and very beautiful species of parrot.

CUSP, *cuspis*, properly denotes the point of a spear or sword; but is used in astronomy to express the points or horns of the moon, or any other luminary.

CUSP, in astrology, is used for the first point of each of the 12 houses, in a figure or scheme of the heavens. See HOUSE.

CUSPIDATED, in botany, are such plants whose leaves are pointed like a spear.

CUSTOM, a very comprehensive term, denoting the manners, ceremonies, and fashions of a people, which having turned into a habit, and passed into use, obtain the force of laws; in which sense it implies such usages, as, though voluntary at first, are yet by practice become necessary. Custom is hence, both by lawyers and civilians, defined *lex non scripta*, "a law or right not written," established by long usage, and the consent of our ancestors: in which sense it stands opposed to the *lex scripta*, or "the written law." See LAW.

CUSTOM *and Habit*, in the human œconomy. The former is often confounded with the latter. By *custom* we mean a frequent reiteration of the same act; and by *habit*, the effect that custom has on the mind or body. This curious subject admits of being considered first in a moral, and secondly in a physical point of view. Custom hath such influence upon many of our feelings, by warping and varying them, that its operations demand the attention of all those who would be acquainted with human nature. The subject, however, is intricate. Some pleasures are fortified by custom; and yet custom begets familiarity, and consequently indifference.

> If all the year were playing holidays,
> To sport would be as tedious as to work:
> But when they seldom come, they wish'd-for come,
> And nothing pleaseth but rare accidents. *Shakespeare.*

In many instances, satiety and disgust are the consequences of reiteration: again, though custom blunts the edge of distress and of pain: yet the want of any thing to which we have been long accustomed is a sort of torture. A clue to guide us through all the intricacies of this labyrinth, would be an acceptable present.

Whatever be the cause, it is certain that we are much influenced by custom: it hath an effect upon our pleasures, upon our actions, and even upon our thoughts and sentiments. Habit makes no figure during the vivacity of youth: in middle age it gains ground; and in old age governs without controul. In that period of life, generally speaking, we eat at a certain hour, take exercise at a certain hour, go to rest at a certain hour, all, by the direction of Habit; nay, a particular seat, table, bed, comes to be essential; and a habit in any of these cannot be controuled without uneasiness.

Any slight or moderate pleasure, frequently reiterated for a long time, forms a peculiar connection between us and the thing that causes the pleasure This connection, termed *habit*, has the effect to awaken our desire or appetite for that thing when it returns not as usual. During the course of enjoyment, the pleasure rises insensibly higher and higher till a habit be established; at which time the pleasure is at its height. It continues not, however, stationary: the same customary reiteration which carried it to its height, brings it down again by insensible degrees even lower than it was at first. Those things which at first are but moderately agreeable, are the aptest to become habitual. Spirituous liquors, at first scarce agreeable, readily produce an habitual appetite: and custom prevails so far, as even to make us fond of things originally disagreeable, such as coffee, assa-fœtida, and tobacco.

A walk upon the quarter deck, though intolerably confined, becomes however so agreeable by custom, that a sailor in his walk on shore confines himself commonly within the same bounds. Lord Kaimes speaks of a man who had relinquished the sea for a country life: in the corner of his garden, he reared an artificial mount with a level summit, resembling most accurately a quarter deck, not only in shape but in size; and here he generally walked. In Minorca governor Kane made an excellent road the whole length of the island; and yet the inhabitants adhere to the old road, though not only longer, but extremely bad. Play or gaming, at first barely amusing by the

occupation it affords, becomes in time extremely agreeable; and is frequently profecuted with avidity, as if it were the chief bufinefs of life. The fame obfervation is applicable to the pleafures of the internal fenfes, thofe of knowledge and virtue in particular: children have fcarce any fenfe of thefe pleafures; and men very little who are in the ftate of nature without culture: our tafte for virtue and knowledge improves flowly; but is capable of growing ftronger than any other appetite in human nature.

To introduce an active habit, frequency of acts is not fufficient without length of time: the quickeft fucceffion of acts in a fhort time is not fufficient; nor a flow fucceffion in the longeft time. The effect muft be produced by a moderate foft action, and a long feries of eafy touches, removed from each other by fhort intervals. Nor are thefe fufficient without regularity in the time, place, and other circumftances of the action; the more uniform any operation is, the fooner it becomes habitual. And this holds equally in a paffive habit; variety, in any remarkable degree, prevents the effect; thus any particular food will fcarce ever become habitual where the manner of dreffing is varied. The circumftances then requifite to augment a moderate pleafure, and at the long-run to form a habit, are weak uniform acts, reiterated during a long courfe of time, without any confiderable interruption: every agreeable caufe that operates in this manner will grow habitual. See this fubject treated at length in Lord Kaimes's Elements of Criticifm.

CUSTOMS, in political economy, the duties, toll, tribute, or tariff, payable, by act of Parliament, upon merchandize exported and imported; forming a branch of the perpetual taxes. See TAX. The confiderations upon which this revenue (or the more ancient part of it, which arofe only from exports) was invefted in the king, were faid to be two: 1. Becaufe he gave the fubject leave to depart the kingdom, and to carry his goods along with him. 2. Becaufe the king was bound of common right to maintain and keep up the ports and havens, and to protect the merchant from pirates. Some have imagined they are called with us *cuftoms*, becaufe they were the inheritance of the king by immemorial ufage and the common law, and not granted him by any ftatute: but Sir Edward Coke hath clearly fhown, that the king's firft claim to them was by grant of parliament 3 Edw. I. though the record thereof is not now extant. And indeed this is in exprefs words confeffed by ftatute 25 Edw. I. c. 7. wherein the king promifes to take no cuftoms from merchants, without the common affent of the realm, "faving to us and our heirs the cuftoms on wool, fkins, and leather, formerly granted to us by the commonalty aforefaid." Thefe were formerly called *hereditary cuftoms* of the crown; and were due on the exportation only of the faid three commodities, and of none other: which were ftyled the *ftaple* commodities of the kingdom, becaufe they were obliged to be brought to thofe ports where the king's ftaple was eftablifhed, in order to be there firft rated, and then exported. They were denominated in the barbarous Latin of our ancient records, *cuftuma* (an appellation which feems to be derived from the French word *couftum or coutum*, which fignifies toll, or tribute; and owes its own etymology to the word *couft*, which fignifies price, charge, or, as we have adopted it in Englifh, *coft*); not *confuetudines*, which is the language of our law whenever it means merely ufages. The duties on wool, fheep-fkins or woolfells, and leather exported, were called *cuftuma antiqua five magna*, and were payable by every merchant, as well native as ftranger; with this difference, that merchant-ftrangers paid an additional toll, viz. half as much again as was paid by natives. The *cuftuma parva et nova* were an impoft of 3d. in the pound, due from merchant-ftrangers only, for all commodities as well imported as exported; which was ufually called the *alien's* duty, and was firft granted in 31 Edw. I. But thefe ancient hereditary cuftoms, efpecially thofe on wool and woolfells, came to be of little account, when the nation became fenfible of the advantages of a home manufacture, and prohibited the exportation of wool by ftatute 11 Edw. III. c. 1.

Other cuftoms payable upon exports and imports were diftinguifhed into fubfidies, tonnage, poundage, and other impofts. Subfidies were fuch as were impofed by parliament upon any of the ftaple commodities before mentioned, over and above the *cuftuma antiqua et magna*: tonnage was a duty upon all wines imported, over and above the prifage and butlerage aforefaid; poundage was a duty impofed *ad valorem*, at the rate of 12d. in the pound, on all other merchandize whatfoever: and the other impofts were fuch as were occafionally laid on by parliament, as circumftances and times required. Thefe diftinctions are now in a manner forgotten, except by the officers immediately concerned in this department; their produce being in effect all blended together, under the general denomination of the *cuftoms*.

By thefe we underftand, at prefent, fays Blackftone, a duty or fubfidy paid by the merchant at the quay upon all imported as well as exported commodities, by authority of parliament; unlefs where, for particular national reafons, certain rewards, bounties or drawbacks, are allowed for particular exports or imports. The cuftoms thus impofed by parliament are chiefly contained in two books of rates, fet forth by parliamentary authority; one figned by Sir Harbottle Grimefton, fpeaker of the houfe of commons in Charles II's time; and the other an additional one, figned by Sir Spencer Compton, fpeaker in the reign of George I. to which alfo fubfequent additions have been made. Aliens pay a larger proportion than natural fubjects, which is what is now generally underftood by the aliens duty; to be exempted from which is one principal caufe of the frequent applications to parliament for acts of naturalization.

Thefe cuftoms are then, we fee, a tax immediately paid by the merchant, although ultimately by the confumer. And yet thefe are the duties felt leaft by the people: and, if prudently managed, the people hardly confider that they pay them at all. For the merchant is eafy, being fenfible he does not pay them for himfelf; and the confumer, who really pays them, confounds them with the price of the commodity; in the fame manner as Tacitus obferves, that the emperor Nero gained the reputation of abolifhing the tax of the fale of flaves, though he only transferred it from the buyer to the feller; fo that it was, as he expreffes it, *remiffum magis fpecie, quam vi: quia cum venditor pendere juberetur, in partem pretii emptoribus accrefcebat.* But this inconvenience attends it on the other hand, that thefe impofts, if too heavy, are a check and cramp upon trade; and efpecially when the value of the commodity bears little or no proportion to the quantity of the duty impofed. This in confequence gives rife alfo to fmuggling, which then becomes a very lucrative employment; and its natural and moft reafonable punifhment, viz. confifcation of the commodity, is in fuch cafes quite ineffectual: the intrinfic value of the goods, which is all that the fmuggler has paid, and therefore all that he can lofe, being very inconfiderable when compared with his profpect of advantage in evading the duty. Recourfe muft therefore be had to extraordinary punifhments to prevent it; perhaps even to capital ones: which deftroys all proportion of punifhment, and puts murderers upon an equal footing with fuch as are really guilty of no natural, but merely a pofitive offence.

There is alfo another ill confequence attending high impofts on merchandize, not frequently confidered, but indifputably certain; that the earlier any tax is laid on a commodity, the heavier it falls upon the confumer in the end: for every trader, through whofe hands it paffes, muft have a profit, not only upon the raw material and his own labour and time in preparing it, but alfo upon the very tax itfelf, which he advances to the

government; otherwife he lofes the ufe and intereft of the money which he fo advances. To inftance in the article of foreign paper. The merchant pays a duty upon importation, which he does not receive again till he fells the commodity, perhaps at the end of three months. He is therefore equally entitled to a profit upon that duty which he pays at the cuftom-houfe, as to a profit upon the original price which he pays to the manufacturer abroad; and confiders it accordingly in the price he demands of the ftationer. When the ftationer fells it again, he requires a profit of the printer or bookfeller upon the whole fum advanced by him to the merchants: and the bookfeller does not fail to charge the full proportion to the ftudent or ultimate confumer; who therefore does not only pay the original duty, but the profits of thefe three intermediate traders, who have fucceffively advanced it for him. This might be carried much farther in any mechanical, or more complicated branch of trade.

Custom-*Houfe*, an office eftablifhed in the maritime cities, or port-towns, for the receipt and management of the cuftoms and duties of importation and exportation, impofed on merchandifes, and regulated by books of rates.

CUSTOS brevium, the principal clerk belonging to the court of common pleas, whofe bufinefs it is to receive and keep all the writs made returnable in that court, filing every return by itfelf; and, at the end of each term, to receive of the prothonotaries all the records of the nifi prius, called the *pofteas*.

Custos *Rotulorum*, an officer who has the cuftody of the rolls and records of the feffion of peace, and alfo of the commiffion of the peace itfelf. He ufually is fome perfon of quality, and always a juftice of the peace, of the quorum, in the county where he is appointed.

Custos *Spiritualium*, he that exercifes the fpiritual jurifdiction of a diocefe, during the vacancy of any fee, which, by the canon-law, belongs to the dean and chapter; but at prefent, in England, to the archbifhop of the province by prefcription.

Custos *Temporalium*, was the perfon to whom a vacant fee or abbey was given by the king, as fupreme lord. His office was, as fteward of the goods and profits, to give an account to the efcheator, who did the like to the exchequer.

CUT-a-feather, in the fea-language. If a fhip has too broad a bow, it is common to fay, *fhe will not cut a feather*; that is, fhe will not pafs through the water fo fwift as to make it foam or froth.

Cut-*Purfe*, in law; if any perfon *clam & fecrete*, and without the knowledge of another, cut his purfe or pick his pocket, and fteal from thence above the value of twelve pence, it is felony without benefit of clergy. *Cut-purfes*, or *faccularii*, were more feverely punifhed than common thieves by the Roman and Athenian laws.

Cut-*Water*, the fharp part of the head of a fhip below the beak. It is fo called becaufe it cuts or divides the water before it comes to the bow, that it may not come too fuddenly to the breadth of the fhip, which would retard it.

CUTANEOUS, in general, an appellation given to whatever belongs to the cutis or fkin. Thus, we fay *cutaneous* eruptions; the itch is a *cutaneous* difeafe.

CUTICLE, the fcarf-fkin. See Anatomy, p. 185.

CUTICULAR, the fame with Cutaneous.

CUTIS, the fkin. See Anatomy, p. 185.

CUTTER, a fmall veffel, commonly navigated in the channel of England. It is furnifhed with one maft, and rigged as a floop. Many of thefe veffels are ufed in an illicit trade, and others are employed by government to take them; the latter of which are either under the direction of the admiralty or cuftom-houfe. See a reprefentation of one in plate 4. vol. III.

Cutter is alfo a fmall boat ufed by fhips of war.

Cutter *of the Tallies*, an officer of the exchequer, whofe bufinefs is to provide wood for the tallies, to cut or notch the fum paid upon them; and then to caft them into court, to be written upon. See Tally.

CUTTING, a term ufed in various fenfes and various arts; in the general it implies a divifion or feparation.

Cutting is particularly ufed in heraldry, where the fhield is divided into two equal parts, from right to left, parallel to the horizon, or in the feffe-way. The word is alfo applied to the honourable ordinaries, and even to animals and moveables, when they are divided equally the fame way; fo however, as that one moiety is colour, the other metal. The ordinaries are faid to be cut, couped, when they do not come full to the extremities of the fhield.

Cutting, in furgery, denotes the operation of extracting the ftone out of the bladder by the knife. See Lithotomy.

Cutting in coinage. When the laminæ or plates of the metal, be it gold, filver, or copper, are brought to the thicknefs of the fpecie to be coined, pieces are cut out, of the thicknefs, and nearly of the weight, of the intended coin; which are now called *planchets*, till the king's image hath been ftamped on them. The inftrument wherewith they cut, confifts of two pieces of fteel, very fharp, and placed over one another; the lower a little hollow, reprefenting a mortar, the other a peftle. The metal put between the two, is cut out in the manner defcribed under Coinage. Medallions, where the relievo is to be great, are not cut, but caft or moulded.

Cutting, in the manege, is when the horfe's feet interfere; or when with the fhoe of one foot he beats off the fkin from the paftern joint of the other foot. This is more frequent in the hind feet than the fore: the caufe is commonly bad fhoeing.

Cutting, in painting, the laying one ftrong lively colour over another, without any fhade or foftening. The cutting of colours has always a difagreeable effect.

Cutting in wood, a particular kind of fculpture or engraving: denominated from the matter wherein it is employed. It is ufed for various purpofes; as for figured letters, head and tail-pieces of books; and even for fchemes and other figures, to fave the expence of engraving on copper; and the prints and ftamps for paper, calicoes, linens, &c. The invention of cutting in wood, as well as that in copper, is afcribed to a goldfmith of Florence; but it is to Albert Durer and Lucas they are both indebted for their perfection. See Engraving, and Printing. One Hugo de Carpi invented a manner of cutting in wood, by means whereof the prints appeared as if painted in clair-obfcure. In order to this, he made three kinds of ftamps for the fame defign; which were drawn, one after another, through the prefs for the fame print. They were fo conducted, that one ferved for the grand lights, a fecond for the demi-tints, and a third for the outlines and the deep fhadows.

The art of cutting in wood was certainly carried to a very great pitch above two hundred years ago; and might even vie, for beauty and juftnefs, with that of engraving in copper. At prefent it is too much neglected, and the application of artifts wholly employed on copper, as the more eafy and lucrative province. In fome refpects wooden cuts have the advantage of thofe in copper, as in figures and devices for books; for they can be printed at the fame time and in the fame prefs as the letters: whereas for the other there is required a particular impreffion. In the reprefentation of plants and flowers, and in defigns for paper-hangings, where the outline only is wanted to be printed in a bold full manner, this method will be found cheaper and more effectual than the ufe of copper-plates.

The cutters in wood having prepared a ſmooth block of beech, pear-tree, or box, draw their deſign with a pencil, juſt as they would have it printed, and then cut away very curiouſly every part which is not traced on, by means of little chiſſels or gravers, according to the roughneſs or delicacy of the work. It differs from engraving in copper, becauſe in the former, the impreſſion comes from the prominent parts or ſtrokes left uncut; whereas in the latter it comes from the channels cut in the metal.

The art of cutting in wood has of late been greatly improved by Mr. Bewick of Newcaſtle; who, among other ingenious ſpecimens of his art, has publiſhed a volume of natural hiſtory, the ſubjects of which, though cut in wood, poſſeſs nearly as much accuracy, and perhaps more ſpirit, than if done on copper.

CUTTINGS, or ſlips, in gardening, the branches or ſprigs of trees or plants, cut or ſlipped off to ſet again; which is done in any moiſt fine earth. The beſt ſeaſon is from Auguſt to April; but care is to be taken, when it is done, that the ſap be not too much in the top, leſt the cut die before that part in the earth have root enough to ſupport it: nor yet muſt it be too dry or ſcanty; the ſap in the branches aſſiſting it to take root. In providing the cuttings, ſuch branches as have joints, knots, or burrs, are to be cut off two or three inches beneath them, and the leaves to be ſtripped off ſo far as they are ſet in the earth. Small top branches, of two or three years growth, are fitteſt for this operation.

CUTTLE-FISH. See SEPIA. The bone of the cuttle-fiſh is hard on one ſide, but ſoft and yielding on the other; ſo as readily to receive pretty neat impreſſions from medals, &c. and afterwards to ſerve as a mould for caſting metals, which thus take the figure of the original: the bone is likewiſe frequently employed for cleaning or poliſhing ſilver. This fiſh contains in a certain diſtinct veſſel a fluid as black as ink: which it is ſaid to ſhed when purſued, and thus to conceal itſelf by diſcolouring the water. The particular qualities of this liquor are not yet determined. Dr. Leigh ſays, he ſaw a letter which had been written with it ten years before, and which ſtill was legible. Some report that the ancients made their ink from it; and others, that it is the baſis of China, or Indian-ink; but both theſe accounts have little foundation. Pliny, ſpeaking of the inks made uſe of in his time, after obſerving that the cuttle-fiſh is in this reſpect of a wonderful nature, adds expreſsly, that ink was not made from it.

CUTTS (John lord), a ſoldier of moſt hardy bravery in king William's wars, was ſon of Richard Cutts, Eſq. of Matching in Eſſex; where the family were ſettled about the time of Henry VI. and had a great eſtate. He died at Dublin, Jan. 26, 1706-7, and is buried there in the cathedral of Chriſt-church. He wrote a poem on the death of queen Mary; and publiſhed, in 1687, "Poetical exerciſes, written upon ſeveral occaſions, and dedicated to her Royal Highneſs Mary Princeſs of Orange." It contains, beſides the dedication ſigned J. Cutts, verſes to that princeſs; a poem on Wiſdom; another to Mr. Waller on his commending it; ſeven more copies of verſes (one of them called *La Muſe Cavalier*, which had been aſcribed to lord Peterborough, and as ſuch mentioned by Mr. Walpole in the liſt of that nobleman's writings), and 11 ſongs; the whole compoſing but a very thin volume; which is by no means ſo ſcarce as Mr. Walpole ſuppoſes it to be.

CYATHUS, κυαθος, was a common meaſure among the Greeks and Romans, both of the liquid and dry kind. It was equal to an ounce, or the twelfth part of a pint. The cyathus was made with an handle like our punch-ladle. The Roman topers were uſed to drink as many *cyathi* as there were muſes, i. e. nine; alſo as many as there were letters in the patron's name. Thus, they had modes of drinking ſimilar to the modern health-drinking or toaſting. They ſay, that the cyathus of the Greeks weighed 10 drachms; and Galen ſays the ſame; though elſewhere he ſays, that a cyathus contains 12 drachms of oil, 13 drachms and one ſcruple of wine, water, or vinegar, and 18 drachms of honey. Galen ſays, that among the Veterinarii the cyathus contained two ounces.

CYBEBE, a name of Cybele, from κυβηβειν, becauſe in the celebration of her feſtivals men were driven to madneſs.

CYBELE, in Pagan mythology, the daughter of Cœlus and Terra, and wife of Saturn. She is ſuppoſed to be the ſame as Ceres, Rhea, Ops, Veſta, Bona Mater, Magna Mater, Berecynthia, Dindymene, &c. According to Diodorus, ſhe was the daughter of a Lydian prince, and as ſoon as ſhe was born ſhe was expoſed on a mountain. Cybele was generally repreſented as a robuſt woman far advanced in her pregnancy, to intimate the fecundity of the earth. She held keys in her hand, and her head was crowned with riſing turrets, and ſometimes with the leaves of an oak. She ſometimes appears riding in a chariot drawn by two tame lions: Atys follows by her ſide, carrying a ball in his hand, and ſupporting himſelf upon a fir-tree which is ſacred to the goddeſs. Sometimes ſhe is repreſented with a ſceptre in her hand, with her head covered with a tower. She is alſo ſeen with many breaſts, to ſhow that the earth gives aliments to all living creatures; and ſhe generally carries two lions under her arms. From Phrygia the worſhip of Cybele paſſed into Greece, and was ſolemnly eſtabliſhed at Eleuſis under the name of the *Eleuſinian myſteries of Ceres*.

CYBELICUM MARMOR, a name given by the ancients to a ſpecies of marble dug in a mountain of that name in Phrygia. It was of an extremely clear white, with broad veins of blueiſh black.

CYCAS, in botany; a genus of plants belonging to the firſt natural order, *Palmæ*. The fruit is a dry plum with a bivalved kernel. There is but one ſpecies deſcribed by Linnæus, viz. the *circinalis*, or ſago-tree, which grows ſpontaneouſly in the Eaſt-Indies, and particularly on the coaſt of Malabar. It runs up, with a ſtraight trunk to 40 feet or more, having many circles the whole length, occaſioned by the old leaves falling off; for they ſtanding in a circular order round the ſtem, and embracing it with their baſe, whenever they drop, leave the marks of their adheſion behind. The leaves are pinnated, and grow to the length of ſeven or eight feet. The pinnæ or lobes are long, narrow, entire, of a ſhining green, all the way of a breadth, lance-ſhaped at the point, are cloſely crowded together, and ſtand at right angles on each ſide the midrib, like the teeth of a comb. The flowers are produced in long bunches at the footſtalks of the leaves, and are ſucceeded by oval fruit, about the ſize of large plums, of a red colour when ripe, and a ſweet flavour. Each contains a hard brown nut, encloſing a white meat, which taſtes like a cheſnut.

This is a valuable tree to the inhabitants of India, as it not only furniſhes a conſiderable part of their conſtant bread, but alſo ſupplies them with a great article of trade. The body contains a farinaceous ſubſtance, which they extract from it and make into bread in this manner: they ſaw the body into ſmall pieces, and after beating them in a mortar, pour water upon the maſs; this is left for ſome hours to ſettle. When fit, it is ſtrained through a cloth, and the finer particles of the mealy ſubſtance running through with the water, the groſs ones are left behind and thrown away. After the farinaceous part has ſufficiently ſubſided, the water is poured off, and the meal being properly dried, is occaſionally made into cakes and baked. Theſe cakes are ſaid to eat nearly as well as wheaten bread, and are the ſupport of the inhabitants for three or four months in the year.

The ſame meal more finely pulverized, and reduced into gra-

nules, is what is called *Sago*, which is ſent into all parts of Europe, and ſold in the ſhops as a great ſtrengthener and reſtorative. There is a ſort of ſago made in the Weſt Indies, and ſent to Europe in the ſame manner as that from the Eaſt; but the Weſt India ſago is far inferior in quality to the other. It is ſuppoſed to be made from the pith of the areca oleracea. See Areca.

The *brood boom* (or bread-tree) of the Hottentots, a plant lately diſcovered by profeſſor Thunberg, is deſcribed as a new ſpecies of this genus, by the name of *cycas Caffra*, in the *Nova Acta Reg. Soc. Scient. Upſ.* vol. ii. p. 283. tab. V. The pith, or *medulla*, which abounds in the trunk of this little palm, Mr. Sparman informs us, is collected and tied up in dreſſed calf or ſheep-ſkins, and then buried in the earth for the ſpace of ſeveral weeks, till it becomes ſufficiently mellow and tender to be kneaded up with water into a paſte, of which they afterwards make ſmall loaves or cakes, and bake them under the aſhes. Other Hottentots not quite ſo nice, nor endued with patience enough to wait this tedious method of preparing it, are ſaid to dry and roaſt the pith or marrow, and afterwards make a kind of frumenty of it.

CYCEON, from κυκαειν, "to mix;" a name given by the ancient poets and phyſicians to a mixture of meal and water, and ſometimes of other ingredients. Theſe conſtituted the two kinds of cyceon; the coarſer being of the water and meal alone; the richer and more delicate compoſed of wine, honey, flour, water, and cheeſe. Homer, in the 11th Iliad, talks of cyceon made with cheeſe and the meal of barley mixed with wine, but without any mention either of honey or water; and Ovid, deſcribing the draught of cyceon given by the old woman of Athens to Ceres, mentions only flour and water. Dioſcorides underſtood the word in both theſe ſenſes; but extolled it moſt in the coarſe and ſimple kind: he ſays, when prepared with water alone, it refrigerates and nouriſhes greatly.

CYCINNIS, a Grecian dance, ſo called from the name of its inventor, one of the ſatyrs belonging to Bacchus. It conſiſted of a combination of grave and gay movements.

CYCLADES insulae; iſlands anciently ſo called, as Pliny informs us, from the Cyclus or orb in which they lie; beginning from the promontory Geraeſtum of Euboea, and lying round the iſland Delos. Where they are, and what their number, is not ſo generally agreed. Strabo ſays, they were at firſt reckoned 12, but that many others were added: yet moſt of them lie to the ſouth of Delos, and but few to the north, ſo that the middle or centre, aſcribed to Delos, is to be taken in a looſe, not a geometrical ſenſe. Strabo recites them after Artemidorus, as follows; Helena, Ceos, Cynthus, Seriphus, Melus, Siphus, Cimolus, Prepeſinthus, Olearus, Naxus, Parus, Syrus, Mycoſius, Tenus, Andrus, Gyarus; but he excludes from the number Prepeſinthus, Olearus, and Gyarus.

CYCLAMEN, Sowbread; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 21ſt order, *Precia*. The corolla is verticillated, with the tube very ſhort, and the throat prominent; the berry is covered with the capſule. There are but two ſpecies; which, however, produce many beautiful varieties. They are low, herbaceous, flowery perennials of the tuberous rooted kind, with numerous angular, heart-ſhaped, ſpotted, marbled leaves; with many fleſhy foot-ſtalks ſix inches high, carrying monopetalous, five-parted reflexed flowers of various colours. All the varieties are extremely ornamented, and ſome of the flowers very fragrant. They may be planted in any of the common borders, but require to be ſheltered from hard froſts by being covered with mats. They ſhould alſo have a light dry ſoil, otherwiſe their roots are apt to rot. The ſpecies are propagated by ſeeds, and the particular varieties by dividing their roots. The root of the cyclamen has, when freſh, an extremely acrimonious burning taſte, which it loſes almoſt entirely on being dried. It is recommended as an errhine; in cataplaſms for ſcirrhous and cancerous tumours; and internally as a cathartic, detergent, and aperient. It operates very ſlowly, but with great virulence, inflaming the fauces and inteſtines.

CYCLE, in chronology, a certain period or ſeries of numbers, which regularly proceed from the firſt to the laſt, and then return again to the firſt, and ſo circulate perpetually. See Chronology, p. 524.

Cycle *of Indiction*, a period of 15 years, in uſe among the Romans. It has no connection with the celeſtial motions, but was inſtituted, according to Baronius, by Conſtantine; who having reduced the time which the Romans were obliged to ſerve, to 15 years, was conſequently obliged every 15 years to impoſe, or *indicere*, according to the Latin expreſſion, an extraordinary tax for the payment of thoſe who were diſcharged; and hence aroſe this cycle, which, from the Latin word *indicere*, was ſtyled *indiction*.

Cycle *of the Moon*, called alſo the *golden number*, and the *Metonic* cycle, from its inventor Meton the Athenian, is a period of 19 years, which when they are completed, the new moons and full moons return on the ſame days of the month, ſo that on whatever days the new and full moons fall this year, 19 years hence they will happen on the very ſame days of the month, though not at the ſame hour, as Meton and the fathers of the primitive church thought; and therefore at the time of the council of Nice, when the method of finding the time for obſerving the feaſt of Eaſter was eſtabliſhed, the numbers of the lunar cycle were inſerted in the kalendar, which, upon the account of their excellent uſe, were ſet in golden letters, and the year of the cycle called the *golden number* of that year.

Cycle *of the Sun*, a revolution of 28 years, which being elapſed, the dominical or Sunday-letters return to their former place, and proceed in the ſame order as before, according to the Julian kalendar.

CYCLISUS, in ſurgery, an inſtrument in the form of a half-moon, uſed in ſcraping the ſkull, in caſe of fractures on that part.

CYCLOID, a curve on which the doctrine of pendulums, and time-meaſuring inſtruments, in a great meaſure depends. Mr. Huygens demonſtrated, that from whatever point or height, a heavy body, oſcillating on a fixed centre, begins to deſcend, while it continues to move in a cycloid, the time of its falls or oſcillations will be equal to each other. It is likewiſe demonſtrable, that it is the curve of quickeſt deſcent, *i. e.* a body falling in it, from any given point above, to another not exactly under it, will come to this point in a leſs time than in any other curve paſſing through thoſe two points.

CYCLOPÆDIA, or Encyclopædia, denotes the circle or compaſs of arts and ſciences. A cyclopædia, ſay the authors of the French Encyclopedie, ought to explain as much as poſſible the order and connection of human knowledge. See Encyclopædia.

CYCLOPS, in fabulous hiſtory, the ſons of Neptune and Amphitrite; the principal of whom were Brontes, Steropes, and Peracmon; but their whole number amounted to above an hundred. Jupiter threw them into Tartarus as ſoon as they were born; but they were delivered at the interceſſion of Tellus, and became the aſſiſtants of Vulcan. They were of prodigious ſtature, and had each only one eye, which was placed in the middle of their foreheads. Some mythologiſts ſay, that the Cyclops ſignify the vapours raiſed in the air, which occaſion thunder and lightning; on which account they are repreſented as forging the thunderbolts of Jupiter. Others repreſent them as the firſt inhabitants of Sicily, who were cruel, of a gigantic form, and dwelt round mount Ætna.

CYCLOPTERUS, the SUCKER, in ichthyology, a genus belonging to the order of amphibia nantes. The head is obtufe, and furnifhed with faw-teeth: there are four rays in the gills: and the belly-fins are connected together in an orbicular form. See plate 89. The fpecies are,

1. The *lumpus* or lump-fifh, grows to the length of 19 inches, and weighs feven pounds. The fhape of the body is like that of the bream, deep and very thick, and it fwims edge-ways. The back is fharp and elevated; the belly flat, of a bright crimfon colour. Along the body there run feveral rows of fharp and bony tubercles, and the whole fkin is covered with fmall ones. The pectoral fins are large and broad, almoft uniting at their bafe. Beneath thefe is the part by which it adheres to the rocks, &c. It confifts of an oval aperture, furrounded with a flefhy, mufcular, and obtufe fubftance; edged with many fmall threaded appendages, which concur as fo many clafpers. The tail and vent-fins are purple. By means of this part it adheres with vaft force to any thing it pleafes. As a proof of its tenacity, it hath been known, that in flinging a fifh of this fpecies juft into a pail of water, it fixed itfelf fo firmly to the bottom, that on taking the fifh by the tail, the whole pail by that means was lifted, though it held fome gallons, without once making the fifh quit its hold. Thefe fifh refort in multitudes during fpring to the coaft of Sutherland near the Ord of Caithnefs. The feals which fwarm beneath, prey greatly upon them, leaving the fkins; numbers of which, thus emptied, float afhore at that feafon. Great numbers of lump-fifh are found in the Greenland feas during the months of April and May, when they refort near the fhore to fpawn.

2. The *liparis* takes the name of *fea-fnail* from the foft and unctuous texture of its body, refembling that of the land-fnail. It is almoft tranfparent, and foon diffolves and melts away. It is found in the fea near the mouths of great rivers, and hath been feen full of fpawn in January. The length is five inches: the colour a pale brown, fometimes finely ftreaked with a darker. Beneath the throat is a round depreffion of a whitifh colour like the impreffion of a feal, furrounded by twelve fmall pale yellow tubera, by which probably it adheres to the ftones like the other fpecies.

3. The *leffer* fucking-fifh is found in different parts of the Britifh feas. It is about four inches in length; the fkin without fcales, flippery, and of a dufky colour. It hath alfo an apparatus for adhering to ftones and rocks fimilar to the others.

CYDER, or CIDER, an excellent drink made of the juice of apples, efpecially of the more curious table kinds. In making this, it has been thought neceffary to lay the harder cyder-fruits in heaps for fome time before breaking their pulps; but the Devonfhire people have much improved on this. In other counties, the method is to make thefe heaps of apples in a houfe, or under fome covering inclofed on every fide. This method hath been found objectionable, becaufe, by excluding the free air, the lofs of juice becomes fo great, as to reduce the fruit to half their former weight, attended with a general rottennefs, rancid fmell, and difagreeable tafte. In the Southhams, a middle way has been purfued, to avoid the inconveniences and lofs attending the above. They make their heaps of apples in an open part of an orchard, where, by the means of a free air and lefs perfpiration, the defired maturity is brought about, with an inconfiderable wafte of the juices and decay of the fruit, entirely free from ranknefs; and though fome apples rot even in this manner, they are very few, and are ftill fit for ufe.

In purfuing the Devonfhire method it is to be obferved, 1. That all the promifcuous kinds of apples that have dropped from the trees, from time to time, are to be gathered up and laid in a heap by themfelves, and to be made into cyder after having fo lain about ten days. 2. Such apples as are gathered from the trees, having already acquired fome degree of maturity, are likewife to be laid in a heap by themfelves for about a fortnight. 3. The later hard fruits, which are to remain a month or fix weeks, by which, notwithftanding froft, rain, &c, their juices will receive fuch a maturation, as will prepare them for a kindly fermentation, and which they could not have attained on the trees becaufe of the coldnefs of the feafon.

It is obfervable, that the riper and mellower the fruits are at the time of collecting them into heaps, the fhorter fhould be their continuance there; and on the contrary, the harfher, immaturer, and harder they are, the longer they fhould reft. Thefe heaps fhould be made in an even and open part of an orchard, without any regard to covering from rain, dews, or what elfe may happen during the apples ftaying there; and whether they be carried in and broke in wet or dry weather, is all the fame. If it may be objected, that during their having lain together in the heap, they may have imbibed great humidity, as well from the air as from the ground, rain, dews, &c. which are mixed with their juices; the anfwer is, this will have no other effect than a kindly diluting, natural to the fruit, by which means a fpeedier fermentation enfues, and all heterogeneous humid particles are thrown off.

The apples are then ground, and the pummice is received in a large open-mouthed veffel, capable of containing as much thereof as is fufficient for one making, or one cheefe. Though it has been a cuftom to let the pummice remain fome hours in the veffel appropriated to contain it, yet this practice is by no means commendable; for if the fruits did not come ripe from the trees, or otherwife matured, the pummice remaining in the vat too long, will acquire fuch harfhnefs and coarfenefs from the fkins as is never to be got rid of; and if the pummice is of well ripened fruit, the continuing it too long there will occafion it to contract a fharpnefs that very often is followed with want of fpirit and pricking; nay, fometimes it becomes vinegar, or always continues of a wheyifh colour; all which proceeds from the heat of fermentation that it almoft inftantly falls into on lying together. The pummice therefore fhould remain no longer in the vat than until there may be enough broke for one preffing, or that all be made into a cheefe, and preffed the fame day it is broken. See farther the article *Cyder*-MILL.

It was once a practice in Devonfhire, to fuffer the apple-juice to run into veffels of lead, which being diffolved by the acid of the liquor became poifonous; and thoufands perhaps have loft their lives in confequence of this practice. The difeafe in the bowels produced by drinking the cyder thus contaminated, has been called the *Devonfhire colic*.

CYDER-*Spirit*, a fpirituous liquor drawn from cyder by diftillation, in the fame manner as brandy from wine. The particular flavour of this fpirit is not the moft agreeable, but it may with care be diverted wholly of it, and rendered a perfectly pure and infipid fpirit upon rectification. The traders in fpirituous liquors are well enough acquainted with the value of fuch a fpirit as this: they can give it the flavours of fome other kinds, and fell it under their names, or mix it in large proportion with the foreign brandy, rum and arrack, in the fale, without any danger of the cheat being difcovered.

CYDER-*Wine*, a kind of wine made from the juice of apples taken from the prefs and *boiled*, and which being kept three or four years is faid to refemble Rhenifh. The method of preparing this wine, as communicated by Dr. Rufh of America, where it is much practifed, confifts in evaporating in a brewing copper the frefh apple-juice till half of it be confumed. The remainder is then immediately conveyed into a wooden cooler, and afterwards is put into a proper cafk, with an addition of yeaft, and fermented in the ordinary way. The procefs is evidently borrowed from what has long been practifed on the recent juice of the grape, under the term of *vin cuit*, or boiled

wine, not only in Italy, but alſo in the iſlands of the Archipelago, from time immemorial.

This proceſs has lately become an object of imitation in the cyder counties, and particularly in the weſt of England, where it is reported that many hundred hogſheads of this wine have already been made; and as it is ſaid to betray no ſign of an impregnation of copper by the uſual chemical teſts, it is conſidered as perfectly wholeſome, and is accordingly drunk without apprehenſion by the common people. Others, however, ſuſpect its wholeſomeneſs; whence it appeared an object of no ſmall moment to determine in ſo doubtful a matter, whether or not the liquor acquires any noxious quality from the copper in which it is boiled.—With this view Dr. Fothergill made a variety of experiments; and the reſult ſeemed to afford a ſtrong preſumption that the cyder wine *does* contain a minute impregnation of copper; not very conſiderable indeed, but yet ſufficient, in the Doctor's opinion, to put the public on their guard concerning a liquor that comes in ſo very "queſtionable a ſhape."

It is a curious chemical fact, he obſerves, if it be really true, that acid liquors, while kept boiling in copper veſſels, acquire little or no impregnation from the metal, but preſently begin to act upon it when left to ſtand in the cold. Can this be owing to the agitation occaſioned by boiling, or the expulſion of the aerial acid? Atmoſpheric air powerfully corrodes copper, probably through the intervention of the aerial or rather nitrous acid, for both are now acknowledged to be preſent in the atmoſphere. But the latter is doubtleſs a much ſtronger menſtruum of copper than the former.

In the preſent proceſs the liquor is properly directed to be paſſed into a wooden cooler as ſoon as the boiling is completed. But as all acids, and even common water, acquire an impregnation and unpleaſant taſte, from ſtanding in copper veſſels in the cold, why may not the acid juice of apples act in ſome degree on the copper before the boiling commences? Add to this, that brewing coppers, without far more care and attention than is generally beſtowed on them in keeping them clean, are extremely apt to contract a quantity of verdegris, as appears from the blue or green ſtreaks very viſible when theſe veſſels are minutely examined. Should the unfermented juice be thought incapable of acting on the copper either in a cold or boiling ſtate, yet no one will venture to deny its power of waſhing off or diſſolving verdegris already formed on the internal ſurface of the veſſel. Suppoſe only one-eighth part of a grain of verdegris to be contained in a bottle of this wine, a quantity that may elude the ordinary teſts, and that a bottle ſhould be drunk daily by a perſon without producing any violent ſymptom or internal uneaſineſs; yet what perſon in his ſenſes would knowingly chooſe to hazard the experiment of determining how long he could continue even this quantity of a ſlow poiſon in his daily beverage with impunity? And yet it is to be feared the experiment is but too often unthinkingly made, not only with cyder-wine, but alſo with many of the foreign wines prepared by a ſimilar proceſs. For the grape juice, when evaporated in a copper veſſel, under the denomination of *vino cotto* or boiled wine, cannot but acquire an equal if not yet ſtronger impregnation of the metal, than the juice of apples, ſeeing that verdegris itſelf is manufactured merely by the application of the acid huſks of grapes to plates of copper. The poiſon of lead however is ſtill more formidable.

Independent of the danger of any metallic impregnation, the Doctor thinks it may be juſtly queſtioned how far the proceſs of preparing boiled wines is neceſſary or reconcileable to reaſon or economy. The evaporation of the muſt by long boiling not only occaſions an unneceſſary waſte of both liquor and fuel, but alſo diſſipates certain eſſential principles, without which the liquor can never undergo a complete fermentation, and without a complete fermentation there can be no perfect wine. Hence the boiled wines are generally crude, heavy, and flat, liable to produce indigeſtion, flatulency, and diarrhœa. If the evaporation be performed haſtily, the liquor contracts a burnt empyreumatic taſte, as in the preſent inſtance; if ſlowly, the greater is the danger of a metallic impregnation. For the proceſs may be preſumed to be generally performed in a veſſel of braſs or copper, as few families poſſeſs any other that is ſufficiently capacious. Nor can a veſſel of caſt-iron, though perfectly ſafe, be properly recommended for this purpoſe, as it would certainly communicate a chalybeate taſte and dark colour to the liquor. At all events, lead and copper veſſels ought to be entirely baniſhed from this and every other culinary proceſs.

Cyderkin, called alſo, *purre*, or *perkin*, is made of the murk or groſs matter remaining after the cyder is preſſed out. To make this liquor, the murk is put into a large vat, with a proper quantity of boiled water, which has ſtood till it be cold again: if half the quantity of water be uſed that there was of cyder, it will be good; if the quantities be equal, the cyderkin will be ſmall. The whole is left to infuſe 48 hours, and then well preſſed: what is ſqueezed out by the preſs is immediately tunned up and ſtopped; it is fit to drink in a few days. It clarifies of itſelf, and ſerves in families inſtead of ſmall beer. It will keep, if boiled, after preſſure, with a convenient quantity of hops.

CYDONIA, the quince; ſo called from Cydon, a town of Crete, famous for its abounding with this fruit. Linnæus has joined this genus to the apple and pear; but as there is ſuch a remarkable difference between the fruits, we follow Mr. Miller, who treats the quince as a genus by itſelf.

The *Species* are, 1. The *oblonga*, with an oblong fruit, lengthened at the baſe. 2. The *maliforma*, with oval leaves, woolly on their under ſide, and lengthened at their baſe. 3. The *luſitanica*, with obverſe oval leaves, woolly on their upper ſide. There are ſome other varieties of this fruit propagated in fruit-gardens, and in the nurſeries for ſale. One of them is a ſoft eatable fruit, another aſtringent, and a third with a very ſmall fruit cottony all over, which is ſcarce worth keeping. Theſe Mr. Miller ſuppoſed to be ſeminal variations, but the three others to be diſtinct ſpecies. The Portugal quince is the moſt valuable; its pulp turns to a fine purple when ſtewed or baked, and becomes much ſofter and leſs auſtere than the others; ſo is much fitter for making marmalade. The trees are all eaſily propagated, either by layers, ſuckers, or cuttings; which muſt be planted in a moiſt ſoil. Thoſe raiſed from ſuckers are ſeldom ſo well rooted as thoſe which are obtained from cuttings or layers, and are ſubject to produce ſuckers again in greater plenty; which is not ſo proper for fruit-bearing trees. Theſe trees require very little pruning: the chief thing to be obſerved is, to keep their ſtems clear from ſuckers, and cut off ſuch branches as croſs each other: likewiſe all upright luxuriant ſhoots from the middle of the tree ſhould be taken off, that the head may not be too much crowded with wood, which is of ill conſequence to all fruit-trees. Theſe ſorts may alſo be propagated by budding or grafting upon ſtocks raiſed by cuttings; ſo that the beſt ſorts may be cultivated this way in greater plenty than by any other method. Theſe are alſo in great eſteem to bud or graft pears upon; which for ſummer or autumn fruits are a great improvement to them, eſpecially thoſe deſigned for walls and eſpaliers; for the trees upon theſe ſtocks do not ſhoot ſo vigorouſly as thoſe upon free-ſtocks, and therefore may be kept in leſs compaſs, and ſooner produce fruit: but hard winter fruits do not ſucceed ſo well upon theſe ſtocks, their fruit being ſubject to crack, and are commonly ſtony, eſpecially all the breaking pears: therefore theſe ſtocks are only fit for melting pears and a moiſt ſoil.

CYGNUS, or SWAN, in ornithology. See ANAS.

CYGNUS, the SWAN, in aftronomy, a conftellation of the northern hemifphere, between Lyra and Cepheus. The ftars in the conftellation Cygnus, in Ptolemy's catalogue, are 19; in Tycho's 18; in Hevelius's 47; in the Britannic Catalogue 81.

CYLINDER, in geometry, a folid body fuppofed to be generated by the rotation of a parallelogram.

Rolling, or *Loaded* CYLINDER, a cylinder which rolls up an inclined plane. See MECHANICS.

CYLINDROID, in geometry, a folid body approaching to the figure of a cylinder, but differing from it in fome refpects, as having the bafes elliptical, but parallel and equal.

CYLINDRUS, in natural hiftory, the name of a genus of fhell-fifh, of which there are many elegant and precious fpecies.

CYMA, in botany, the tender ftalks which herbs fend forth in the beginning of the fpring, particularly thofe of the cabbage kind.

CYMA, or CYMATIUM, in architecture, a member or moulding of the corniche, the profile of which is waved, that is, concave at top, and convex at bottom.

CYMBAL, κυμβαλον, a mufical inftrument in ufe among the ancients. The cymbal was made of brafs, like our kettle-drums, and, as fome think, in their form, but fmaller, and of different ufe. Ovid gives cymbals the epithet of *genialia*, becaufe they were ufed at weddings and other diverfions. Caffiodorus and Ifidore call this inftrument *acetabulum*, the name of a cup or cavity of a bone wherein another is articulated; and Xenophon compares it to a horfe's hoof; whence it muft have been hollow; which appears, too, from the figure of feveral other things denominated from it; as a bafin, caldron, goblet, cafk, and even a fhoe, fuch as thofe of Empedocles, which were of brafs.

In reality, the ancient cymbals appear to have been very different from our kettle-drums, and their ufe of another kind. To their exterior cavity was faftened a handle; whence Pliny compares them to the upper part of the thigh, and Rabanus to phials. They were ftruck againft one another in cadence, and made a very acute found. Their invention was attributed to Cybele; whence their ufe in feafts and facrifices: fetting afide this occafion, they were feldom ufed but by diffolute and effeminate people. M. Lampe, who has written exprefsly on the fubject, attributes the invention to the Curetes, or inhabitants of mount Ida in Crete: it is certain thefe, as well as the Corybantes or guards of the kings of Crete, and thofe of Rhodes and Samothracia, were reputed to excel in the mufic of the cymbal. The Jews had their cymbals, or at leaft inftruments which tranflators render *cymbals*; but as to their matter and form, critics are ftill in the dark. The modern cymbal is a mean inftrument, chiefly in ufe among vagrants, gypfies, &c. It confifts of fteel wire, in a triangular form, whereon are paffed five rings, which are touched and fhifted along the triangle with an iron rod held in the left hand, while it is fupported in the right by a ring, to give it the freer motion. Durandus fays, that the monks ufed the word *cymbal* for the cloifter-bell, ufed to call them to the refectory.

CYMENE, in botany, a name given by the ancient Greeks to a plant with which they ufed to dye woollen cloths yellow, and with which the women of thofe times ufed alfo to tinge the hair yellow, that being the favourite colour in thofe ages. The *cymene* of the Greeks is evidently the fame plant with the *lutea herba* of the Latins; or what we call *dyer's weed*. See RESEDA.

CYNÆGIRUS, an Athenian, celebrated for his extraordinary courage. He was brother to the poet Æfchylus. After the battle of Marathon he purfued the flying Perfians to their fhips, and feized one of their veffels with his right hand, which was immediately fevered by the enemy. Upon this he feized the veffel with his left hand, and when he had loft that alfo, he ftill kept his hold with his teeth.

CYNANCHE, a name for the quinfey, or inflammation of the fauces, tonfils, &c. Cullen diftinguifhes five fpecies of Cynanche, viz. 1. Cynanche tonfillaris. 2. Cynanche maligna. 3. Cynanche trachealis. 4. Cynanche pharyngæus. 5. Cynanche parotidæa. See MEDICINE.

CYNANCHUM, BASTARD DOGSBANE; a genus of the digynia order, belonging to the pentandria clafs of plants; and in the natural method ranking under the 30th order, *Contortæ*. The nectarium is cylindrical and quinquedentated. There are fix fpecies; of which the following are the moft remarkable. 1. The acutum, commonly called *Montpellier fcammony*; and, 2. The monfpeliacum, or round-leaved Montpellier fcammony. They abound with a milky juice like the fpurge, which iffues out wherever they are broken; and this milky juice when concreted has frequently been fold for fcammony. Thefe plants propagate fo faft by their creeping roots, that few people care to admit them into their gardens.

CYNARA, the ARTICHOKE; a genus of the polygamia æqualis order, belonging to the fyngenefia clafs of plants. The calyx is dilated, imbricated with carnous fquamæ, and emarginated with a fharp point. Of this genus there are four fpecies, but only two are cultivated for ufe.

1. The fcolynius, or garden artichoke, hath large, thick, perennial roots, crowned by a confiderable clufter of large pinnatifid, erect leaves, two or three feet long. In the middle are upright ftalks rifing a yard high, on the top of which is a large round fcaly head, compofed of numerous, oval, calycinal fcales, inclofing the florets, fitting on a broad flefhy receptacle, which, with the flefhy bafe of the fcales, is the only eatable part of the plant. The varieties of this fpecies are, 1. The conical green-headed French artichoke, having the fmall leaves terminated by fpines, a tall ftalk, the head fomewhat conical, and of a light green colour, with the fcales pointed at top, opening and turning outward. 2. The globular headed red Dutch artichoke, having leaves without fpines, a ftrong ftalk, the head large, globular, a little compreffed at top, and of a reddifh-green colour; broad obtufe fcales emarginated at top, growing clofe, and turning inward. Of thefe varieties the laft is defervedly the moft efteemed, both on account of its fuperiority in fize and the agreeablenefs of its flavour. Both varieties are perennial in their root: but the leaves and fruit-ftem die to the ground in winter; and their roots remaining, fend up frefh leaves and ftems every fummer, producing a fupply of artichokes for 20 years if required. The flowers and feed of all the plants of this genus are produced in the centre of the head; the fcales of which are the proper calyx of the flower, which confifts of numerous fmall blueifh florets, fucceeded by downy feeds fitting naked on the receptacle.

2. The cardunculus, or cardoon, greatly refembles the artichoke, but is of larger and more regular growth; the leaves being more upright, taller, broader, and more regularly divided; and the ftalks of the leaves blanched are the only eatable parts of the plant.

Both the above varieties of the artichoke are propagated by flips or fuckers, arifing annually from the ftool or root of the old plants in fpring, which are to be taken from good plants of any prefent plantation in March or the beginning of April, and planted in the open quarter of the kitchen garden, in rows five feet afunder: and they will produce artichokes the fame year in autumn. It fhould, however, be remarked, that though artichokes are of many years duration, the annual produce of their fruit will gradually leffen in the fize of the eatable parts after the third or fourth year, fo that a frefh plantation fhould be made every three or four years. The cardoon is a

very hardy plant, and proſpers in the open quarters of the kitchen-garden. It is propagated by ſeed ſowed annually in the full ground in March; either in a bed for tranſplantation, or in the place where they are deſigned to remain. The plants are very large, ſo muſt ſtand at conſiderable diſtances from one another. By this means you may have ſome ſmall temporary crops between the rows, as of lettuce, ſpinach, endive, cabbage, ſavoy, or brocoli plants. In the latter end of September, or in October, the cardoons will be grown very large, and their footſtalks have acquired a thick ſubſtance; you muſt then tie up the leaves of each plant, to admit of earthing them cloſely all round for blanching, which will take up ſix or eight weeks; and thus the plants will come in for uſe in November and December, and continue all winter.

CYNÆUS of Theſſaly, the ſcholar of Demoſthenes, flouriſhed 275 years before Chriſt. Pyrrhus had ſo high an eſteem for him, that he ſent him to Rome to ſolicit a peace; and ſo vaſt was his memory, that the day after his arrival he ſaluted all the ſenators and knights by name. Pyrrhus and he wrote a Treatiſe on War, quoted by Tully.

CYNICS, a ſect of ancient philoſophers, who valued themſelves upon the contempt of riches and ſtate, arts and ſciences, and every thing, in ſhort, except virtue or morality.

The cynic philoſophers owe their origin and inſtitution to Antiſthenes of Athens, a diſciple of Socrates; who being aſked of what uſe his philoſophy had been to him, replied, "It enables me to live with myſelf." Diogenes was the moſt famous of his diſciples, in whoſe life the ſyſtem of this philoſophy appears in its greateſt perfection. He led a moſt wretched life, a tub having ſerved him for a lodging, which he rolled before him wherever he went. Yet he was nevertheleſs not the more humble on account of his ragged cloak, bag, and tub; for one day entering Plato's houſe, at a time when there was a ſplendid entertainment there for ſeveral perſons of diſtinction, he jumped upon a very rich couch in all his dirt, ſaying, "I trample on the pride of Plato." "Yes (replied Plato), but with greater pride, Diogenes." He had the utmoſt contempt for all the human race; for he walked in the ſtreets of Athens at noon day with a lighted lanthorn in his hand, telling the people, "He was in ſearch of a man." Amongſt many excellent maxims of morality, he held ſome very pernicious opinions; for he uſed to ſay, that the uninterrupted good fortune of Harpalus, who generally paſſed for a thief and a robber, was a teſtimony againſt the gods. He regarded chaſtity and modeſty as weakneſſes; hence Laertius obſerves of him, that he did every thing openly, whether it belonged to Ceres or Venus; though he adds, that Diogenes only ran to an exceſs of impudence to put others out of conceit with it. But impudence was the characteriſtic of theſe philoſophers; who argued, that what was right to be done, might be done at all times and in all places. The chief principle of this ſect in common with the ſtoics, was, that we ſhould follow nature. But they differed from the ſtoics in their explanation of that maxim; the cynics being of opinion, that a man followed nature that gratified his natural motions and appetites; while the ſtoics underſtood right reaſon to be ſignified by the word nature.

CYNIC-*Spaſm*, a kind of convulſion, wherein the patient is ſuppoſed to imitate the howling of dogs.

CYNIPS, in zoology, a genus of inſects belonging to the hymenoptera order. The mouth is armed with jaws, but has no proboſcis: the ſting is ſpiral, and moſtly concealed within the body. The quercus folii, or oak-leaf cynips, is of a burniſhed ſhining brown colour. The antennæ are black; the legs and feet of a cheſnut brown; and the wings white, but void of marginal ſpots. It is in the little ſmooth, round, hard galls, found under the oak leaves, generally faſtened to the fibres, that this inſect is produced, a ſingle one in each gall. Theſe latter are ligneous, of a hard compact ſubſtance, formed like the reſt, by the extravaſation of the ſap of the leaf, occaſioned by the puncture of the gall-fly when it depoſits its eggs. Sometimes, inſtead of the cynips, there is ſeen to proceed from the gall a larger inſect of a brown colour, which is an ichneumon. This ichneumon is the real inmate of the gall, or he that formed it. He is a paraſite, whoſe mother depoſited her eggs in the yet tender gall; which, when hatched, brings forth a larva that deſtroys the larva of the cynips, and then comes out when it has undergone its metamorphoſis and acquired its wings.

The quercus gemmæ, or oak-bud cynips, is of a very dark green, ſlightly gilded: its antennæ and feet are of a dun colour, rather deep. It depoſits its eggs in the oak-buds, which produces one of the fineſt galls, leafed like a roſe-bud beginning to blow. When the gall is ſmall, that great quantity of leaves is compreſſed, and they are ſet one upon another like the tiles of a roof. In the centre of the gall there is a kind of ligneous kernel, in the middle of which is a cavity; and in that is found the little larva, who feeds there, takes its growth, undergoes its metamorphoſis, and breaks through the incloſure of that kind of cod in order to get out. The whole gall is often near an inch in diameter, ſometimes more when dried and diſplayed; and it holds to a branch by a pedicle.—There are a great number of other ſpecies.

CYNOCEPHALUS, in zoology, the trivial name of a ſpecies of SIMIA.

CYNOGLOSSUM, HOUND'S TONGUE; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 41ſt order, *Aſperifoliæ*. The corolla is funnel-ſhaped, with its throat cloſed up by little arches formed in it; the ſeeds depreſſed, and affixed to the ſtyle or receptacle only on their inner ſide. There are eight ſpecies, none of them remarkable for their beauty. The root of one of them, the officinale, or common greater hound's tongue, was formerly uſed in medicine, and ſuppoſed to poſſeſs narcotic virtues; but it is diſcarded from practice. The ſmell of the whole plant is very diſagreeable. Goats eat it: ſheep, horſes, and ſwine refuſe it.

CYNOMETRA, in botany; a genus of the monogynia order, belonging to the decandria claſs of plants: and in the natural method ranking with thoſe of which the order is doubtful. The calyx is tetraphyllous; the antheræ bifid at top; the legumen carnous, creſcent-ſhaped, and monoſpermous.

CYNOMORIUM, in botany; a genus of the monandria order, belonging to the monœcia claſs of plants; and in the natural method ranking under the 50th order, *Amentaceæ*. The male calyx is an imbricated catkin: there is no corolla: the calyx of the female is in the ſame catkin; no corolla; one ſtyle; and one roundiſh ſeed.

CYNOPHONTIS, in antiquity; a feſtival obſerved in the dog days at Argos, and ſo called ἀπὸ τοῦ κύνας φονεῖν, i. e. from killing dogs; becauſe it was uſual on this day to kill all the dogs they met with.

CYNOREXY, an immoderate appetite, to the degree of a diſeaſe, called alſo *fames canina* and *bulimy*.

CYNOSARGES, a place in the ſuburbs of Athens, named from a white or ſwift dog, who ſnatched away part of the ſacrifice offering to Hercules. It had a gymnaſium, in which ſtrangers or thoſe of the half-blood performed their exerciſes; the caſe with Hercules, to whom the place was conſecrated. It had alſo a court of judicature, to try illegitimacy, and to examine whether perſons were Athenians of the whole or half blood. Here Antiſthenes ſet up a new ſect of philoſophers called *Cynics*, either from the place, or from the ſnarling or impudent diſpoſition of that ſect.

CYNOSSEMA, the tomb of Hecuba, on the promontory Maſtuſia, over againſt Sigeum, in the ſouth of the Cherſoneſus

Thracia; named either from the figure of a dog, to which she was changed, or from her sad reverse of fortune.

CYNOSURA, in astronomy, a denomination given by the Greeks to *ursa minor*, or "the little bear," by which sailors steer their course. The word is formed of κυνοσουρα, q. d. the dog's tail. This is the constellation next our pole, consisting of seven stars; four whereof are disposed like the four wheels of a chariot, and three lengthwise representing the beam: whence some give it the name of the *chariot* or *Charles's wain*.

Cynosura, in mythology, a nymph of Ida in Crete. She nursed Jupiter, who changed her into a star that bears the same name. It is the same as the ursa minor.

CYNOSURUS, in botany; a genus of the digynia order, belonging to the triandria class of plants; and in the natural method ranking under the 4th order, *Gramina*. The calyx is bivalved and multiflorous; the receptacle proper, unilateral, and foliaceous. There are ten species, four of which are natives of Britain, viz. the cristatus, or crested dog-tail-grass; the echinatus, or rough dog-tail-grass; the cæruleus, or blue dog-tail-grass; and the paniceus, or bearded dog-tail-grass.

CYNTHIUS and Cynthia, in mythology, surnames of Apollo and Diana, derived from *Cynthia*, the name of a mountain in the middle of the island of Delos.

CYPERUS, in botany; a genus of the monogynia order, belonging to the triandria class of plants: and in the natural method ranking under the 3d order, *Calamariæ*. The glumes are paleaceous, and imbricated towards each side; the corolla is wanting, and there is one naked seed. There are 20 species; the only remarkable are the round and the long sweet cyperus. The former is a native of the East Indies, and grows by the sides of rivulets, ditches, and the like. The root is knotty, wrapped round with fibrous strings not easy to break, of a brown colour without, and grey within; of a pleasant scent, especially when fresh and well dried; the leaves are green, and resemble those of the reed and leek. The latter, commonly called *English* or *Flemish cyperus*, grows in the water, and along the banks and river sides. Its root is as thick as an olive, full of little knots or specks, of an oblong figure, grey colour, sweet and somewhat sharp taste, and almost without smell when it is newly taken out of the ground. The roots of both plants are esteemed cordial, and diuretic, and long cyperus is much used by perfumers and glovers.

CYPHON, in antiquity, a kind of punishment used by the Athenians. It was a collar made of wood; so called because it constrained the criminal who had this punishment inflicted on him to bow down his head.

CYPHONISM, Cyphonismus, from κυφων, which has various significations; derived from κυφος, *crooked*: a kind of torture or punishment in use among the ancients. The learned are at a loss to determine what it was. Some will have it to be that mentioned by St. Jerome in his Life of Paul the Hermit, chap. 2. which consisted in smearing the body over with honey, and thus exposing the person, with his hands tied, to the warm sun, to invite the flies and other vermin to persecute him.

CYPRÆA, or Gowrie, in zoology, a genus of insects belonging to the order of vermes testacea. It is an animal of the limax or snail kind; the shell is one involuted, subovated, obtuse, smooth valve. The aperture on each side is linear, longitudinal, and teethed. There are 44 species, distinguished by the form of their shells. The pediculus, or common gowrie, is represented in plate 81. This genus is called *cypræa* and *venerea* from its being peculiarly dedicated to Venus, who is said to have endowed a shell of this genus with the powers of a *remora*, so as to impede the course of the ship which was sent by Periander tyrant of Corinth, with orders to castrate the young nobility of Corcyra.

CYPRESS. See Cupressus.

CYPRIANUS (Thascius-Cæcilius), a principal father of the Christian church, was born at Carthage in Africa, at the latter end of the second or beginning of the third century. We know nothing more of his parents than that they were heathens; and he himself continued such till the last 12 years of his life. He applied himself early to the study of oratory; and some of the ancients, particularly Lactantius, inform us, that he taught rhetoric in Carthage with the highest applause. Cyprian's conversion is fixed by Pearson to the year 246, at Carthage, where, as St. Jerome observes, he had often employed his rhetoric in the defence of paganism. He died a martyr in the persecution of Valerian and Gallienus, in 258. Cyprian wrote 81 letters, and several treatises. The best editions of his works are those of Pamelius in 1568; of Rigaltius in 1648; and of Oxford in 1682.

CYPRINUS, in ichthyology. See Barbel.

CYPRIPEDIUM, lady's slipper, in botany; a genus of the diandria order, belonging to the gynandria class of plants; and in the natural method ranking under the 7th order, *Orchideæ*. The nectarium is ventricose, inflated and hollow. There are three species; of which only one, *viz*. the calceolus, is a native of Britain. It grows in rough ground in different parts of the island. The other species are natives of America. None of them are easily propagated in gardens, and therefore must be transplanted from those places where they are natives.

CYPRUS, an island in the Mediterranean, near the coast of Syria. It was taken by the Turks from the Venetians in 1570. Nicosia is the capital. The soil is an excellent fertile clay; and, if the natives were industrious, they might make it a paradise; for, though there are no rivers, the defect is supplied by plenty of springs. They are much infested with locusts, and the inhabitants are obliged to tack bells to their boots to frighten away the asps, the tarantulas, and other venomous reptiles. There is one kind of serpent, about two yards long, of a blackish colour, with a sort of coronet on its head, which it carries majestically about a foot high, as it waves along. There is one archbishop and three bishops. The priests are extremely ignorant, and they submit to the most servile employments to get money. The exports of the island are silk, wool, and wine.

Knights of Cyprus, an order instituted by Guy de Lusignan, titular king of Jerusalem, to whom Richard I. of England, after conquering this island, made over his right.

CYR, (St.) a village of France, two miles from Versailles, lately celebrated for a nunnery founded by Lewis XIV. under the patronage of Madame de Maintenon. The nuns were entrusted with the education of 250 young ladies of decayed noble families, who were obliged to prove their nobility from the 4th generation by the father's side. They could not be admitted before the age of 7, nor after 12; and they continued in the convent till they were 20 years and three months old. They were then either sent to some of the royal abbies as nuns; married to gentlemen, with a portion of 400 pistoles; or sent home to their families. The nuns, 50 in number, were all ladies of quality: and Madame de Maintenon herself was the abbess till her death in 1719.

CYRANO (Bergerac), a French author, born in Gascony, about the year 1620. He first entered into the army, where his natural courage engaged him frequently in duels in the quality of a second; which, with other rash actions, procured him the title of the *Intrepid*. But the little prospect he saw of preferment made him renounce the trade of war for the exercise of wit. His comic histories of the states and empires in the sun and moon, show him well acquainted with the Cartesian philosophy, and to have a lively imagination. Lord Orrery classes him with Swift for his turn of humour, which he says the latter adopted and pursued.

CYRENAICA, an ancient kingdom of Africa, corresponding

to the prefent kingdom and defert of Barca and Tripoli. It was originally inhabited by a number of barbarous nations, differing little from great gangs of robbers. Afterwards fome colonies from Greece fettled here, and Cyrenaica became fo powerful a ftate that it waged war with Egypt and Carthage, and often with fuccefs. The capital was Cyrene.

CYRENAICS, a fect of ancient philofophers, fo called from their founder Ariftippus of Cyrene, a difciple of Socrates. The great principle of their doctrine was, that the fupreme good of man in this life is pleafure; whereby they not only meant a privation of pain, and a tranquillity of mind, but an affemblage of all mental and fenfual pleafures, particularly the laft. Cicero makes frequent mention of Ariftippus's fchool, and fpeaks of it as yielding debauchees. Three difciples of Ariftippus, after his death, divided the fect into three branches; under which divifion it languifhed and funk: the firft called the *Hegefiac* fchool; the fecond the *Annicerian*; and the third the *Theodoran*; from the names of their authors.

CYRUS, the fon of Cambyfes the Perfian, by Mandane the daughter of Aftyages king of the Medes. The two chief hiftorians, who have written the life of Cyrus, are Herodotus and Xenophon; but their accounts of him are different, in as much as the latter makes his father a king of Perfia, and the former a meaner man. He engaged in feveral wars, and fubdued all the nations which lie between Syria and the Red Sea. He died at the age of 70 years, after a reign of 30: but authors differ very much concerning the manner of his death. Herodotus, Juftin, and Valerius Maximus relate, that he died in the war againft the Scythians; and that falling into an ambufh which queen Tomyris had laid for him, fhe ordered his head to be cut off, and caft into a veffel full of blood, faying, "Thou haft always thirfted after human blood, now glut thyfelf with it." Diodorus the Sicilian fays, that he was taken in an engagement and hanged. Ctefias affures us, that he died of a wound which he received in his thigh: but by Xenophon's account, he died peaceably in his bed, amidft his friends and fervants; and certain it is, that in Alexander's time his monument was fhown at Pafagarda in Perfia. From this extraordinary difference of opinion, it is eafy to conclude, that we are but imperfectly acquainted with the hiftory of this great prince, the founder of the Perfian, and deftroyer of the Chaldean empire.

CYST, the bag or tunic including all incyfted tumors, as the atheroma, fteotoma, meliceris, &c.

CYSTIC, in anatomy, a name given to two arteries and two veins.

Cystic duct. See Anatomy, page 191.

CYTHEREA, in mythology, the furname of Venus, fo called from Cythera an ifland, where fhe had a temple efteemed the moft ancient in Greece, and on the fhores of which fhe was believed to be borne by the Zephyrs, furrounded by the Loves, the Tritons, and Nereides, reclining in a languifhing pofture in a fea-fhell. They give the name of Cytheriades to the Graces who attended her on the fhore without quitting her, except on thofe occafions when fhe rather chofe to be waited upon by the Pleafures.

CYTINUS, in botany; a genus of the dodecandria order, belonging to the gynandria clafs of plants; and in the natural method ranking under the 11th order, *Sarmentaceæ*. The calyx is quadrifid, fuperior; there is no corolla; the antheræ are 16, and feffile; the fruit an octolocular polyfpermous berry.

CYTISUS, tree trefoil; a genus of the decandria order, belonging to the diadelphia clafs of plants; and in the natural method ranking under the 32d order, *Papilionaceæ*. The calyx is bilabiated, with the upper lip bifid; inferior, tridentate; the legumen attenuated at the bafe. There are 11 fpecies; of which the moft remarkable are, 1. The *laburnum*, or large deciduous cytifus, hath a large upright tree-ftem, branching into a full-fpreading head, 20 or 30 feet high, having fmooth greenifh branches, oblong oval entire leaves, growing by threes on long flender foot-ftalks; and from the fides of all the branches numerous yellow flowers collected into long fpikes hanging loofely downward, and appearing in May. 2. The *feffilifolius*, often called *cytifus fecundus Clufii*, has a low fhrubby ftem dividing into numerous erect brownifh branches, forming a bufhy head five or fix feet high, garnifned with fmall oval leaves growing by threes; fome on very fhort foot-ftalks, others fitting clofe; and bright yellow flowers in fhort erect fpikes at the end of the branches, appearing in June. 3. The *nigricans* grows with a fhort fhrubby ftem, dividing low into many erect flender branches, forming a bufhy head four or five feet high, with oblong, oval, trifoliate leaves, and yellow flowers terminating all the branches in upright fpikes, appearing in July. 4. The *hirfutus*, or hairy evergreen Neapolitan cytifus, rifes with an upright fhrubby grey ftem, fending out many erect greenifh hairy branches, forming a fine head fix or eight feet high, clofely garnifhed with fmall hairy trifoliated leaves on fhort foot-ftalks, and yellow flowers from the fides of the branches in fhort pendulous fpikes, appearing in June. 5. The *Auftriacus*, Auftrian or Tartarian evergreen cytifus, hath a fhrubby ftem, dividing low into many greenifh branches, forming a bufhy head three or four feet high, having fmooth whitifh-green leaves, and bright yellow flowers in clofe umbellate heads at the ends of the branches, having a clufter of leaves under each head. Thefe flowers appear in May. All the forts are hardy, and will profper in any common foil and expofure: though, as the hirfutus is fometimes affected by fevere froft, it fhould have a dry foil, and a fomewhat fheltered fituation. They may all be propagated by feeds or cuttings, and all the culture they require in the nurfery is to have the ground kept clear from weeds, and dug annually between the rows. Though they are generally confidered only as ornamental fhrubs, yet the firft fpecies, if originally trained to a ftem, and fuffered to ftand, will grow to a fize of pretty large timber trees. They grow naturally on the Alps, the mountains of Dauphiny, and the highlands of Scotland; and the timber being very hard, and taking a fine polifh, is frequently ufed for making houfhold furniture; and is faid to equal the fineft mahogany in beauty. A fpecies of cytifus, called by Linnæus *cytifus cajan*, is known in the Weft Indies, where it is a native, by the name of the *pigeon pea*, from the feeds being the common food of thefe birds in that part of the world. Thefe feeds are alfo fometimes ufed as food for the human fpecies; and as they are of a very binding quality, afford a wholefome nourifhment during the wet feafon, when dyfenteries are fo frequent.

CYZICENS; Cyzicena, among the ancient Greeks, were a fort of magnificent banqueting-houfes, always looking towards the north, and ufually opening upon gardens. They had their name from Cyzicus, a city very confiderable for the grandeur of its buildings; fituated in an ifland of Myfia, bearing the fame name.

CZACKTHURN, a ftrong town of Germany, in Auftria, and near the frontiers of Hungary. It is feated between the rivers Drave and Muhir, in E. long. 17. 19. N. lat. 46. 24.

CZAR, a title of honour, affumed by the grand-dukes, or, as they are now ftyled, emperors of Ruffia. The natives pronounce it *tzar*, or *zaar*; and this, by corruption (it has been fancied), from *Cæfar*, "emperor," from fome imagined relation to the Roman emperors. But this etymology does not feem correct. When the czar Peter formally required of the European courts an acknowledgment of his imperial titles, and that the appellation of *Emperor* fhould never be omitted, there was great difficulty made about it, efpecially at the court of Vienna; which occafioned him to produce the famous letter, written in the German tongue, from Maximilian I. emperor of Germany, to

Vaſſili Ivanovitch, confirming a treaty of alliance offenſive and defenſive againſt Sigiſmond king of Poland. In this diſpatch, which is dated Auguſt the 4th, 1514, and is ratified with the ſeal of the golden bull, Maximilian addreſſes Vaſſili by calling him *Kayſer* and *Herrſcher aller Ruſſen,* "emperor and ruler of all the Ruſſias." But independently of this document, there could be no doubt that the foreign courts, in their intercourſe with that of Moſcow, ſtyled the ſovereigns indiſcriminately *Great Duke, Czar,* and *Emperor.* With reſpect to England in particular, it is certain, that in Chancellor's Account of Ruſſia, ſo early as the middle of the 16th century, Ivan Vaſſilievitch II. is called *Lord and Emperor of all Ruſſia*; and in the Engliſh diſpatches, from the reign of Elizabeth to that of Anne, he is generally addreſſed under the ſame appellation. When the European powers, however, ſtyled the czar *Emperor of Muſcovy,* they by no means intended to give him a title ſimilar to that which was peculiar to the emperor of Germany; but they beſtowed upon him that appellation as upon an Aſiatic ſovereign, in the ſame manner as we now ſay the emperors of China and Japan. When Peter, therefore, determined to aſſume the title of emperor, he found no difficulty in proving that it had been conferred upon his predeceſſors by moſt of the European powers; yet when he was deſirous of affixing to the term the European ſenſe, it was conſidered as an innovation, and was productive of more negotiations than would have been requiſite for the termination of the moſt important ſtate affair. At the ſame time it occaſioned a curious controverſy among the learned, concerning the riſe and progreſs of the titles by which the monarchs of this country have been diſtinguiſhed. From their reſearches it appeared, that the early ſovereigns of Ruſſia were called great duke, and that Vaſſili Ivanovitch was probably the firſt who ſtyled himſelf *tzar,* an expreſſion which in the Sclavonian language ſignifies *king*; and that his ſucceſſors continued to bear within their own dominions that title as the moſt honourable appellation, until Peter the Great firſt took that of *Povelitel,* or emperor. After many delays and objections, the principal courts of Europe conſented, about the year 1722, to addreſs the ſovereign of Ruſſia with the title of Emperor; without prejudice, nevertheleſs, to the other crowned heads of Europe.

CZASLAU, a town of Bohemia, and capital of a circle of the ſame name. Here is the higheſt tower in all Bohemia; and near this place the king of Pruſſia gained a victory over the Auſtrians in 1742. It is ſeated on the river Crudenka, in E. long. 15. 33. N. lat. 49. 50.

CZENSTOKOW, a town of Poland in the palatinate of Cracovia, with a fort, in which they keep a rich treaſure, called "the treaſure of the virgin Mary." The pilgrims flock here ſo much for the ſake of a convent near it, that it is called the *Loretto* of Poland. The town is ſituated on the river Warte. E. long. 19. 15. N. lat. 50. 48.

CZERNIC, a town of Carniola, in Auſtria, ſituated in E. long. 15. 0. N. lat. 46. 12. It is remarkable for its lake, which, when full, abounds with fiſh; and, when dried up, leaves the land exceedingly fertile.

CZERNIKOU, a conſiderable town of Muſcovy, and capital of a duchy of the ſame name, with a caſtle. It is ſeated on the river Dezna, in E. long. 32. 13. N. lat. 51. 20.

CZONGRODT, a town of Upper Hungary, and capital of a territory of the ſame name, at the confluence of the rivers Teiſſe and Keres. E. long. 20. 57. N. lat. 46. 50.

D

D, THE fourth letter of the alphabet, and the third conſonant. Grammarians generally reckon D among the lingual letters, as ſuppoſing the tongue to have the principal ſhare in the pronunciation thereof; though the Abbot de Dangeau ſeems to have reaſon in making it a palate letter. The letter D is the fourth in the Hebrew, Chaldee, Samaritan, Syriac, Greek, and Latin alphabets; in the five firſt of which languages it has the ſame name, though ſomewhat differently ſpoke, *e. g.* in Hebrew, Samaritan, and Chaldee *Daleth,* in Syriac *Doleth,* and in Greek *Delta.*

The form of our D is the ſame with that of the Latins, as appears from all the ancient medals and inſcriptions; and the Latin D is no other than the Greek Δ, rounded a little, by making it quicker and at two ſtrokes. The Δ of the Greeks, again, is borrowed from the ancient character of the Hebrew *Daleth*; which form it ſtill retains, as is ſhown by the Jeſuit Soueiet, in his diſſertation on the Samaritan Medals.

D is alſo a numeral letter, ſignifying *five hundred*; which ariſes hence, that, in the Gothic characters, the D is half the M, which ſignifies a *thouſand.* Hence the verſe, "*Litera* D *velut* A *quingentos ſignificabit.*" A daſh added a-top D̄, denotes it to ſtand for *five thouſand.*

Uſed as an abbreviation, it has various ſignifications: thus D ſtands for Doctor; as, M. D. for Doctor of Medicine; D. T. Doctor of Theology; D. D. implies Doctor of Divinity, or "dono dedit;" D. D. D. is uſed for "dat, dicat, dedicat;" and D. D. D. D. for "dignum Deo donum dedit."

DAB, in ichthyology, the Engliſh name of a ſpecies of PLEURONECTES.

DABUL, a town of Aſia, in the Eaſt-Indies, on the coaſt of Malabar, and to the ſouth of the gulf of Cambaye, on a navigable river. It was formerly very flouriſhing, but is now much decayed. It belongs to the Portugueſe, and its trade conſiſts principally in pepper and ſalt. E. long. 73. 55. N. lat. 17. 30.

DACCA, a town of Aſia, in the kingdom of Bengal in the Eaſt Indies, ſituated in E. long. 89. 10. N. lat. 24. 0.—The advantages of the ſituation of this place, and the fertility of the ſoil round it, have long ſince made it the centre of an extenſive commerce.

DACE, in ichthyology, a ſpecies of *Cyprinus.* See BARBEL. This fiſh is extremely common in our rivers, and affords the expert angler great diverſion. The dace will bite at any fly; but he is more than ordinarily fond of the ſtone caddis, or May-fly, which is plentiful in the latter end of April and the whole month of May. Great quantities of theſe may be gathered among the reeds of ſedges by the water-ſide; and on the hawthorn buſhes near the waters. Theſe are a large and handſome bait; but as they only laſt a ſmall part of the year in ſeaſon, recourſe is to be had to the ant-fly. Of theſe the black ones found in large mole hills or ant-hills are the beſt. Theſe may be kept alive a long time in a bottle, with a little of the earth of the hill, and ſome roots of graſs; and they are in ſeaſon throughout the months of June, July, Auguſt, and September. The beſt ſeaſon of all is when they ſwarm, which is in the end of July or beginning of Auguſt; and they may be kept many months in a veſſel waſhed out with a ſolution of honey in water, even longer than with the earth and graſs-roots in the vial; though that is the moſt convenient method with a ſmall parcel taken for one day's fiſhing. In warm weather this fiſh very ſeldom refuſes a fly at the top of the water; but at other times

he muft have the bait funk to within three inches of the bottom. The winter fifhing for dace requires a very different bait: this is a white maggot with a reddifh head, which is the produce of the eggs of the beetle, and is turned up with the plough in great abundance. A parcel of thefe put in any veffel, with the earth they were taken in, will keep many months, and are an excellent bait. Small dace may be put into a glafs jar with frefh water; and there preferved alive for a long time, if the water is properly changed. They have been obferved to eat nothing but the animalcula of the water. They will grow very tame by degrees.

DACHAW, a town of Bavaria in Germany. It is pretty large, well built, and feated on a mountain, near the river Amber. Here the elector has a palace and fine gardens. E. long. 11. 30. N. lat. 48. 20.

DACIER, (Andrew), was born in 1651, at Caftres in Upper Languedoc, in France, had a great genius and inclination for learning, and ftudied at Saumur under Tannegui le Fevre, then engaged in the inftruction of his daughter, who proved afterwards an honour to her fex. This gave rife to a mutual tendernefs which a marriage of 40 years could never weaken in them. The duke of Montaufier hearing of his merit, put him in the lift of commentators for the ufe of the dauphin, and engaged him in an edition of Pompeius Feftus, which he publifhed in 1681. His edition of Horace printed at Paris in ten vols. 12mo. and his other works, raifed him a great reputation. He was made a member of the academy of infcriptions in 1695. When the hiftory of Louis XIV. by medals was finifhed, he was chofen to prefent it to his Majefty; who being informed of the pains which he had taken in it, fettled upon him a penfion of 2000 livres, and appointed him keeper of the books of the king's clofet in the Louvre. When that poft was united to that of library-keeper to the king, he was not only continued in the privileges of his place during life, but the reverfion was granted to his wife, a favour of which there had been no inftance before. But the death of Madam Dacier in 1720 rendered this grant, which was fo honourable to her, ineffectual. He died, September 18, 1722, of an ulcer in the throat. In his manners, fentiments, and the whole of his conduct, he was a complete model of that ancient philofophy of which he was fo great an admirer, and which he improved by the rules and principles of Chriftianity.

Dacier (Anne), a noted writer, daughter of Tannegui le Fevre, profeffor of Greek at Saumur in France. She early fhowed a fine genius, which her father cultivated with great care and fatisfaction. Madam Dacier was in a very infirm ftate of health the two laft years of her life; and died, after a very painful ficknefs, Auguft 17, 1720, aged 69. She was remarkable for her firmnefs, generofity, equality of temper, and piety.

DACTYL, *dactylus*, a foot in the Latin and Greek poetry, confifting of a long fyllable, followed by two fhort ones: as *cārmĭnă*. Some fay it is derived from δακτυλος, "a finger," becaufe it is divided into three joints, the firft of which is longer than the other two. The dactyl is faid to have been the invention of Dionyfius or Bacchus, who delivered oracles in this meafure at Delphos, before Apollo. The Greeks call it πολιτικος. The dactyl and fpondee are the moft confiderable of the poetical feet; as being the meafures ufed in heroic verfe by Homer, Virgil, &c. Thefe two are of equal time, but not equal motion. The fpondee has an even, ftrong, and fteady pace, like a trot: the dactyl refembles the nimbler ftrokes of a gallop.

Dactylus was alfo a fort of dance among the ancient Greeks, chiefly performed, Hefychius obferves, by the athletæ.

Dactyls alfo denote the fruit of the palm-tree, more ufually called *dates*.

DACTYLI IDÆI; the *Fingers of Mount Ida*. Concerning thefe, Pagan theology and fable give very different accounts The Cretans paid divine worfhip to them, as thofe who had nurfed and brought up the god Jupiter; whence it appears, that they were the fame as the Corybantes and Curetes. Neverthelefs Strabo makes them different; and fays, that the tradition in Phrygia was, that "the Curetes and Corybantes were defcended from the Dactyli Idæi: that there were originally an hundred men in the ifland, who were called *Dactyli Idæi*; from whom fprang nine Curetes, and each of thefe nine produced ten men, as many as the fingers of a man's two hands; and this gave the name to the anceftors of the Dactyli Idæi." Diomedes the grammarian fays the Dactyli Idæi were priefts of the goddefs Cybele; called *Idæi*, becaufe the goddefs was chiefly worfhipped on mount Ida in Phrygia; and *Dactyli*, becaufe that, to prevent Saturn from hearing the cries of infant Jupiter, whom Cybele had committed to their cuftody, they ufed to fing certain verfes of their own invention, in the dactylic meafure. See Curetes and Corybantes.

DACTYLIC, fomething that has a relation to dactyls. Anciently there were dactylic as well as fpondaic flutes, *tibiæ dactylicæ*. The dactylic flutes confifted of unequal intervals; as the dactylic foot does of unequal meafures.

Dactylic *Verfes* are hexameter verfes, ending in a dactyl inftead of a fpondee; as fpondaic verfes are thofe which have a fpondee in the fifth foot inftead of a dactyl. An inftance of a dactylic verfe we have in Virgil;

> *Bis patriæ cecidere manus: quin protinus omnia*
> *Perlegerent oculis.*——Æn. vi. 33.

DACTYLIOMANCY, Dactyliomantia, a fort of divination performed by means of a ring. The word is compofed of the Greek δακτυλιος, "ring," of δακτυλος, "finger," and μαντεια, "divination." Dactyliomancy confifted principally in holding a ring, fufpended by a fine thread, over a round table, on the edge whereof were made divers marks with the twenty-four letters of the alphabet. The ring in fhaking, or vibrating over the table, ftopped over certain of the letters, which being joined together, compofed the anfwer required. But the operation was preceded and accompanied by feveral fuperftitious ceremonies; for firft the ring was to be confecrated with a great deal of myftery: the perfon who held it was to be clad in linen garments to the very fhoes; his head was to be fhaved all round; and in his hand he was to hold vervain. And before he proceeded on any thing, the gods were firft to be appeafed by a formulary of prayers, &c. Ammianus Marcellinus gives the procefs at large in his 29th book.

DACTYLIS, Cock's-foot grass; a genus of the digynia order, belonging to the triandria clafs of plants; and in the natural method ranking under the 4th order, *Gramina*. The calyx is bivalved and compreffed, with the one valve longer than the other, carinated, or having the rachis prominent and fharp. There are two fpecies, the *cynofuroides*, or fmooth cock's-foot grafs, and the *glomeratus*, or rough cock's-foot grafs. Both are natives of Britain; the firft grows on marfhy places, and the latter is common in meadows and pafture-grounds. This laft is eaten by horfes, fheep, and goats; but refufed by cows.

DACTYLUS, in zoology, a name given by Pliny to the Pholas.

DADUCHI, in antiquity, priefts of Ceres. That goddefs having loft her daughter Proferpine, fay mythologifts, began to fearch for her at the beginning of the night. In order to do this in the dark, fhe lighted a torch, and thus fet forth on her travels throughout the world: for which reafon it is that fhe is always reprefented with a lighted torch in her hand. On this account, and in commemoration of this pretended exploit, it became a cuftom for the priefts, at the feafts and facrifices of

this goddefs, to run about in the temple, with torches after this manner; one of them took a lighted torch from off the altar, and holding it with his hand, ran with it to a certain part of the temple, where he gave it to another, faying to him, *Tibi trado:* this fecond ran after the like manner to another part of the temple, and gave it to the third, and fo of the reft. From this ceremony the priefts became denominated *daduchi*, δαδουχοι, q. d. "torch-bearers;" from δας, "an unctuous refinous wood, as pine, fir, &c." whereof the ancients made torches; and εχω, "I have, I hold."—The Athenians alfo gave the name *daduchus* to the high-prieft of Hercules.

DÆDALA, a mountain and city of Lycia, where Dædalus was buried, according to Pliny. Alfo two feftivals in Bœotia, fo called; one of them obferved at Alalcomenos by the Platæans in a large grove, where they expofed in the open air pieces of boiled flefh, and carefully obferved whither the crows that came to prey upon them directed their flight. All the trees upon which any of thefe birds alighted were immediately cut down, and with them ftatues were made, called *Dædala*, in honour of Dædalus. The other feftival was of a more folemn kind. It was celebrated every 60 years by all the cities of Bœotia, as a compenfation for the intermiffion of the fmaller feftivals, for that number of years, during the exile of the Platæans.

DÆDALUS, an Athenian, fon of Eupalamus, defcended from Erichtheus king of Athens. He was the moft ingenious artift of his age; and to him we are indebted for the invention of the wedge, and many other mechanical inftruments, and the fails of fhips. He made ftatues which moved of themfelves, and feemed to be endowed with life. Talus his fifter's fon promifed to be as great as himfelf by the ingenuity of his inventions; and therefore from envy he threw him down from a window and killed him. After the murder of this youth, Dædalus, with his fon Icarus, fled from Athens to Crete, where Minos king of the country gave him a cordial reception. Dædalus made a famous labyrinth for Minos, and affifted Pafiphae the queen to gratify her unnatural paffion for a bull. For this action Dædalus incurred the difpleafure of Minos, who ordered him to be confined in the labyrinth which he had conftructed. Here he made himfelf wings with feathers and wax, and carefully fitted them to his body and that of his fon, who was the companion of his confinement. They took their flight in the air from Crete: but the heat of the fun melted the wax on the wings of Icarus, whofe flight was too high, and he fell into that part of the ocean which from him has been called the *Icarian Sea*. The father, by a proper management of his wings, alighted at Cumae, where he built a temple to Apollo, and thence directed his courfe to Sicily, where he was kindly received by Cocalus, who reigned over part of the country. He left many monuments of his ingenuity in Sicily, which ftill exifted in the age of Diodorus Siculus. He was difpatched by Cocalus, who was afraid of the power of Minos, who had declared war againft him becaufe he had given an afylum to Dædalus. The flight of Dædalus from Crete with wings is explained by obferving that he was the inventor of fails, which in his age might pafs at a diftance for wings. He lived 1400 years before the Chriftian era. There were two ftatuaries of the fame name; one of Scyon fon of Patroclus; the other a native of Bithynia.

DÆMON, Δαιμων, a name given by the ancients to certain fpirits or genii, which they fay appeared to men, either to do them fervice or to hurt them. According to the philofophers, dæmons held a middle rank between the celeftial gods and men on earth, and carried on all intercourfe between them; conveying the addreffes of men to the gods, and the divine benefits to men. It was the opinion of many, that the celeftial divinities did not themfelves interpofe in human affairs, but committed the intire adminiftration of the government of this lower world to thefe fubaltern deities.

Several of the heathen philofophers held that there were different kinds of dæmons; that fome of them were fpiritual fubftances of a more noble origin than the human race, and that others had once been men. But thofe dæmons who were the more immediate objects of the eftablifhed worfhip amongft the ancient nations were human fpirits, fuch as were believed to become dæmons or deities after their departure from their bodies. Thus, fays Plutarch, "Ifis and Ofiris were, for their virtue, changed from good dæmons into gods, as were Hercules and Bacchus afterwards, receiving the united honours both of gods and dæmons." Hefiod, and other poets who have recorded the ancient hiftory or traditions on which the public faith and worfhip were founded, affert, that the men of the golden age, who were fuppofed to be very good, became dæmons after death, and difpenfers of good things to mankind.

Though *dæmon* is often ufed in a general fenfe as equivalent to a *deity*, and is accordingly applied to *fate* or *fortune*, or whatever elfe was regarded as a god; yet thofe dæmons who were the more immediate objects of divine worfhip amongft the heathens, were human fpirits; as is fhown in Farmer on Miracles, chap. iii. fect. 2.

The word *dæmon* is ufed indifferently in a good and a bad fenfe. In the former fenfe, it was very commonly ufed among the ancient heathens. But it has been generally thought, that by *dæmons* we are to underftand *devils*, in the Septuagint verfion of the Old Teftament. Others think the word is in that verfion certainly applied to the ghofts of fuch dead men as the heathens deified, in Deut. xxxii. 17. Pf. cvi. 37. That *dæmon* often bears the fame meaning in the New Teftament, and particularly in Acts xvii. 18. 1 Cor. x. 21. 1 Tim. iv. 1. Rev. ix. 13. is fhown at large by Mr. Jofeph Mede. (Works, p. 623, *et feq.*) That the word is applied *always* to human fpirits in the New Teftament, Mr. Farmer has attempted to fhow in his Effay on Dæmoniacs, p. 208, *et feq.*

Different orders of dæmons had different ftations and employments affigned them by the ancients. Good dæmons were confidered as the authors of good to mankind; evil dæmons brought innumerable evils both upon men and beafts. Amongft evil dæmons there was a great diftinction with refpect to the offices affigned them; fome compelled men to wickednefs, others ftimulated them to madnefs. See DÆMONIAC.

DÆMONIAC, from *dæmon*, a human being whofe volition and other mental faculties are overpowered and reftrained, and his body poffeffed and actuated by fome creafed fpiritual being of fuperior power. Such feems to be the determinate fenfe of the word; but it is difputed whether any of mankind ever were in this unfortunate condition. Be this as it may, it is generally agreed, that neither good nor evil fpirits are known to exert fuch authority at prefent over the human race: but in the ancient heathen world, and among the Jews, particularly in the days of our Saviour, evil fpirits at leaft are thought by many to have exifted.

The Greeks and Romans imagined, that their deities, to reveal future events, frequently entered into the prophet or prophetefs who was confulted, overpowered their faculties, and uttered refponfes with their organs of fpeech. Apollo was believed to enter into the Pythonefs, and to dictate the prophetic anfwers received by thofe who confulted her. Other oracles befides that of Delphi were fuppofed to unfold futurity by the fame machinery. And in various other cafes, either malignant dæmons or benevolent deities were thought to enter into and to actuate human beings. The *Lymphatici*, the *Cerriti*, the *Larvati*, of the Romans, were all of this defcription; and the Greeks, by the ufe of the word δαιμονιζομενοι, fhow that they referred to this caufe the origin of madnefs. Among the ancient heathens,

therefore, it appears to have been a generally received opinion, that ſuperior beings entered occaſionally into men, overpowered the faculties of their minds, and actuated their bodily organs.

DÆMONIACS, in church-hiſtory, a branch of the Anabaptiſts; whoſe diſtinguiſhing tenet is, that the devils ſhall be ſaved at the end of the world.

DAFFODIL. See NARCISSUS.

DAGNO, a town of Turky in Europe, in Albania, with a biſhop's ſee. It is the capital of the diſtrict of Ducagini, and is ſeated on the rivers Drino and Nero, near their confluence. It is 15 miles ſouth-eaſt of Scutari, and 15 north-eaſt of Aleſſio. E. long. 19. 48. N. lat. 42. 0.

DAGO, or DAGHO, an iſland in the Baltic Sea, on the coaſt of Livonia, between the gulf of Finland and Riga. It is of a triangular figure, and may be about 20 miles in circumference. It has nothing conſiderable but two caſtles, called *Dagger-wort* and *Paden*. E. long. 22. 30. N. lat. 58. 48.

DAGON, the falſe god of Aſhdod, or, as the Greeks call it, *Azotus*. He is commonly repreſented as a monſter, half man and half fiſh; whence moſt learned men derive his name from the Hebrew *dag*, which ſignifies "a fiſh." Thoſe who make him to have been the inventor of *bread-corn*, derive his name from the Hebrew *Dagan*, which ſignifies *frumentum*; whence Philo Biblius calls him Ζευς Αροτριος, *Jupiter Aratrius*. This deity continued to have a temple at Aſhdod during all the ages of idolatry to the time of the Maccabees; for the author of the firſt book of Maccabees tells us, that "Jonathan, one of the Maccabees, having beaten the army of Apollonius, Demetrius's general, they fled to Azotus, and entered into Bethdagon (the temple of their idol); but that Jonathan ſet fire to Azotus, and burnt the temple of Dagon and all thoſe who had fled into it." Dagon, according to ſome, was the ſame with Jupiter; according to others, Saturn; according to others, Venus; and according to moſt, Neptune.

DAHGESTAN, a country of Aſia, bounded by Circaſſia on the north, by the Caſpian Sea on the eaſt, by Chirvein a province of Perſia on the ſouth, and by Georgia on the weſt. Its chief towns are Tarku and Derbent, both ſituated on the Caſpian Sea.

DAHOME, a kingdom of Africa, on the coaſt of Guinea, to the north of Whidah, or Fida. The king of this country conquered Whidah, and very much diſturbed the ſlave trade of the Europeans.

DAIRI, or DAIRO, in the hiſtory of Japan, is the ſovereign pontiff of the Japaneſe; or, according to Kæmpfer, the hereditary eccleſiaſtical monarch of Japan. In effect, the empire of Japan is at preſent under two ſovereigns, viz. an eccleſiaſtical one called the *dairo*, and the ſecular one who bears the title of *kubo*. The laſt is the emperor, and the former the oracle of the religion of the country.

DAIRY, in rural affairs, a place appropriated for the management of milk, and the making of butter, cheeſe, &c. See BUTTER, CHEESE, &c. The dairy-houſe ſhould always be in the neateſt order, and ſo ſituated that the windows or lattices never front the ſouth, ſouth-eaſt, or ſouth-weſt. Lattices are alſo to be preferred to windows, as they admit a more free circulation of air than glazed lights can poſſibly do. It has been objected, that they admit cold air in winter and the ſun in ſummer; but the remedy is eaſily obtained, by making a frame the ſize or ſomewhat larger than the lattice, and conſtructing it ſo as to ſlide backward and forward at pleaſure. Packthread ſtrained acroſs this frame, and oiled cap paper paſted thereon, will admit the light, and keep out the ſun and wind. It is hardly poſſible in the ſummer to keep a dairy-houſe too cool; on which account none ſhould be ſituated far from a good ſpring or current of water. They ſhould be neatly paved either with red brick or ſmooth hard ſtone; and laid with a proper deſcent, ſo that no water may lodge. This pavement ſhould be well waſhed in the ſummer every day, and all the utenſils belonging to the dairy kept perfectly clean. Nor ſhould we ever ſuffer the churns to be ſcalded in the dairy, as the ſteam that ariſes from hot water will injure the milk. Nor ſhould cheeſe be kept therein, nor rennet for making cheeſe, nor a cheeſe-preſs be fixed in a dairy, as the whey and curd will diffuſe their acidity throughout the room. The proper receptacles for milk are earthen pans, or wooden vats or trundles; but none of the latter ſhould be lined with lead, as that imparts a poiſonous quality to the milk.

DAKIR, in our ſtatutes, is uſed for the twentieth part of a laſt of hides. According to the ſtatute of 51 Hen. III. *De compoſitione ponderum & menſurarum*, a laſt of hides conſiſts of twenty dakirs, and every dakir of ten hides. But by 1 Jac. cap. 33. one laſt of hides or ſkins is twelve dozen. See DICKER.

DAIS, in botany; a genus of the monogynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 31ſt order, *Vepreculæ*. The involucrum is tetraphyllous; the corolla quadrifid or quinquefid; the fruit a monoſpermous berry.

DAISY. See BELLIS.

DALACA, an iſland of the Red Sea, over-againſt the coaſt of Abex, about 72 miles in length and 15 in breadth. It is very fertile, populous, and remarkable for a pearl fiſhery. The inhabitants are negroes, and great enemies to the Mahometans. There is a town of the ſame name ſeated over againſt Abaſſia.

DALBERGIA, in botany; a genus of the octandria order, belonging to the diadelphia claſs of plants. There are two filaments or ſtamina quadrifid at top. The fruit is pedicellated, not gaping, leguminous, membrano-compreſſed, and bearing ſeeds.

DALEA, a province of Sweden, bounded on the north by Dalecarlia, on the eaſt by the Wermerland and the lake Wener, on the ſouth by Gothland, and on the north by Norway and the ſea.

DALEBURG, a town in Sweden, and capital of the province of Dalia, ſeated on the weſtern bank of the lake Wener, 50 miles north of Gottenburg. E. long. 13. 0. N. lat. 59. 0.

DALECARLIA, a province in Sweden, ſo called from a river of the ſame name, on which it lies, near Norway. It is divided into three parts, which they call *valleys*; and is about 175 miles in length and 100 in breadth. It is full of mountains, which abound in mines of copper and iron, ſome of which are of a prodigious depth. The towns are very ſmall, and Idra is the capital. The inhabitants are rough, robuſt, and warlike: and all the great revolutions in Sweden had their riſe in this province. The river riſes in the Doſrine mountains, and, running ſouth-eaſt through the province, falls into the gulph of Bothnia.

DALECHAMP (James), a phyſician in Normandy, in the 16th century, wrote a Hiſtory of Plants, and was well ſkilled in polite learning. He wrote notes on Pliny's Natural Hiſtory, and tranſlated Athenæus into Latin. He practiſed phyſic at Lyons from 1552 to 1558, when he died, aged 75.

DALECHAMPIA, in botany; a genus of the adelphia order, belonging to the monœcia claſs of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The involucrum of the male is common and quadripartite; the calyces hexaphyllous; corolla none; the nectarium laminated or ſcaly; the ſtamina monodelphous or coalited at the baſe, and polyandrous or numerous. The female involucrum is common and triphyllous; corolla none; ſtyle one; the capſule tricoccous.—There is but one ſpecies, viz. the ſcandens, a native of Jamaica. It is a climbing plant, which riſes to a conſiderable height; and is remarkable for nothing but having its leaves

armed with briftly hairs, which fting the hands of thofe who unwarily touch them;

DALEM, a town of the United Provinces, and capital of a diftrict of the fame name. It is feated on the river Bervine, five miles north-eaft of Liege. E. long. 5. 59. N. lat. 50. 40.

D'ALEMBERT. See ALEMBERT.

DALEN (Cornelius Van), an eminent engraver, who flourifhed about the year 1640. He was a native of Holland; but under what mafter he learned the art of engraving, is uncertain. It is difficult to form a proper judgment of his merit; for fometimes his prints refemble thofe of Cornelius Vifscher, of Lucas Vofterman, of P. Pontius, of Bolfwert, and other mafters. A fet of antique ftatues, engraved by him, are in a bold, free ftyle, as if founded upon that of Goltzius; others, again, feem imitations of that of Francis Poilly. In all thefe different manners he has fucceeded; and they plainly manifeft the great command he had with his graver, for he worked with that inftrument only. He engraved a great variety of portraits, fome of which are very valuable, and form the beft as well as the larger part of his works.

DALKEITH, a town of Scotland, in Mid-Lothian, fix miles fouth-eaft of Edinburgh. W. long. 2. 20. N. lat. 55. 50.

DALMATIA, a province of Europe, bounded on the north by Bofnia, on the fouth by the gulph of Venice, on the eaft by Servia, and on the weft by Morlachia. Spalatro is the capital of that part belonging to the Venetians; and Raguza, of a republic of that name; the Turks have a third, whofe capital is Herzegovina. The air is wholefome, and the foil fruitful; and it abounds in wine, corn, and oil.

DALTON, a town in Lancafhire, with a market on Saturday. It is feated on the fpringhead of a river, in a champaign country, not far from the fea; and the ancient caftle is made ufe of to keep the records and prifoners for debt in the liberty of Furnefs. It is 16 miles N. W. of Lancafter, and 273 N. N. W. of London. W. long. 3. 18. N. lat. 54. 14.

DALTON (John), D. D. an eminent divine and poet, was the fon of the Rev. Mr. John Dalton, rector of Dean near Whitehaven, in Cumberland, where he was born in 1709. He was educated at Queen's College, Oxford; and became tutor or governor to the Lord Beauchamp, only fon of the Earl of Hertford, late Duke of Somerfet; during which time he adapted Milton's admirable Mafk of Comus to the ftage, by a judicious infertion of feveral fongs and different paffages felected from other of Milton's works, as well as of feveral fongs and other elegant additions of his own, fuited to the characters and to the manner of the original author. During the run of this piece he induftrioufly fought out a grand-daughter of Milton's, oppreffed both by age and poverty; and procured her a benefit from it, the profits of which amounted to a very confiderable fum. He was promoted by the king to a prebend of Worcefter; where he died on the 22d of July, 1763. Befides the above, he wrote a defcriptive poem, addreffed to two ladies at their return from viewing the coal-mines near Whitehaven; and Remarks on 12 hiftorical defigns of Raphael, and the *Mufeum Græcum & Egyptiacum*.

DAM, a boundary or confinement, as to *dam* up or *dam* out: *Infra damnum fuum*, within the bounds or limits of his own property or jurifdiction.

DAMA, in zoology. See CERVUS.

DAMAGE, in law, is generally underftood of a hurt or hindrance attending a perfon's eftate: but, in common law, it is a part of what the jurors are to inquire of in giving verdict for the plaintiff or defendant in a civil action, whether real or perfonal; for after giving verdict on the principal caufe, they are likewife afked their confciences touching cofts and damages, which contain the hindrances that one party hath fuffered from the wrong done him by the other. See COSTS.

DAMAN, a maritime town of the Eaft Indies, at the entrance into the gulph of Cambay. It is divided by the river Daman into two parts; one of which is called *New Daman*, and is a handfome town, well fortified, and defended by a good Portuguefe garrifon. The other is called *Old Daman*, and is very ill built. There is a harbour between the two towns, defended by a fort. It was taken by the Portuguefe in 1535. The Mogul has attempted to get poffeffion of it feveral times, but always without effect. E. lon. 72. 35. N. lat. 21. 5.

DAMASCUS, now called SHAM, a town of Syria, in Afiatic Turkey; a very ancient place, and had once three walls, which are almoft entirely ruined; and of the feveral fuburbs which it formerly had, there remains only one, which extends three miles in length from N. to W. The form of this town is an exact fquare, each fide being a mile and a half long. The extraordinary beauty of this place is owing to feveral ftreams which run acrofs the plain of Damafcus, and water all the gardens, fupply the public fountains, and run into every houfe. The moft remarkable things are the caravanfaries, which confift of long galleries, fupported by marble pillars, and furrounding a large fquare court. There is a mofque belonging to one, which is very handfome, and adorned in the infide with columns of curious marble. The caftle is like a little town, having its own ftreets and houfes, and the famous Damafcus fteel was kept here in a magazine. The houfes of this place are built of wood, with their fronts backward, and within is a court. In the ftreets there is nothing to be feen but walls without windows, and yet the infides are richly adorned. The mofques are the handfomeft buildings, of which there are about 200, the moft ftately of which was a Chriftian church. The only thing befide this, worth notice, is the ftraight ftreet which runs acrofs the city and fuburbs in a direct line; on each fide there are fhops, where all forts of rich merchandife are fold. The gardens are always extremely handfome; and they have feveral manufactures, among which that of fabres and knives has been moft famous. It is an archbifhop's fee, and contains great numbers of Chriftians and Jews. It ftands on the river Barida, in a very fertile plain, 112 miles S. of Antioch, and 112 N. of Jerufalem. E. lon. 0. 37. N. lat. 33. 45.

DAMASCUS *Steel*. See DAMASK.

DAMASK, a fort of filken ftuff, having fome parts raifed above the ground, reprefenting flowers or other figures. Damafk fhould be of dreffed filks, both of warp and woof. It has its name from its being originally brought from Damafcus in Syria. There is alfo a ftuff made in France called the *caffart damafk*, made in imitation of the true damafk, having woof of hair, coarfe filk, thread, wool, or cotton. Some have the warp of filk and the woof of thread; others are all thread or all wool. DAMASK is alfo a kind of wrought linen, made in Flanders, fo called, becaufe its large flowers refemble thofe of damafks. It is chiefly ufed for tables; a table-cloth and a dozen of napkins are called a *damafk-fervice*.

DAMASK is alfo applied to a very fine fteel, in fome parts of the Levant, chiefly at Damafcus in Syria; whence its name. It is ufed for fword and cutlafs blades, and is finely tempered.

DAMASKEENING, or DAMASKING, the art or operation of beautifying iron, fteel, &c. by making incifions therein, and filling them up with gold or filver wire: chiefly ufed for adorning fword-blades, guards and gripes, locks of piftols, &c. Damafkeening partakes of the mofaic, of engraving, and of carving: like the mofaic, it is inlaid work; like engraving, it cuts the metal, reprefenting divers figures; and, as in chafing, gold and filver is wrought in relievo. There are two ways of damafking:

the one, which is the fineft, is when the metal is cut deep with proper inftruments, and inlaid with gold and filver wire: the other is fuperficial only.

DAMELOPRE, a kind of bilander, ufed in Holland for conveying merchandife from one canal to another; being very commodious for paffing under the bridges.

DAMIANISTS, in church-hiftory, a branch of the ancient acephali-feveritæ. They agreed with the catholics in admitting the VIth council, but difowned any diftinction of perfons in the Godhead; and profeffed one fingle nature, incapable of any difference: yet they called God "the Father, Son, and Holy Ghoft."

DAMIETTA, an ancient and celebrated town of Africa, in Egypt, feated at one of the eaftern mouths of the Nile, with a good harbour, and a Greek archbifhop's fee. It is one of the richeft places in Egypt, 100 miles N. of Cairo.

DAMNII, anciently a people of Britain; fituated between the Selgovæ to the fouth and the Caledonii to the north. Now *Clydefdale*.

DAMNONII. See DANMONII.

DAMOCLES, one of the flatterers of Dionyfius the Elder of Sicily. He admired the tyrant's wealth, and pronounced him the happieft man on earth. Dionyfius prevailed upon him to undertake for a while the charge of royalty, and be convinced of the happinefs which a fovereign enjoyed. Damocles afcended the throne, and while he gazed upon the wealth and fplendor that furrounded him, he perceived a fword hanging over his head by a horfe-hair. This fo terrified him, that all his imaginary felicity vanifhed at once, and he begged Dionyfius to remove him from a fituation which expofed his life to fuch fears and dangers.

DAMON, the name of feveral illuftrious ancients; particularly of a Pythagorean philofopher very intimate with Pythias. When he had been condemned to death by Dionyfius, he obtained from the tyrant leave to go and fettle his domeftic affairs, on promife of returning at a ftated hour to the place of execution. Pythias pledged himfelf to undergo the punifhment which was to be inflicted on Damon, fhould he not return in time, and he confequently delivered himfelf into the hands of the tyrant. Damon returned at the appointed moment; and Dionyfius was fo ftruck with the fidelity of thofe two friends, that he remitted the punifhment, and entreated them to permit him to fhare their friendfhip and enjoy their confidence.

DAMPIER (William), a famous navigator, defcended from a good family in Somerfetfhire in England, was born in 1652. Lofing his father when very young, he was fent to the fea, where he foon diftinguifhed himfelf, particularly in the South Seas. His voyage round the world is well known, and has gone through many editions. He appears afterwards to have engaged in an expedition concerted by the merchants of Briftol to the South Sea, commanded by Captain Woods Rogers; who failed in Auguft 1708, and returned by September 1711: but we have no further particulars of his life or death.

DAMPS, in natural hiftory (from the Saxon word *damp*, fignifying vapour or exhalation), are certain noxious exhalations iffuing from fome parts of the earth, and which prove almoft inftantly fatal to thofe who breathe them. Thefe damps are chiefly obferved in mines and coal-pits: though vapours of the fame kind often iffue from old lavas of burning mountains; and, in thofe countries where volcanoes are common, will frequently enter houfes, and kill people fuddenly without the leaft warning of their approach. In mines and coal-pits they are chiefly of two kinds, called by the miners and colliers the *choke* and *fire damps*; and both go under one general name of *foul air*. The *choke damp* is very much of the nature of fixed air; and ufually infefts thofe places which have been formerly worked, but long neglected, and are known to the miners by the name of *waftes*. No place, however, can be reckoned fafe from this kind of damp, except where there is a due circulation of air; and the procuring of this is the only proper means of preventing accidents from damps of all kinds. The choke-damp fuffocates the miners fuddenly, with all the appearances found in thofe that are fuffocated by fixed air. Being heavy, it defcends towards the loweft parts of the workings, and thus is dangerous to the miners, who can fcarce avoid breathing it. The *fire-damp*, which feems chiefly to be compofed of inflammable air, rifes to the roof of the workings, as being fpecifically lighter than the common atmofphere; and hence, though it will fuffocate as well as the other, it feldom proves fo dangerous in this way as by its inflammable property, by which it often takes fire from the candles, and explodes with great violence.

In the Phil. Tranf. No. 119, there is an account of fome explofions by damps of this kind, on which we have the following obfervations: 1. Thofe who are in the place where the vapour is fired, fuddenly find themfelves furrounded with flames, but hear little or no noife; though thofe who are in places adjacent, or above ground, hear a very great one. 2. Thofe who are furrounded by the inflamed vapour feel themfelves fcorched or burnt, but are not moved out of their places, though fuch as unhappily ftand in the way of it are commonly killed by the violence of the fhock, and often thrown with great force out at the mouth of the pit; nor are the heavieft machines found able to refift the impetuofity of the blaft. 3. No fmell is perceived before the fire, but a very ftrong one of brimftone is afterwards felt. 4. The vapour lies towards the roof, and is not perceived if the candles are held low; but when thefe are held higher, the damp defcends like a black mift, and catches hold of the flame, lengthening it to two or three handfuls; and this appearance ceafes when the candles are held nearer the ground. 5. The flame continues in the vault for feveral minutes after the crack. 6. Its colour is blue, fomething inclining to green, and very bright. 7. On the explofion of the vapour, a dark fmoke like that proceeding from fired gunpowder is perceived. 8. Damps are generally obferved to come about the latter end of May, and to continue during the heat of fummer. They return feveral times during the fummer feafon, but obferve no certain rule.

With regard to the formation of damps we have as yet no certain theory; nor, though the experiments of aerologifts are abundantly able to fhow the compofition and manner of forming thefe noxious airs artificially, have they yet thrown much light on the method by which nature prepares them on a large fcale.

A much more important confideration, however, is the proper method of avoiding their pernicious effects. The inflammability of one kind affords an eafy method of preventing it from accumulating, viz. by fetting fire to it. This may be done with fafety, unlefs it has been fuffered to go too far before the experiment is made: for the inflammable air being much lighter than any other kind, will naturally rife to the top; fo that a man, lying flat on the ground to avoid the force of the explofion, and holding up a lighted candle fixed upon a pole, may at once free the mine from fuch a troublefome gueft. But where it has been allowed to accumulate in too great quantity, fo that this method cannot be ufed, or in the other kind, which is not inflammable, the method commonly practifed is to produce a conftant circulation of air as much as poffible through all parts of the mine. To procure this, they make a perpendicular opening, which they call a *fhank* or *fhaft*, fo that the mine may have two or more openings: and thus by reafon of the difference of temperature between the open atmofphere and that in the

mine, there is a continual draught of air through them both. This current will always be ſtronger in proportion to the difference between the external atmoſphere and that of the mine; and likewiſe in proportion to the difference between the depth of the two ſhafts. See the article COALERY. But as the temperature of the atmoſphere is variable, it happens, at certain ſeaſons of the year, that there is not a ſufficient difference between that of the atmoſphere and in the mine to produce the neceſſary circulation. This happens principally in the ſpring and autumn; at which ſeaſons it is neceſſary to light fires in the ſhafts, which are always efficacious for the purpoſe deſired.

Among the other uſes to which dephlogiſticated air might be applied, Mr. Cavallo reckons that of ſecuring people from the dangerous effects of damps in mines, and other ſubterraneous places. "If a large bladder," ſays he, "into which a ſolution of lime in water is introduced, be filled with dephlogiſticated air, and a ſmall wooden or glaſs pipe be adapted to its neck, a man may hold that pipe in his mouth, and may breathe the dephlogiſticated air; and thus equipped, he may venture into theſe ſubterranean places, amidſt the various elaſtic fluids contained in them. A large bladder of dephlogiſticated air will ſerve for above a quarter of an hour, which is a length of time ſufficient for various purpoſes; beſides, if longer time is required to be ſpent in theſe places, a perſon may have two or more bladders of dephlogiſticated air along with him, and may ſhift as ſoon as the air of one is contaminated. Without the neceſſity of any more complicated apparatus, the bladders full of dephlogiſticated air may be kept ſtopped by putting corks into the glaſs or wooden pipes that are tied to their necks. This air might alſo be uſed for diving-bells." See AEROLOGY.

DAMSEL, from the French *damoiſel* or *damoiſeau*, an appellation anciently given to all young people of either ſex, that were of noble or genteel extraction, as the ſons and daughters of princes, knights, and barons: thus we read of Damſel Pepin, Damſel Louis le Gros, Damſel Richard Prince of Wales. From the ſons of kings this appellation firſt paſſed to thoſe of great lords and barons, and at length to thoſe of gentlemen who were not yet knights. Afterwards, damſel denoted a young maiden, though the term is now in a great meaſure exploded.

DAN, or JOR-DAN, which laſt literally denotes "the river Dan;" ſo named from the people where it has its ſource, which is a lake called *Phiala*, from its round figure, to the north of its apparent riſing from the mountain Panium or Paneum, as was diſcovered by Philip, Tetrarch of Trachonites; for on throwing light bodies into the Phiala, he found them to emerge again at Paneum (Joſephus). From Paneum it runs in a direct courſe to a lake called *Samachonites*, as far as which it is called *Jordan the Leſs*; and thence to the lake Geneſareth, or of Tiberias, where it comes increaſed by the lake Samachonites and its ſprings, and is called the *Greater Jordan*; continuing its direct courſe ſouthwards, till it falls into the Aſphaltites. DAN, the tribe, extended itſelf weſtward of Judah, according to Joſephus, and was terminated by Azotas and Dora on the Mediterranean.

DANAE, in antiquity, a coin ſomewhat more than an obolus, which uſed to be put into the mouths of the dead, to pay their paſſage over the river Acheron.

DANAE, in fabulous hiſtory, was the daughter of Acriſius king of Argos, by Eurydice. She was confined in a brazen tower by her father, who had been told by an oracle that his daughter's ſon would put him to death. His endeavours to prevent Danae from becoming a mother proved fruitleſs; and Jupiter, who was enamoured of her, introduced himſelf to her bed by changing himſelf into a golden ſhower. From his embraces Danae had a ſon, with whom ſhe was expoſed on the ſea by her father.

DANAIDES, in fabulous hiſtory, the fifty daughters of Danaus king of Argos. When their uncle Ægyptus came from Egypt with his fifty ſons, they were promiſed in marriage to their couſins; and before the celebration of their nuptials, Danaus, who had been informed by an oracle that he was to be killed by the hands of one of his ſons-in-law, made his daughters ſolemnly promiſe that they would deſtroy their huſbands. They were provided with daggers by their father; and all except Hypermneſtra ſtained their hands with the blood of their couſins the firſt night of their nuptials; and as a pledge of their obedience to their father's injunctions, they preſented him each with the head of the murdered ſons of Ægyptus. Hypermneſtra was ſummoned to appear before her father, and anſwer for her diſobedience in ſuffering her huſband Lynceus to eſcape; but the unanimous voice of the people declared her innocent, and ſhe dedicated a temple to the goddeſs of Perſuaſion. The ſiſters were purified of this murder by Mercury and Minerva, by order of Jupiter; but, according to the more received opinion, they were condemned to ſevere puniſhment in hell, and were compelled to fill with water a veſſel full of holes, ſo that the water ran out as ſoon as poured into it: and therefore their labour was infinite, and their puniſhment eternal. The heads of the ſons of Ægyptus were buried at Argos; but their bodies were left at Lerna, where the murder had been committed.

DANCE, or DANCING, as at preſent practiſed, may be defined, "an agreeable motion of the body, adjuſted by art to the meaſures or tune of inſtruments, or of the voice." But, according to what ſome reckon more agreeable to the true genius of the art, dancing is "the art of expreſſing the ſentiments of the mind, or the paſſions, by meaſured ſteps or bounds that are made in cadence by regulated motions of the body, and by graceful geſtures; all performed to correſpond with certain muſical ſounds."

There is no account of the origin of the practice of dancing among mankind. It is found to exiſt among all nations whatever, even the moſt rude and barbarous; and, indeed, however much the aſſiſtance of art may be neceſſary to make any one perfect in the practice, the foundation muſt certainly lie in the mechaniſm of the human body itſelf.

The connection that there is between certain ſounds and thoſe motions of the human body called *dancing*, hath ſeldom or never been enquired into by philoſophers, though it is certainly a very curious ſpeculation. The power of certain ſounds not only over the human ſpecies, but even over the inanimate creation, is indeed very ſurpriſing. It is well known, that the moſt ſolid walls, nay the ground itſelf, will be found to ſhake at ſome particular notes in muſic. This ſtrongly indicates the preſence of ſome univerſally diffuſed and exceedingly elaſtic fluid, which is thrown into vibrations by the concuſſions of the atmoſphere upon it, produced by the motion of the ſounding body. If theſe concuſſions are ſo ſtrong as to make the large quantity of elaſtic fluid vibrate that is diſperſed through a ſtone wall or a conſiderable portion of earth, it is no wonder they ſhould have the ſame effect upon the nerves of the human ſubject. Some, however, there are that cannot be affected by the ſounds which affect others, and ſome ſcarce with any; while others have ſuch an irritability of the nerves in this caſe, that they cannot, without the greateſt difficulty, ſit or ſtand ſtill when they hear a favourite piece of muſic played.

It is conjectured by very eminent philoſophers, that all the ſenſations and paſſions to which we are ſubject, do immediately depend upon the vibrations excited in the nerves of the human body. Hence, muſical ſounds have the greateſt power over thoſe people who are of a delicate ſenſible frame, and who have ſtrong paſſions. If it be true, therefore, that every paſſion in the human breaſt immediately depends upon a certain af-

fection of the nervous fyftem, or a certain electric vibration in the nervous fluid, we fhall immediately fee the origin of the different dances among different nations. One kind of vibration, for inftance, raifes the paffions of anger, pride, &c. which are indifpenfably neceffary in warlike nations. The founds, for fuch there are, capable of exciting a fimilar vibration, would naturally conftitute the martial mufic among fuch nations, and dances conformable to it would be inftituted. This appears to be the cafe particularly among barbarous nations, as we fhall prefently have occafion to remark. Other vibrations of the nerves produce the paffions of joy, love, &c.; and founds capable of exciting thefe particular vibrations will immediately be formed into mufic for dancers of another kind.

As barbarous nations are obferved to have the ftrongeft paffions, fo they are alfo obferved to be the moft eafily affected by founds, and the moft addicted to dancing. Sounds to us the moft difagreeable, the drumming with fticks upon an empty cafk, or the noife made by blowing into reeds incapable of yielding one mufical note tolerable to us, is agreeable mufic to them. Much more are they affected by the found of inftruments which have any thing agreeable in them. Mr. Gallini informs us, that "the fpirit of dancing prevails almoft beyond imagination among both men and women in moft parts of Africa. It is even more than inftinct, it is a rage, in fome countries of that part of the globe. Upon the gold coaft efpecially, the inhabitants are fo paffionately fond of it, that in the midft of their hardeft labour, if they hear a perfon fing, or any mufical inftrument played, they cannot refrain from dancing. There are even well attefted ftories of fome negroes flinging themfelves at the feet of an European playing on a fiddle, entreating him to defift, unlefs he had a mind to tire them to death; it being impoffible for them to ceafe dancing while he continued playing." The fame thing is found to take place in America, though, as the inhabitants of that continent are found to be of a more fierce and barbarous nature than the African nations, their dances are ftill more uncouth and barbarous than thofe of the negroes. "In Mexico (fays Gallini) they have alfo their dances and mufic, but in the moft uncouth and barbarous ftyle. For their fymphony they have wooden drums, fomething in form of a kettle-drum, with a kind of pipe or flageolet, made of a hollow cane or reed, but very grating to an European ear. It is obferved they love every thing that makes a noife, how difagreeable foever the found is. They will alfo hum over fomething like a tune when they dance 30 or 40 in a circle, ftretching out their hands, and laying them on each others fhoulders. They ftamp and jump, and ufe the moft antic geftures for feveral hours, till they are heartily weary. And one or two of the company fometimes ftep out of the rings to make fport for the reft, by fhowing feats of activity; throwing their lances up into the air, catching them again; bending backwards, and fpringing forwards with great agility."

The origin of dancing among the Greeks was moft certainly the fame as among all other nations; but as they proceeded a certain length in civilization, their dances were of confequence more regular and agreeable than thofe of the more barbarous nations. They reduced dancing into a kind of regular fyftem; and had dances proper for exciting, by means of the fympathy above mentioned, any paffion whatever in the minds of the beholders. In this way they are faid to have proceeded very great lengths, to us abfolutely incredible. At Athens, it is faid, that the dance of the Eumenides or Furies on the theatre had fo expreffive a character as to ftrike the fpectators with irrefiftible terror: men grown old in the profeffion of arms trembled; the multitude ran out; women with child mifcarried; people imagined they faw in earneft thofe terrible deities commiffioned with the vengeance of heaven to purfue and punifh crimes upon earth.

The Greeks had martial dances, which they reckoned to be very ufeful for keeping up the warlike fpirit of their youth; but the Romans, though equally warlike with the Greeks, never had any thing of the kind. This probably may be owing to the want of that romantic turn for which the Greeks were fo remarkable. The Romans had no heroes among them, fuch as Hercules, Achilles, or Ajax; nor does the whole Roman hiftory furnifh an example of a General that made war after the manner of Alexander the Great. Though their foldiers were as valiant as ever the Greeks could pretend to be, the object with them was the honour of the republic, and not their own perfonal praife. Hence there was lefs fury, and much more cool deliberate valour, exercifed by the Romans, than by any other nation whatever. The paffions of pride, refentment, obftinacy, &c. were excited in them, not by the mechanical means of mufic and dancing, but being taught that it was their chief honour to fight for the republic. It does not however appear, that the Romans were at all lefs capable of being affected in this mechanical manner than the Greeks. When dancing was once introduced, it had the very fame effects at Rome as at Athens.

Among the Jews, dancing feems to have made a part of the religious worfhip on fome occafions, as we learn from fome paffages in the Pfalms, though we do not find either that or finging pofitively enjoined as a divine precept. In the Chriftian churches mentioned in the New Teftament, there is no account of dancing being introduced as an act of worfhip, though it is certain that it was ufed as fuch in after ages. Mr. Gallini tells us, that "at Limoges, not long ago, the people ufed to dance the round in the choir of the church which is under the invocation of their patron faint; and at the end of each pfalm, inftead of the *Gloria Patri*, they fung as follows: *St. Marcel, pray for us, and we will dance in honour of you.*" Though dancing would now be looked upon as the higheft degree of profanation in a religious affembly, yet it is certain, that dancing, confidered as an expreffion of joy, is no more a profanation than finging, or than fimple fpeaking; nor can it be thought in the leaft more abfurd, that a Chriftian fhould dance for joy that Jefus Chrift is rifen from the dead, than that David danced before the ark when it was returned to him after a long abfence.

Plato reduces the dances of the ancients to three claffes. 1. The military dances, which tended to make the body robuft, active, and well-difpofed for all the exercifes of war. 2. The domeftic dances, which had for their object an agreeable and innocent relaxation and amufement. 3. The mediatorial dances, which were in ufe in expiations and facrifices. Of military dances there were two forts: the *gymnopedique* dance, or the dance of children; and the *enoplian*, or armed dance. The Spartans had invented the firft for an early excitation of the courage of their children, and to lead them on infenfibly to the exercife of the armed dance. This children's dance ufed to be executed in the public places. It was compofed of two choirs; the one of grown men, the other of children; whence, being chiefly defigned for the latter, it took its name. They were both of them in a ftate of nudity. The choir of the children regulated their motions by thofe of the men, and all danced at the fame time, finging the poems of Thales, Alcman, and Dionyfodotus. The *enoplian* or *pyrrhic* was danced by young men armed cap-à-pié, who executed to the found of the flute, all the proper movements either for attack or defence. It was compofed of four parts. The firft, the *podifm* or footing; which confifted in a quick fhifting motion of the feet, fuch as was neceffary for overtaking a flying enemy, or for getting from him when an overmatch. The fecond part was the *xiphifm*: this was a kind of mock-fight, in which the dancers imitated all the motions of combatants; aiming a ftroke,

rting a javelin, or dexterouſly dodging, parrying, or avoiding blow or thruſt. The third part, called the *komos*, conſiſted in ry high leaps or vaultings, which the dancers frequently re-ated, for the better uſing themſelves occaſionally to leap over ditch, or ſpring over a wall. The *tetracomos* was the fourth l laſt part: this was a ſquare figure, executed by ſlow and ajeſtic movements; but it is uncertain whether this was every ere executed in the ſame manner.

Of all the Greeks, the Spartans were thoſe who moſt culti-ted the Pyrrhic dance. Athenæus relates, that they had a w by which they were obliged to exerciſe their children at it om the age of five years. This warlike people conſtantly re-ined the cuſtom of accompanying their dances with hymns d ſongs. The following was ſung for the dance called *tri-oria*, ſaid to be inſtituted by Lycurgus, and which had its me from its being compoſed of three choirs, one of children, other of young men, and the third of old. The old men ened the dance, ſaying, "In time paſt we were valiant." he young men anſwered, "We are ſo at preſent." "We all be ſtill more ſo when our time comes," replied the chil-en. The Spartans never danced but with real arms. In oceſs of time, however, other nations came to uſe only wea-ns of wood on ſuch occaſions. Nay, it was only ſo late as e days of Athenæus, who lived in the ſecond century, that e dancers of the Pyrrhic, inſtead of arms, carried only flaſks, y-bound wands (thyrſus) or reeds. But, even in Ariſtotle's ys, they had begun to uſe thyrſuſes inſtead of pikes, and ghted torches in lieu of javelins and ſwords. With theſe torches ey executed a dance called the *conflagration of the world.*

Of the dances for amuſement and recreation, ſome were but nply gambols, or ſportive exerciſes, which had no character imitation, and of which the greater part exiſt to this day. he others were more complex, more agreeable, figured, and ere always accompanied with ſinging. Among the firſt or nple ones was the *aſcoliaſmus*; which conſiſted in jumping, ith one foot only, on bladders filled with air or wine, and bbed on the outſide with oil. The *dypodium* was jumped ith both feet cloſe. The *kybeſteſis* was what is called in this untry the *ſomerſet*. Of the ſecond kind was that called the *ine-preſs*, of which there is a deſcription in Longinus, and e Ionian dances: theſe laſt, in the original of their inſtitu-on, had nothing but what was decent and modeſt; but, in me, their movements came to be ſo depraved, as to be em-oyed in expreſſing nothing but voluptuouſneſs, and even the oſſeſt obſcenity.

Among the ancients there were no feſtivals nor religious aſ-mblies but what were accompanied with ſongs and dances. was not held poſſible to celebrate any myſtery, or to be ini-ated, without the intervention of theſe two arts. In ſhort, ey were looked upon to be ſo eſſential in theſe kinds of cere-onies, that to expreſs the crime of ſuch as were guilty of re-aling the ſacred myſteries, they employed the word *kheiſtæ*, to be out of the dance." The moſt ancient of theſe religious nces is the *Bacchic*; which was not only conſecrated to Bac-us, but to all the deities whoſe feſtival was celebrated with a nd of enthuſiaſm. The moſt grave and majeſtic was the *hy-rchematic*: it was executed to the lyre, and accompanied with e voice. At his return from Crete, Theſeus inſtituted a dance which he himſelf aſſiſted at the head of a numerous and lendid band of youths round the altar of Apollo. The dance as compoſed of three parts; the *ſtrophe*, the *antiſtrophe*, and e *ſtationary*. In the ſtrophe, the movements were from the ght to the left; in the antiſtrophe, from the left to the right. the ſtationary, they danced before the altar; ſo that the ſta-onary did not mean an abſolute pauſe or reſt, but only a ore ſlow or grave movement. Plutarch is perſuaded, that in is dance there is a profound myſtery. He thinks, that by the ſtrophe is indicated the motion of the world from eaſt to weſt; by the antiſtrophe, the motion of the planets from the weſt to the eaſt; and by the ſtationary, the ſtability of the earth. To this dance Theſeus gave the name of *geranos*, or "the crane;" becauſe the figures which characteriſed it bore a re-ſemblance to thoſe deſcribed by cranes in their flight.

With regard to the modern practice of dancing, there are no directions that can be of much ſervice. The art can in fact be ſucceſsfully learned only from the inſtructions of thoſe who profeſſedly teach it; and of theſe gentry there are abun-dance in the metropolis, and in every conſiderable town in the kingdom.

The Greeks were the firſt who united the dance to their tra-gedies and comedies; not indeed as making part of thoſe ſpec-tacles, but merely as an acceſſary.

The Romans, as uſual, copied after the Greeks; but in the reign of Auguſtus they left their inſtructors far behind them. Pylades and Bathylus, two very extraordinary men, made their appearance at that time. They invented a new ſpecies of en-tertainment, which they carried to an aſtoniſhing degree of perfection. In fact, they were the firſt who introduced among the Romans what the French call the *ballet d'action*, wherein the performer is both actor and dancer. The art nevertheleſs gradually ſunk into obſcurity, and became entirely forgotten on the acceſſion of Trajanus to the empire.

Thus buried with the other arts in entire oblivion, dancing remained uncultivated till about the 15th century, when bal-lets were revived in Italy at a magnificent entertainment given by a nobleman of Lombardy at Tortona on account of the mar-riage between Galeas Duke of Milan and Iſabella of Arragon. Every reſource that poetry, muſic, dancing, and machinery could ſupply, was employed and exhauſted on the occaſion. The deſcription given of ſo ſuperb an entertainment excited the admiration of all Europe, and excited the emulation of ſe-veral men of genius, who improved the hint, to introduce among their countrymen a kind of ſpectacle equally pleaſing and novel.

It would ſeem, however, that at firſt the women had no ſhare in the public or theatrical dance; at leaſt we do not ſee them mentioned in the various entertainments given at the opera in Paris till the 21ſt of January 1681, when the then Dauphineſs, the Princeſs of Conti, and ſome other ladies of the firſt diſtinc-tion in the court of Louis XIV. performed a ballet with the opera called *Le Triomphe de l'Amour*. This union of the two ſexes ſerved to enliven and render the ſpectacle more pleaſing and more brilliant than it ever was at any other period. It was received with ſo much applauſe, that on the 16th of May following, when the ſame opera was acted in Paris at the thea-tre of the then Palais Royal, it was thought indiſpenſable for the ſucceſs of that kind of entertainment to introduce female dancers.

The dance is now in ſuch commendation, that the Opera-Houſe ſeems rather an academy for dancing than calculated for the repreſentation of lyric poems. The diſguſting and immo-derate length of their recitatives is one of the chief cauſes of that general taſte for dancing which prevails amongſt them. A wit being aſked one day what could be done to keep up an opera threatened with a moſt complete damnation? "Do! (ſays he); why, lengthen the dances and ſhorten the petticoats." So evident is it, that ſinging, though apparently the chief pur-poſe of an opera, is by no means the moſt pleaſing part of the entertainment for the ſpectators. Thus, what was at firſt in-troduced as a mere acceſſary to the muſical performance, became in proceſs of time its only ſupport; and has excited the emulation of ſeveral eminent ballet-maſters, as the fre-quenters of the Opera Houſe have great reaſon to know.

Country-DANCE, commonly ſo written, and hence ſeeming

to imply a ruſtic way of dancing borrowed from country people or peaſants, is by others ſuppoſed to be a corruption of the French *Contrè-danſe*, where a number of perſons placing themſelves oppoſite one to another begin a figure. See Country-*Dance*.

Rope-Dancer, *ſchœnobates*, a perſon who walks, leaps, dances, and performs ſeveral other feats, upon a ſmall rope or wire. The ancients had their rope-dancers as well as we. Theſe had four ſeveral ways of exerciſing their art: The firſt vaulted, or turned round the rope like a wheel round its axis, and there hung by the heels or neck. The ſecond flew or ſlid from above, reſting on the ſtomach, with their arms and legs extended. The third ran along a rope ſtretched in a right line, or up and down. Laſtly, the fourth not only walked on the rope, but made ſurpriſing leaps and turns thereon. They had likewiſe the *cremnobates* or *orobates*; that is, people who walked on the brinks of precipices. Nay more, Suetonius *in Galba*, *c.* 6. Seneca in his 85th Epiſtle, and Pliny, *lib.* viii. *c.* 2. make mention of Elephants that were taught to walk on the rope.

St. Vitus's Dance. See Medicine.

DANCETTE, in heraldry, is when the outline of any bordure, or ordinary, is indented very largely, the largeneſs of the indentures being the only thing that diſtinguiſhes it from indented.

DANCING. See Dance.

Dancing-*Girls* of Egypt. See Alme.

Dancing-girls are employed all over the eaſt, as affording great diverſion at all public entertainments. They are all proſtitutes; and by the laws of their ſociety, are bound to refuſe no one for their price, which is rated according to their beauty and other accompliſhments. There are even particular ſets of them appropriated to the ſervice of the Gentoo temples, and the uſe of the bramin prieſts who attend them. Theſe poor creatures ſay that they were firſt debauched by their *god*, and afterwards by him conſigned over to the uſe of the prieſts who belong to his temples.

Theſe dancing-girls, whether in a ſettled or unſettled condition, live in a band or community under the direction of ſome ſuperannuated female of the ſame profeſſion, under whom they receive a regular education, and are trained up in all the arts of love and attraction, like ſcholars in an academy. Thus they acquire the art of captivating the affections of the other ſex to ſuch a degree, that nothing is more common than for one of the princes or chief people of the country to take a liking to one of theſe girls, and waſte immenſe ſums on her, though at the ſame time their own haram is ſtocked with beauties far ſuperior, and who beſides are poſſeſſed of the natural modeſty of the ſex, to which the others have not the ſmalleſt pretenſion. Thus ſome of theſe girls acquire immenſe wealth. In the neighbourhood of Goa, for inſtance, on a part of the continent bordering on the diſtrict of that iſland, the dancing girls founded a village, after being driven from Goa by the zeal of the archbiſhop. Here they reſide in a body corporate, and attend the parties of pleaſure of the noblemen and principal inhabitants, for it is not every one's purſe that can afford them. Here many of them acquire conſiderable fortunes by this ſcandalous traffic, and throw it into a common ſtock for the ſake of carrying on merchandiſe; being concerned in ſhipping and the moſt profitable voyages, for which they have regular factors and brokers.

The dreſs of theſe women varies according to the country they live in; but in all it is the moſt gorgeous imaginable. "They have nothing (ſays Mr. Groſe) of that nauſeous boldneſs which characteriſes the European proſtitutes, their ſtyle of ſeduction being all ſoftneſs and gentleneſs."

With regard to the performances of theſe women as dancers, we have various accounts. The author of Memoirs of the late War in Aſia, acquaints us, "that their attitudes as well as movements are not ungraceful. Their perſons are delicately formed, gaudily attired, and highly perfumed. By the continuation of wanton attitudes, they acquire, as they grow warm in the dance, a frantic laſciviouſneſs themſelves, and communicate, by a natural contagion, the moſt voluptuous deſires to the beholders."

DANDELION, in botany. See Leontodon.

DANDINI (Pietro), an eminent painter, was born at Florence in 1646, and received his firſt inſtructions in the art of painting from Valero Spada, who excelled in ſmall drawings with a pen. Whilſt he was under the care of that artiſt, he gave ſuch evident proofs of a ready genius, that he was then placed as a diſciple with his uncle Vicencio Dandini, a maſter of great reputation through all Italy, who had been bred up under Pietro da Cortona. He afterwards travelled through moſt of the cities of Italy, ſtudying the works of thoſe who were moſt diſtinguiſhed; and reſided for a long time at Venice, where he copied the paintings of Titian, Tintoretto, and Paolo Veroneſe. He next viſited Parma and Modena, to deſign the works of Correggio; omitting no opportunity that might contribute to improve his hand or his judgment. When he returned to Florence, the grand duke Coſmo III. the grand ducheſs Victoria, and the prince Ferdinand, kept him perpetually employed, in freſco-painting as well as in oil; his ſubjects being taken not only from ſacred fabulous hiſtory, but from his own invention and fancy, which frequently furniſhed him with ſuch as were odd and ſingular, and eſpecially with whimſical caricatures. He died in 1712. This maſter had a moſt extraordinary talent for imitating the ſtyle of even the moſt celebrated ancient painters of every ſchool, particularly Titian, Veroneſe, and Tintoretto; and with a force and elegance, equal to his ſubjects of hiſtory, he painted portraits, landſcapes, architecture, flowers, fruit, battles, animals of all kinds, and likewiſe ſea-pieces; proving himſelf an univerſal artiſt, and excellent in every thing he undertook. He had a ſon, Octavio, who proved not inferior to him in any branch of his profeſſion, and was an honour to his family and country.

Dandini (Cæſare), hiſtory-painter, was born at Florence; and was the elder brother and firſt inſtructor of Vicentio Dandini, the uncle of Pietro. This maſter had ſucceſſively ſtudied as a diſciple with Cavalier Curradi, Paſſignano, and Criſtofano Allori; from whom he acquired a very pleaſing manner of deſigning and colouring. He was extremely correct in his drawing, and finiſhed his pictures highly. Several noble altarpieces in the churches of Florence are of his hand; and one, which is the chapel l'Annonciata, is particularly admired.

DANEGELT, an annual tax laid on the Anglo-Saxons, firſt of 1s. afterwards of 2s. for every hide of land through the realm, for maintaining ſuch a number of forces as were thought ſufficient to clear the Britiſh ſeas of Daniſh pirates, which heretofore greatly annoyed our coaſts. Danegelt was firſt impoſed as a ſtanding yearly tax on the whole nation, under King Ethelred, A. D. 991. That prince, ſays Cambden, *Britan.* 142. much diſtreſſed by the continual invaſions of the Danes, to procure a peace, was compelled to charge his people with heavy taxes, called *Danegelt*.—At firſt he paid 10,000l. then 16,000l. then 24,000l. after that 36,000l. and laſtly 48,000l. Edward the confeſſor remitted this tax. William I. and II. reaſſumed it occaſionally. In the reign of Henry I. it was accounted among the king's ſtanding revenues; but King Stephen, on his coronation-day, abrogated it for ever. No church or church-land paid a penny to the *danegelt*; becauſe, as is ſet forth in an ancient Saxon law, the people of England placed more confidence in the prayers of the church than in any military defence they could make.

DANIEL, the fourth of the greater prophets, was born in

Judea, of the tribe of Judah, about the 25th year of the reign of Josiah. It is believed that Daniel died in Chaldea, and that he did not take advantage of the permission granted by Cyrus to the Jews of returning to their own country. St. Epiphanius says he died at Babylon; and herein he is followed by the generality of historians. The Jews do not reckon Daniel among the prophets; part of his book, that is, from the fourth verse of his second chapter to the end of the seventh chapter, was originally written in the Chaldee language; the reason of which was, that in that part he treats of the Chaldean or Babylonish affairs: all the rest of the book is in Hebrew. The first six chapters of the book of Daniel are a history of the kings of Babylon, and what befel the Jews under their government. In the last six he is altogether prophetical, foretelling not only what should happen to his own church and nation, but events in which foreign princes and kingdoms were concerned.

Daniel (Samuel), an eminent poet and historian, was born near Taunton in Somersetshire in the year 1562, and educated at Oxford; but leaving that university without a degree, he applied himself to English history and poetry under the patronage of the Earl of Pembroke's family. He was afterwards tutor to the lady Ann Clifford; and, upon the death of Spenser, was created poet-laureat to Queen Elizabeth. In king James's reign he was appointed gentleman extraordinary, and afterwards one of the grooms of the privy-chamber to the queen consort, who took great delight in his conversation and writings. He wrote an history of England, several dramatic pieces, and some poems; and died in 1619.

Daniel (Gabriel), a celebrated Jesuit, and one of the best French historians, was born at Rouen in 1649. He taught polite literature, philosophy, and divinity, among the Jesuits; and was superior of their house at Paris, where he died in 1728. There are a great number of his works published in French, of which the principal are, 1. An History of France, of which he also wrote an abridgment in nine volumes 12mo. 2. An History of the French Militia, in 2 vols. 4to. 3. An Answer to the Provincial Letters. 4. A Voyage to the World of Descartes. 5. Letters on the doctrines of the Theorists, and on Probability. 6. New difficulties relating to the knowledge of Brutes: And, 7. A theological treatise on the Efficacy of Grace.

DANMONII, an ancient British nation, supposed to have inhabited that tract of country which is now called Cornwall and Devonshire, bounded on the south by the British Ocean, on the west by St. George's channel, on the north by the Severn Sea, and on the east by the country of the Durotriges. Some other British tribes were also seated within these limits; as the Cossini and Ostidamnii, who were probably particular clans of the Danmonii; and, according to Mr. Baxter, they were the keepers of their flocks and herds. As the several tribes of the Danmonii submitted without much resistance to the Romans, and never joined in any revolt against them, that people were under no necessity of building many forts, or keeping many garrisons in their country. This is the reason why so few Roman antiquities have been found in that country, and so little mention is made of it and its ancient inhabitants by Roman writers. Ptolemy names a few places, both on the sea-coasts and in the inland parts of this country, which were known to, and frequented by, the Romans. The most considerable of these places are the two famous promontories of Bolerium and Ocrinum, now the Landsend and the Lizard; and the towns of Isca Danmoniorum and Tamare, now Exeter and Saltash. As the Danmonii submitted so tamely to the Romans, they might perhaps permit them to live, for some time at least, under their own princes and their own laws; a privilege which we know they granted to some other British states. In the most perfect state of the Roman government in Britain, the country of the Danmonii made a part of the province called Flava Cæsariensis, and was governed by the president of that province. After the departure of the Romans, kingly government was immediately revived amongst the Danmonii in the person of Vortigern, who was perhaps descended from the race of their ancient princes, as his name signifies, in the British language, a chieftain or the head of a family.

DANTE (Aligheri) an eminent Italian poet, was descended from an ancient family, and born at Florence, May 27, 1265. He discovered an early inclination and genius for poetry; and, as he fell in love very early in his youth, consecrated the first labours of his muse to Venus. Afterwards he undertook a more serious work, which he began in Latin, and finished in Italian verse. He excelled greatly in Tuscan poetry; and, as Bayle says, it would have been happy for him, had he never meddled with any thing else. But he was ambitious; and having attained some of the most considerable posts in the commonwealth, he was crushed by the ruins of the faction which he embraced. The city of Florence, being divided into two factions, was become so tumultuous, that Pope Boniface VIII. sent Charles de Valois thither in 1301, to re-establish the public tranquillity. Dante's faction being the weakest, it was expelled the city, and himself and other leaders sent into banishment. He did not bear this misfortune with constancy; his resentment was excessive. In the first place, he took the strongest vengeance in his power against Charles de Valois, who was brother to Philip the Fair of France, by railing at the kings of France, and satirizing them in his writings for the meanness of their extraction. Thus he feigns, but very ridiculously, that Hugh Capet, the first of the third race of the kings of France, was the son of a butcher; and makes him own himself to be the root of a plant which has done great mischief to Christendom. In the next place he did all he could to expose his country to a bloody war, on account of the injustices which he thought he suffered from it. He incited Can Della Scala, Prince of Verona, to make war on the Florentines; and, as Volaterranus expresses himself, led the emperor to the siege of Florence. He took great pains to be recalled; but all his efforts were vain. During his banishment he applied himself diligently to study, and wrote several things with more spirit and fire than it is thought he would have done if he had lived at home in quiet. His works were collected and printed at Venice in 1564, in folio, with the notes of Christopher Landini; and they have been published there since. The most considerable of his works is his poem entitled, "The Comedy of Hell, Purgatory, and Paradise." It contains many things, which are not agreeable to the Papists, and which seem to signify, that Rome is the seat of Antichrist: for it appears, that Dante was as indifferent a Catholic for his time, as he was a good poet. Another book, which displeased the court of Rome, and made him pass for a heretic, was his treatise entitled, "De Monarchia;" and Du Plessis Mornay has alleged several opinions of his, which are by no means conformable to Popery. But perhaps we shall do better to ascribe all this indignation at the church of Rome, to the personal injuries that he thought he received from the Pontiff, who helped to ruin his party, than to any real change of sentiment proceeding from conviction; even if we should allow, what some have related, though Bayle thinks it improbable, that during his exile he went to Paris to learn philosophy and the principles of divinity. He died in his exile at Ravenna, in July 1321, having just entered his 57th year; and it is thought that grief was the cause of his death. He enjoyed an honourable retreat in the court of Guy Polentano, prince of Ravenna; and when the republic of Venice prepared to make war on that prince, he was sent by him to Venice to negotiate a peace there. The Venetians behaved arrogantly; they would neither receive Dante, nor hear him;

and this contemptuous treatment is ſuppoſed to have touched him ſo ſenſibly, as to have occaſioned the illneſs, upon his return to Ravenna, of which he died. It is remarkable that, a little before he expired, he had the ſtrength of mind to compoſe his own epitaph.

DANTE (John Baptiſt), a native of Perugia, an excellent mathematician, called the *new Dædalus*, for the wings he made himſelf, and with which he flew ſeveral times over the lake Thraſymenus. He fell in one of his enterpriſes, the iron work with which he managed one of his wings having failed; by which accident he broke his thigh: but it was ſet by the ſurgeons, and he was afterwards called to Venice to profeſs mathematics.

DANTZIC, one of the largeſt and richeſt towns of Europe, capital of Weſtern Pruſſia; with a famous harbour, a biſhop's ſee, and a univerſity. It is encompaſſed by a wall and fortifications of great extent. The houſes are well built of ſtone or brick, ſix or ſeven ſtories high; and the granaries, containing vaſt quantities of corn and naval ſtores, are ſtill higher, to which the ſhips lie cloſe, and take in their lading. The arſenal is well provided, and the exchange is a handſome ſtructure. It is reckoned to contain 200,000 inhabitants, though there died of the plague, in 1709, above 30,000 perſons. The college is provided with very learned profeſſors. It carries on a great trade, particularly in corn, timber, and naval ſtores. The eſtabliſhed religion is the Lutheran; but there are Papiſts, Calviniſts, and Anabaptiſts, who are all tolerated. The magiſtrates conſiſt of 30 ſenators, four of whom are burgomaſters: beſide theſe, there are 43 conſuls, who elect the burgomaſters out of their own body, and they likewiſe appoint all other officers: 100 burghers are elected to repreſent the people's grievances, to defend their privileges, and to inſpect the adminiſtration of the government. They coined money, with the king of Poland's head on one ſide, and the city arms on the other. The juriſdiction of this town extends about 50 miles round it; and they maintain a garriſon at their own expence. It was lately a free hanſeatic town, under the protection of Poland; but in 1793 it ſubmitted to the king of Pruſſia, who forcibly uſurped the ſovereignty, in a ſecond partition of the Poliſh dominions. It is ſeated on the weſtern banks of the river Viſtula, near the gulf of Angil, in the Baltic; 30 miles S. E. of Marienberg, and 160 N. W. by N. of Warſaw. E. long. 18. 38. N. lat. 54. 22.

DANUBE, the largeſt river in Europe, riſing at Doneſchingen, in the Black Foreſt, in the circle of Suabia, in Germany; and running N. E. through Suabia, by Ulm, the capital of that country; and then E. through Bavaria and Auſtria, paſſes by Ratiſbon, Paſſau, Ens, and Vienna. It then enters Hungary, and runs S. E. from Preſburg to Buda, and ſo on to Belgrade; after which it divides Bulgaria from Morlachia and Moldavia, diſcharging itſelf by ſeveral channels into the Black Sea, in the province of Beſſarabia. It was called the Iſter by the ancients. It begins to be navigable for boats at Ulm, and receives ſeveral large rivers as it paſſes along. It is ſo deep between Buda and Belgrade, that the Turks and Germans have had men of war upon it; and yet it is not navigable to the Black Sea, on account of the cataracts.

DAPHNE, a daughter of the river Peneus by the goddeſs Terra, of whom Apollo became enamoured. This paſſion had been raiſed by Cupid; with whom Apollo, proud of his late conqueſt of the ſerpent Python, had diſputed the power of his darts. Daphne heard with horror the addreſſes of the god, and endeavoured to remove herſelf from his importunities by flight. Apollo purſued her; and Daphne, fearful of being caught, entreated the aſſiſtance of the gods, who changed her into a laurel. Apollo crowned his head with the leaves of the laurel, and for ever ordered that that tree ſhould be ſacred to his divinity. Daphne was alſo the name of a daughter of Tireſias, prieſteſs in the temple of Delphi. She was conſecrated to the ſervice of Apollo by the Epigoni, or, according to others, by the goddeſs Tellus. She was called *Sibyl*, on account of the wildneſs of her looks and expreſſions when ſhe delivered oracles. Her oracles were generally in verſe; and Homer, according to ſome accounts, has introduced much of her poetry in his compoſitions.

DAPHNE, *Spurge-Laurel*; a genus of the monogynia order, belonging to the octandria claſs of plants; and in the natural method ranking under the 31ſt order, *Vepreculæ*. There is no calyx; the corolla is quadrifid and marceſcent, incloſing the ſtamina. The fruit is a monoſpermous berry. There are 15 ſpecies; of which the following are the moſt remarkable.

1. *Mezereum*, the mezereon or ſpurge-olive, is a low deciduous ſhrub. It is a native of Germany, and has been diſcovered in this country in ſome woods near Andover in Hampſhire. Of this elegant plant there are four varieties; 1. The white; 2. The pale-red; 3. The crimſon; and, 4. The purple flowering. —Hanbury is very laviſh in praiſe of theſe ſhrubs. He ſays, "they have each every perfection to recommend them as flowering-ſhrubs. In the firſt place, they are of low growth, ſeldom riſing to more than three or four feet in height, and therefore are proper even for the ſmalleſt gardens. In the next place, they will be in bloom when few trees, eſpecially of the ſhrubby tribe, preſent their honours. It will be in February, nay, ſometimes in January; then will the twigs be garniſhed with flowers all around from one end to the other. Each twig has the appearance of a ſpike of flowers of the moſt conſummate luſtre; and as the leaves are not yet out, whether you behold this tree near or at a diſtance, it has a moſt enchanting appearance. But this is not all; the ſenſe of ſmelling is peculiarly regaled by the flowers; their ſpicy ſweetneſs is diffuſed around, and the air is perfumed with their odours to a conſiderable diſtance. Many flowers, deemed ſweet, are not liked by all; but the agreeable inoffenſive ſweetneſs of the mezereon has ever delighted the ſenſe of ſmelling, whilſt the luſtre of its blow has feaſted the eye. Neither is this the only pleaſure the tree beſtows; for beſides the beauty of the leaves, which come out after the flowers are fallen, and which are of a pleaſant green colour and an oblong figure, it will be full of red berries in June, which will continue growing till the autumn. Of theſe berries the birds are very fond; ſo that whoever is delighted with thoſe ſongſters, ſhould have a quantity of them planted all over the outſides of his wilderneſs quarters."

2. *Gnidium*, the flax-leaved daphne, is a low deciduous ſhrub; a native of Italy, Spain, and about Montpelier. This ſpecies ſeldom grows higher than three feet. The branches are very ſlender, and ornamented with narrow, ſpear-ſhaped, pointed leaves, much like thoſe of the common flax. The flowers are produced in panicles at the ends of the branches; they are ſmall, come out in June, but are rarely ſucceeded by ſeeds in England.

3. *Cneorum*, the ſpear-leaved daphne or cneorum, is a very low deciduous ſhrub; native of Switzerland, Hungary, the Alps, and Pyrenean mountains. This riſes with a ſhrubby, branching ſtalk, to about a foot or a foot and a half high. The leaves are narrow, ſpear-ſhaped, and grow irregularly on the branches. The flowers are produced in cluſters at the ends of the little twigs: they make their appearance in March, are of a purple colour, and poſſeſſed of a fragrance little inferior to that of the mezereon; but they are ſeldom ſucceeded by ſeeds in England.

4. *Tartonraira*, the oval-leaved daphne or tartonraira, a very low deciduous ſhrub, is a native of France and Italy. This riſes with a woody ſtalk to the height of about two feet. The branches are numerous, irregular, tough, and covered with a light-brown-coloured bark. The leaves are oval, very ſmall, ſoft to the touch, and ſhining. The flowers are produced in cluſters from the ſides of the ſtalks; they are white, come out in June,

and are succeeded by roundish berries, which seldom ripen in England. This sort should have a dry soil and a warm situation.

5. *Alpina*, the alpine daphne or chamelæa, is a low deciduous shrub; native of the Alps, Geneva, Italy, and Austria. This will grow to the height of about a yard. The leaves are spear-shaped, obtuse, and hoary underneath. The flowers come out in clusters from the sides of the branches, and are very fragrant: They appear in March, and are succeeded by red berries, that ripen in September.

6. *Thymelæa*, the milkwort-leaved daphne, or the thymelæa; a low deciduous shrub, native of Spain and the south of France. The thymelæa will grow to the height of a yard. The stalks of this species are upright, branched, and covered with a light-brown bark. The leaves are spear-shaped, smooth, and in some respect resemble those of milk-wort. The flowers are produced in clusters from the sides of the stalks: they are of a greenish colour, have no footstalks, appear in March, and are succeeded by small yellowish berries, which will be ripe in August. This sort requires a dry soil and a warm situation.

7. *Villosa*, the hairy-leaved daphne, a very low deciduous shrub, native of Spain and Portugal. The stalks are ligneous, about two feet high, and send forth branches alternately from the sides. The leaves are spear-shaped, plain, hairy on both sides, and grow on very short footstalks. The flowers have very narrow tubes, are small, and make no great show: they come out in June, and are not succeeded by ripe seeds in England. This shrub, in some situations, retains its leaves all winter in such beauty as to cause it to be ranked among the low-growing evergreens; but as in others it is sometimes shattered with the first bleak winds, it is left to the gardener whether to place this shrub among the deciduous trees or evergreens.

8. *Laureola*, the spurge laurel or evergreen daphne; a low evergreen shrub, common in some parts of this kingdom, also in Switzerland and France. This shrub seldom grows more than a yard or four feet high; it sends out many branches from the bottom, and these are covered with a smooth light-brown bark that is very thick. The bark on the younger branches is smooth and green; and these are very closely garnished with leaves of a delightful strong lucid green colour. These leaves sit close to the branches, and are produced in such plenty, that they have the appearance, at a small distance, of clusters at the ends of the branches. They are spear-shaped, shining, smooth, and thick; their edges are entire. Hanbury extols this plant with a degree of enthusiasm; continuing, "and this is another excellent property of this tree, that it is thus possessed of such delightful leaves for its ornament. These leaves, when growing under the drip of trees, spread open, and exhibit their green pure and untarnished, in its natural colour; when planted singly in exposed places, they naturally turn back with a kind of twist, and the natural green of the leaf is often alloyed with a brownish tinge. This shrub is also valuable on account of its flowers; not because they make any great show, but from their fragrance, and the time they appear; for it will be in blow the beginning of January, and will continue so until the middle or latter end of April before the flowers fall off.

With regard to the propagation of these plants, the *mezereon* ripens its seeds with us, and may at any time be easily obtained, if secured from the birds. The best soil for them is a good fat black earth, such as is found in the kitchen-gardens that have been well manured for many years. No particular regard need be paid to the situation; for as this tree is a native of the northern parts of Europe, it will grow in a north border perfectly well. The ground being made fine, and cleared, the seeds should be sown hardly half an inch deep, and the mould riddled over them that depth. The beds should then be netted up, and they will want no other attention until the spring. These seeds will sometimes remain in the ground two years; but for the most part they come up in the spring after sowing; and the seedlings will require no other care during the summer than weeding, and gentle watering in dry weather. After they have been in the seed bed one year, the strongest may be drawn out, and planted in the nursery, to make room for the others; though, if they do not come up very close, it would be as well to let them remain in the seed-bed until the second autumn: when they should be taken up with care, and planted in beds at a foot asunder each way. This will be distance enough for these low-growing shrubs. October is the best month for planting them out finally; for although they will grow if removed any time between then and spring, yet that will certainly be a more proper season than when they are in full blow. Such is the culture of this shrub. The other species of this genus require a different management.

The *spurge* laurel is propagated by seeds, in the same manner as the common mezereon, but all the other sorts are with difficulty propagated and retained. They will by no means bear removing, even when seedlings: and if ever this is attempted, not one in an hundred must be expected to grow. They are raised by seeds, which we receive from the places where they grow naturally; and he who is desirous of having these plants, must manage them in the following manner: Let a compost be prepared of these equal divisions: one-fourth part of lime-rubbish; one-fourth part of drift or sea sand; another of splinters of rocks, some broad and others smaller; and the other part of maiden earth from a rich pasture. Let these be mixed all together, and filled into large pots. In each of these pots put a seed or two, about half an inch deep, in the finest of the mould. We receive the seeds in the spring; so that there is little hope of their coming up until the spring following: Let, therefore, the pots be set in the shade all the summer, and in the autumn removed into a warm situation, where they may enjoy the influence of the sun's rays all winter. In March, let them be plunged into a moderate hot-bed, and the plants will soon after appear. This bed will cause them to be strong plants, by the autumn; and when all danger of frost is over, they may be uncovered wholly, and permitted to enjoy the open air. In the autumn they should be removed into the green-house, or set under an hot-bed frame all winter; and in spring they should be placed where they are to continue, moulding them up the height of the pot; the pots being sufficiently broken to make way for their roots as they shoot, and then left to nature.—The situation of the four tenderer sorts must be well sheltered: and if it be naturally rocky, sandy, and dry, it will be the better; for in the places where they grow naturally, they strike into the crevices of rocks, and flourish where there is hardly any appearance of soil.

The *cneorum* and the *alpine chamelæa* are very hardy, and will grow in the coldest situation; but the other sorts should have a warm soil, and a well-sheltered site, or they will be subject to be destroyed in bad weather.

The root of the mezereon was long used in the Lisbon diet-drink, a remedy said to be good for several complaints, particularly nodes and other symptoms resisting the use of mercury. The composition of this diet-drink is described in the Edinburgh Physical Essays, by Dr. Donald Monro of London. On chewing the root of the mezereon, it proves very pungent, and its acrimony is accumulated about the fauces, and is very durable. It is employed chiefly under the form of decoction; and it enters the decoctum sarsaparillæ compositum of the London college; but it has also been used in powder combined with some inactive one, as that of liquorice root. It is apt to occasion vomiting and purging; so must be begun in grain-doses, and

gradually increafed. It is often ufefully combined with mercury. The bark of the root, which is the moft acrimonious part, is recommended in the pharmacopœia chirurgica, to be fteeped in vinegar, and applied to promote the difcharge of iffues. Mezereon has alfo been of ufe in tumours and cutaneous eruptions not venereal. The whole plant is very corrofive; and fix of the berries, it is faid, will kill a wolf. A woman gave 12 grains of the berries to her daughter who had a quartan ague; fhe vomited blood, and died immediately.

DAPHNEPHORIA, a feftival in honour of Apollo, celebrated every ninth year by the Bœotians. It was then ufual to adorn an olive bough with garlands of laurel and other flowers, and place on the top a brazen globe, on which were fufpended fmaller ones. In the middle were placed a number of crowns, and a globe of inferior fize, and the bottom was adorned with a faffron-coloured garment. The globe on the top reprefented the fun or Apollo. That in the middle was an emblem of the moon, and the other of the ftars. The crowns, which were 365 in number, reprefented the fun's annual revolution. This bough was carried in folemn proceffion by a beautiful youth of an illuftrious family, and whofe parents were both living. The youth was dreffed in rich garments which reached to the ground, his hair hung loofe and difhevelled, his head was covered with a golden crown, and he wore on his feet fhoes called *Iphicratidæ*, from Iphicrates an Athenian, who firft invented them. He was called Δαφνηφόρος, *laurel-bearer*; and at the time he executed the office of prieft of Apollo. He was preceded by one of his neareft relations, bearing a rod adorned with garlands, and behind him followed a train of virgins with branches in their hands. In this order the proceffion advanced as far as the temple of Apollo, furnamed Ifmenius, where fupplicatory hymns were fung to the god.—This feftival owes its origin to the following circumftance: When an oracle advifed the Ætolians, who inhabited Arne and the adjacent country, to abandon their ancient poffeffions, and go in queft of a fettlement, they invaded the Theban territories, which at that time were pillaged by an army of Pelafgians. As the celebration of Apollo's feftival was near, both nations, who religioufly obferved it, laid afide all hoftilities, and according to cuftom cut down laurel boughs from mount Helicon, and in the neighbourhood of the river Melas, and walked in proceffion in honour of the divinity. The day that this folemnity was obferved, Polematas, the general of the Bœotian army, faw a youth in a dream, that prefented him with a complete fuit of armour, and commanded the Bœotians to offer folemn prayers to Apollo, and walk in proceffion with laurel boughs in their hands every ninth year. Three days after this dream, the Bœotian general made a fally, and cut off the greateft part of the befiegers, who were compelled by this blow to relinquifh their enterprife. Polematas immediately inftituted a novennial feftival to the god, who feemed to be the patron of the Bœotians.

DAPIFER, the dignity or office of grand-mafter of a prince's houfehold. This title was given by the Emperor of Conftantinople to the Czar of Ruffia as a teftimony of favour. In France the like officer was inftituted by Charlemagne, under the title of *dapiferat*; and the dignity of dapifer is ftill fubfifting in Germany, the elector of Bavaria affuming the title of *arch-dapifer of the empire*, whofe office is, at the coronation of the emperor, to carry the firft difh of meat to table on horfeback.

DAPPLE-BAY, in the manege: when bay horfes have marks of a dark bay, they are called *dapple-bays*.

DAPPLE-*Blacks*: when a black horfe has got fpots or marks more black or fhining than the reft of his fkin, he is called a *dapple-black*.

DARAPTI, among logicians, one of the modes of fyllogifms of the third figure, whofe premifes are univerfal affirmatives, and the conclufion is a particular affirmative: thus,

DAR- Every body is divifible;
AP- Every body is a fubftance;
TI, Therefore, fome fubftance is divifible.

DARDA, a town and fort of Lower Hungary, built by the Turks in 1686, and taken by the Imperialifts the next year, in whofe hands it remains. It is feated on the river Draw, 10 miles from its confluence with the Danube, and at the end of the bridge of Effack. E. lon. 19. 10. N. lat. 45. 45.

DARDANELLES, two ancient and ftrong caftles of Turkey, one of which is in Romania, and the other in Natolia, on each fide the canal, formerly called the *Hellefpont*. This keeps up a communication with the Archipelago, and the Propontis or Sea of Marmora. The mouth of the canal is four miles and a half over; and the caftles were built in 1659, to fecure the Turkifh fleet from the infults of the Venetians. The fhips that come from Conftantinople are fearched at the caftle on the fide of Natolia, to fee what they have on board.

DARDANUS, a fon of Jupiter and Electra, who, after the death of his brother Jafion, left Samothrace, his country, and paffed into Afia Minor, where he married Batia, the daughter of Teucer king of Teucria. After the death of his father-in-law he afcended the throne, and reigned 62 years. He built the city of Dardania, and was reckoned the founder of the kingdom of Troy. He was fucceeded by Erichthonius. According to fome, Corybas, his nephew, accompanied him to Teucria, where he introduced the worfhip of Cybele. Dardanus taught his fubjects to worfhip Minerva, and he gave them two ftatues of the goddefs, one of which is well known by the name of *Palladium*. According to Virgil, Dardanus was an Italian by origin.

DARE, in ichthyology, the fame with *dace*. See DACE.

DARES, a Phrygian, who lived during the Trojan war, in which he was engaged, and of which he wrote the hiftory in Greek. This hiftory was extant in the age of Ælian; the Latin tranflation, now extant, is univerfally believed to be fpurious, though it is attributed by fome to Cornelius Nepos. This tranflation firft made its appearance A. D. 1477, at Milan. Homer fpeaks of him, Il. 5. v. 10. and 27.

DARIC, in antiquity, a famous piece of gold, firft coined by Darius the Mede about 538 years before Chrift; probably during his ftay at Babylon, out of the vaft quantity of gold which had been accumulated in the treafury. From thence it was difperfed over the eaft, and alfo into Greece; fo that the Perfian daric, which was alfo called *ftater*, was the gold coin beft known in Athens in ancient times. According to Dr. Bernard, it weighed two grains more than one of our guineas; but as it was very fine, and contained little alloy, it may be reckoned worth about 25s. of our money. Plutarch informs us, that the darics were ftamped on one fide with an archer clothed in a long robe, and crowned with a fpiked crown, holding a bow in his left hand and an arrow in his right; and on the other fide with the effigies of Darius. All the other pieces of gold of the fame weight and value that were coined of the fucceeding kings, both of the Perfian and Macedonian race, were called *darics*, from Darius, in whofe reign this coin commenced. Of thefe there were whole darics and half darics; and they are called in thofe parts of Scripture written after the Babylonifh captivity, *adarkonim*; and by the Talmudifts, *darkonoth*. Greaves fays that the daric is ftill found in Perfia; but it is certainly very fcarce, and perhaps of doubtful antiquity.

DARIEN, a narrow ifthmus, which joins N. and S. Ame-

rica, having the Atlantic Ocean on the E. fide, and the Pacific Ocean on the Weft. It is alfo the name of a province in Terra Firma, which is not the richeft, but of the greateft importance of any in the poffeffion of the Spaniards; for all the wealth of Peru is brought hither, and thence imported into Europe. There are many high mountains; and the low grounds are often overflowed with the great rains. Here the men go naked, and they have a filver plate faftened to their nofe, which hangs over their mouths, in the fhape of a half-moon. The women have a ring hanging down in the fame manner, which paffes through the bridle of the nofe. They have alfo feveral chains of teeth, fhells, beads, and the like, hanging down from the neck to the pit of the ftomach. Their houfes are moftly thin and fcattered, and always by a river fide, with plantations lying about them. They are built with fmall pofts fet upright, about feven feet high, which are hurdled with fticks, and daubed over with earth. The men clear the plantations, and the women cultivate them. The girls are employed in picking and fpinning cotton, which the women weave, and the cloths are chiefly ufed for hammocks. It is the bufinefs of the men to make bafkets, which they do very neatly with canes, reeds, or palmeto-leaves dyed of feveral colours. Each man has feveral wives, who live together in great harmony. They are fond of dancing to the found of a pipe and drum, and play a great many antic tricks, like our tumblers. When they go out to hunt, the women carry in their bafkets plantains, bananas, yams, potatoes, and caffava-roots ready roafted. When they travel, they guide themfelves by the fun; and, when it does not fhine, by the wind. When they come to the rivers, the women and children, as well as men, fwim over them. They have no diftinction of days or weeks, but reckon their time by the courfe of the moon. The animals are the fame as in other countries of the fame climate.

DARII, in logic, one of the modes of fyllogifm of the firft figure, wherein the major propofition is an univerfal affirmative, and the minor and conclufion particular affirmatives: thus,

DA- Every body that is moved, is moved by another;
RI- Some body is moved;
I, Therefore, fome body is moved by another.

DARKING, or DORKING, a town of Surry, on the river Mole. The market, on Saturday, is noted for corn, provifions, and fowls. It is 23 miles S. W. of London. Lon. 0. 14. W. Lat. 51. 17. N.

DARLINGTON, a large town in the county of Durham, with a market on Monday. It is feated on a flat, on the river Skerne, which falls into the Tees. It has a fpacious market-place; and the market is well fupplied with corn, cattle, and provifions. It has long been noted for the manufacture of huckabacks. It has likewife a thriving one of camlets. Some fmall wares of the Manchefter kind are alfo made here; and there is a confiderable trade in dreffing leather. A curious water machine for grinding optical glaffes, and for fpinning linen yarn, has been erected here, the invention of a native of the town. Darlington is 19 miles S. of Durham, and 239 N. by W. of London. Lon. 1. 25. W. Lat. 54. 32. N.

DARMSTADT, a town of Germany in the circle of the Upper Rhine, and capital of the landgraviate of Heffe-Darmftadt, with a handfome caftle, where its own prince generally refides. It is feated on a river of the fame name in E. lon. 8. 40. N. lat. 49. 50.

DARNEL, in botany. See LOLIUM.

DARTFORD, a town in Kent, with a market on Saturday. It is feated on the river Darent, not far from its influx into the Thames. Here are the remains of a fine nunnery, founded by Edward III. At the diffolution it was converted into a royal palace; but it was alienated by James I. The rebellion of Wat Tyler, in the reign of Richard II. began in this town, which is feven miles W. of Gravefend, and 16 E. by S. of London. Lon. 0. 16. E. Lat. 51. 25. N.

DARTMOUTH, a fea-port and borough of Devonfhire, with a market on Friday. It is feated on the declivity of a hill, by the river Dart, near its fall into the fea, and has a fpacious haven, capable of fheltering a large number of fhips. It has a confiderable trade to the S. parts of Europe and to Newfoundland, as well as a fhare in the coafting traffic. It contains three churches; and is 30 miles S. S. W. of Exeter, and 204 W. by S. of London. Lon. 3. 45. W. Lat. 50, 22. N.

DARTOS, in anatomy, one of the coats which form the fcrotum. It is called the *dartos mufcle*; but Dr. Hunter fays, that no fuch mufcle can be found, and Albinus takes no notice of it in his tables.

DASYPUS, the ARMADILLO or *Tatou*, in zoology; a genus of quadrupeds, belonging to the order of bruta. The dafypus has neither foreteeth nor dogteeth; it is covered with a hard bony fhell, interfected with diftinct moveable zones or belts: this fhell covers the head, the neck, the back, the flanks, and extends even to the extremity of the tail; the only parts to which it does not extend, are the throat, the breaft, and the belly, which are covered with a whitifh fkin of a coarfe grain, refembling that of a hen after the feathers are pulled off. The fhell does not confift of one entire piece, like that of the tortoife; but is divided into feparate belts, connected to each other by membranes which enable the animal to move it, and even to roll itfelf up like a hedge-hog. The number of thefe belts does not depend on the age of the animal, as fome have imagined; but is uniformly the fame at all times, and ferves to diftinguifh the different fpecies. All the fpecies of this animal were originally natives of America; they were entirely unknown to the ancients; and modern travellers mention them as peculiar to Mexico, Brafil, and the fouthern parts of America; though fome indeed have confounded them with two fpecies of manis or fhell-lizard, which are found in the Eaft Indies: others report that they are natives of Africa, becaufe fome of them have been tranfported from Brafil to the coaft of Guinea, where a few have fince been propagated: but they were never heard of in Europe, Afia, or Africa, till after the difcovery of America. —They are all endowed with the faculty of extending and contracting their bodies, and of rolling themfelves up like a ball, but not in fo complete a fphere as the hedge-hog. They are very inoffenfive animals, excepting when they get into gardens, where they devour the melons, potatoes, and other roots. They walk quickly; but can hardly be faid to run or leap, fo that they feldom efcape the purfuit either of men or dogs. But nature has not left them altogether defencelefs. They dig deep holes in the earth; and feldom go very far from their fubterraneous habitations: upon any alarm they immediately go into their holes; but, when at too great a diftance, they require but a few moments to make one. The hunters can hardly catch them by the tail before they fink their bodies in the ground; where they ftick fo clofe, that the tail frequently comes away and leaves the body in the earth; which obliges the hunters, when they want to take them alive and unmutilated, to dilate the fides of the hole. When they are taken, and find that there is no refource, they inftantly roll themfelves up, and will not extend their bodies unlefs they are held near a fire. When in deep holes, there is no other method of making them come out, but by forcing in fmoke or water. They keep in their holes through the day, and feldom go abroad in queft of fubfiftence but in the night. The hunters ufually chafe them with fmall dogs, which eafily come up with them. When the dogs are near, the creatures inftantly roll themfelves up, and in this condition the hunters carry them off. However, if they be near a precipice, they often efcape both the

dogs and hunters: they roll themſelves up, and tumble down like a ball, without breaking their ſhell, or receiving any injury. The daſypus is a very fruitful animal: the female generally brings forth four young ones every month; which is the reaſon why the ſpecies are ſo numerous, notwithſtanding they are ſo much ſought after on account of the ſweetneſs of their fleſh. The Indians likewiſe make baſkets, boxes, &c. of the ſhells which cover their heads.

Linnæus enumerates ſix ſpecies of daſypus, principally diſtinguiſhed by the number of their moveable belts. See Plate I. of Vol. III.

DATA, among mathematicians, a term for ſuch things or quantities as are given or known, in order to find other things thereby that are unknown. Euclid uſes the word *data* (of which he hath a particular tract) for ſuch ſpaces, lines and angles as are given in magnitude, or to which we can aſſign others equal. From the primary uſe of the word *data* in mathematics, it has been tranſplanted into other arts; as philoſophy, medicine, &c. where it expreſſes any quantity, which, for the ſake of a preſent calculation, is taken for granted to be ſuch, without requiring an immediate proof for its certainty; called alſo the *given* quantity, number, or power. And hence alſo ſuch things as are known, from whence either in natural philoſophy, the animal mechaniſm, or the operation of medicines, we come to the knowledge of others unknown, are now frequently in phyſical writers called *data*.

DATE, an addition or appendage in writings, acts, inſtruments, letters, &c. expreſſing the day and month of the year when the act or letter was paſſed or ſigned; together with the place where the ſame was done. The word is formed from the Latin *datum* "given," the participle of *do* "I give." Our ancient deeds had no dates, but only the month and year, to ſignify that they were not made in haſte, or in the ſpace of a day, but upon longer and more mature deliberation. The king's grants began with theſe words, *Præſentibus & futuris, &c.* but the grants of private perſons with *Omnibus præſentes literas inſpecturis, &c.* A deed is good, though it mentions no date, or hath a falſe date; or even if it hath an impoſſible date, as the 30th of February; provided the real day of its being dated or given, that is, delivered, can be proved: *Blackſt. Com.* vol. ii. p. 304.

DATE, the fruit of the great palm-tree. See PHOENIX.

DATI (Carlo), profeſſor of polite learning at Florence, his native country, became very famous, as well on account of his works, as of the eulogies which have been beſtowed on him by learned men. The chief work to which Dati applied himſelf, was *Della Pittura Antica*, of which he publiſhed an eſſay in the year 1667. He died in 1675, much lamented, as well for his humanity and amiable manners as for his parts and learning.

DATISCA, in botany; a genus of the dodecandria order, belonging to the diœcia claſs of plants; and in the natural method ranking under the 54th order, *Miſcellaneæ*. The male calyx is pentaphyllous; there is no corolla; the antheræ are ſeſſile, long, and 15 in number. The female calyx is bidented; no corolla; the ſtyles three; the capſule triangular, three-horned, unilocular, pervious, polyſpermous, inferior.

DATISI, in logic, a mode of ſyllogiſms in the third figure, wherein the major is an univerſal affirmative, and the minor and concluſion particular affirmative propoſitions. Thus,

DA- All who ſerve God are kings;
TI- Some who ſerve God are poor;
SI, Therefore, ſome who are poor are kings.

DATIVE, in grammar, the third caſe in the declenſion of nouns; expreſſing the ſtate or relaxation of a thing to whoſe profit or loſs ſome other thing is referred. See GRAMMAR. It is called *dative*, becauſe uſually governed by a verb, implying ſomething to be given to ſome perſon. As, *commodare Socrati*, "to lend to Socrates;" *utilis reipublicæ*, "uſeful to the commonwealth;" *perniciosus eccleſiæ*, "pernicious to the church." In Engliſh, where we have properly no caſes, this relation is expreſſed by the ſign *to*, or *for*.

DATURA, the THORN-APPLE, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 28th order, *Luridæ*. The corolla is funnel-ſhaped, and plaited; the calyx tubular, angulated, and deciduous; the capſule quadrivalved. There are ſix ſpecies. The ſtramonium, or common thorn-apple, riſes about a yard high, with an erect, ſtrong, round, hollow, green ſtalk, branching luxuriantly, having the branches widely extended on every ſide; large, oval, irregularly angulated, ſmooth, dark-green leaves; and from the diviſions of the branches, large white flowers ſingly, ſucceeded by large, oval, prickly capſules, growing erect, commonly called *thorn-apples*. At night the upper leaves riſe up and incloſe the flowers. The bloſſoms have ſometimes a tinge of purple or violet. The flowers conſiſt of one large, funnel-ſhaped petal, having a long tube, and ſpreading pentagonal limb, ſucceeded by large roundiſh capſules of the ſize of middling apples, cloſely beſet with ſharp ſpines. An ointment prepared from the leaves gives eaſe in external inflammations and in the hæmorrhoids. The ſeeds were recommended by Dr. Storck to be taken internally in caſes of madneſs; but they ſeem to be a very unſafe remedy. Taken even in a ſmall doſe, they bring on a delirium, and in a large one would certainly prove fatal. Cows, horſes, ſheep, and goats, refuſe this plant.

DAUCUS, the CARROT, in botany; a genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The corolla is a little radiated, all hermaphrodite. The fruit briſtly with ſhort hairs. There are five ſpecies; but the only one which merits attention is the carota, or common carrot. This is ſo well known as to need no deſcription. There are ſeveral varieties, as the white, the orange, and the purple carrot; but of theſe the orange carrot is the moſt eſteemed. It grows longer, larger, and is commonly more handſome than the others, being often 15 or 18 inches long in the eatable part, and from two to four in diameter at top. Carrots are propagated by ſeeds, which are ſown at different ſeaſons of the year, in order to procure a ſupply of young roots for the table at all times. The ſeaſon for ſowing for the earlieſt crop is ſoon after Chriſtmas; the manner of cultivating them is too well known to need any particular deſcription.

Under the article HUSBANDRY we ſhall take notice of the good properties of carrots as a food for cattle. They have been greatly recommended as proper for fattening hogs; but from ſome experiments mentioned in the *Georgical Eſſays* it appears, that though the bacon thus fed is of excellent quality, the feeding is conſiderably dearer than that fed with peaſe, pollard, &c. In the ſame eſſays, an experiment is mentioned by Dr. Hunter, concerning the propriety of raiſing carrots for the uſe of the diſtiller. From a groſs calculation, he is induced to think that a good acre of carrots ſo manufactured will leave a profit of 40l. after deducting the landlord's rent, cultivation, diſtillation, and other incidental expences. In this calculation, he preſumes that the ſpirit is worth ſix ſhillings per gallon, and not exciſed. An acre of barley will by no means produce ſo much ſpirit. A rich ſandy loam is the beſt land for carrots; which, after the crop is removed, will be in high cultivation for corn. Attempts have alſo been made to prepare ſugar from carrots, but without ſucceſs; a thick ſyrupy matter like treacle being only obtainable. A poultice of carrots mitigates the pain and abates the ſtench of foul and cancerous ulcers.—Crickets are very fond of carrots; and are

eafily deftroyed by making a pafte of powdered arfenic, wheat-flour, and fcraped carrots, which muft be placed near their habitations. The feeds have been reckoned diuretic; and were formerly much ufed as a remedy for the ftone, but are at prefent little regarded. Carrots were firft introduced into England by the Flemings, in the reign of queen Elizabeth.

DAVENANT (Sir William), an eminent poet in the 17th century, was born at Oxford in 1606. After fome ftay at the univerfity, he entered into the fervice of Frances firft duchefs of Richmond, and afterward of Fulke Grevil, lord Brook; who having an excellent tafte for poetry, was much charmed with him. He got great efteem by writing poems and plays; and upon the death of Ben Jonfon was created poet-laureat. He wrote his poem Gondibert at Paris. He formed a defign for carrying over a confiderable number of artificers, efpecially weavers, to Virginia, by the encouragement of Henrietta Maria, the queen-mother of England, who obtained leave for him of the king of France. But he and his company were feized by fome parliament fhips, and he carried prifoner firft to the ifle of Wight, and then to the tower of London; but, by the mediation of Milton and others, he got his liberty as a prifoner at large At this time tragedies and comedies being prohibited, he contrived to fet up an Opera, to be performed by declamations and mufic. This Italian opera began in Rutland-houfe in Charter-houfe-yard, 1656; but was afterwards removed to the Cock-pit in Drury-Lane, and was much frequented for many years. In 1648, his Madagafcar, with other poems, was printed. He died in 1668.

DAVENTRY, a town of Northamptonfhire, with a market on Wednefday. Here the diffenters had once a flourifhing academy. It is 10 miles W. of Northampton, and 72 N. W. of London. W. lon. 1. 10. N. lat. 52. 15.

DAUGHTER, *filia*, a female child. See the article CHILDREN. Daughters among the ancients were more frequently expofed than fons, as requiring greater charge to educate and fettle them in the world. Thofe who had no legitimate fons were obliged by the Athenian laws to leave their eftates to their daughters, who were confined to marry their neareft relations, otherwife to forfeit their inheritance; as we find to have been practifed likewife among the Jews, many of whofe laws feem to have been tranfcribed by Solon. If an heirefs happened to be married before her father's death, this did not hinder the neareft relation to claim the inheritance, and even to take the woman from her hufband; which is faid to have been a common cafe.

DAVID, king of Ifrael, and Hebrew poet, was born at Bethlehem 1085, and died 1014 years B. C. His hiftory is particularly recorded in the facred writings.

ST. DAVID's, an epifcopal town of Pembrokefhire, with a market on Wednefday; feated in a barren foil, on the river Ilen, not a mile from the fea. It was once a confiderable place, and had walls, which are now demolifhed. The cathedral is a pretty good ftructure. From the cape, near this place, is a profpect into Ireland. It is 24 miles N. W. of Pembroke, and 255 W. by N. of London. W. long. 5. 15. N. lat. 51. 56.

ST. DAVID's, a fort belonging to the Englifh E. India Company, on the coaft of Coromandel, which was taken and deftroyed by the French in 1758, and has not yet been rebuilt. It is 80 miles S. of Fort St. George. E. long. 79. 45. N. lat. 11. 30.

DAVIDISTS, DAVIDICI, or DAVID GEORGIANS, a fect of heretics, the adherents of David George, a native of Delft, who, in 1525, began to preach a new doctrine; publifhing himfelf to be the true Meffiah; and that he was fent thither to fill heaven, which was quite empty for want of people to deferve it. He is likewife faid to have denied the exiftence of angels, good and evil, of heaven and hell, and to have rejected the doctrine of a future judgment. He rejected marriage, with the Adamites; held, with Manes, that the foul was not defiled by fin; and laughed at the felf-denial fo much recommended by Jefus Chrift. Such were his principal errors. He made his efcape from Delft, and retired firft into Friefland, and then to Bafil, where he changed his name, affuming that of John Bruck, and died in 1556. He left fome difciples behind him, to whom he promifed, that he would rife again at the end of three years. Nor was he altogether a falfe prophet herein; for the magiftrates of that city, being informed, at the three years end, of what he had taught, ordered him to be dug up and burnt, together with his writings, by the common hangman. There are ftill fome remains of this ridiculous fect in Holftein, Friefland, and other countries, whofe temper and conduct feem to difcredit the exaggerated account which fome writers have given of their founder. He was probably a deluded fanatic and myftic.

DAVIS (Sir John), an eminent lawyer and poet, born about the year 1570. He firft diftinguifhed himfelf by his poem *Nofce Teipfum* on the Immortality of the Soul. He became attorney-general, and fpeaker of the houfe of commons in Ireland; and afterwards was appointed lord chief Juftice of the court of King's-Bench in England, but died before his inftallation, in 1626. He publifhed many law tracts; but was efteemed more of a fcholar and a wit than of a lawyer.

DAVIS (John), a famous navigator in the 16th century, was born at Sandridge, near Dartmouth in Devonfhire; and diftinguifhed himfelf by making three voyages to the moft northern parts of America, in order to difcover a north-weft paffage to the Eaft Indies; in which he difcovered the Straits which bear his name. He afterwards performed five voyages to the Eaft Indies; in the laft of which he was flain in a defperate fight with fome Japanefe, near the coaft of Malacca, on the 27th of December 1605. He wrote an account of his fecond voyage for the difcovery of the north-weft paffage; a voyage to the Eaft Indies; and other tracts.

DAVIS's *Straits*, an arm of the fea between Greenland and N. America, difcovered by captain Davis in 1585, when he attempted to find a N. W. paffage to China.

DAVIT, in a fhip, a long beam of timber, reprefented by *a, a,* Plate 89, and ufed as a crane whereby to hoift the flukes of the anchor to the top of the bow, without injuring the fides of the fhip as it afcends; an operation which, by mariners, is called *fifhing the anchor*. The anchors being fituated on both the bows, the davit may be occafionally fhifted, fo as to project over either fide of the fhip, according to the pofition of that anchor on which it is employed. The inner end of the davit is fecured by being thruft into a fquare ring of iron *b*, which is bolted to the deck, and forelocked under the beams. This ring, which is called the *fpan-fhackle*, exhibited at large by fig. 9, is fixed exactly in the middle of the deck, and clofe behind the foremaft. Upon the outer end of the davit is hung a large block *c*, through which a ftrong rope traverfes, called the *fifh-pendent*, *d*; to whofe foremoft end is fitted a large iron hook *e*, and to its after end a tackle or complication of pullies *f*; the former of which is called the *fifh-hook*, and the latter the *fifh-tackle*. The davit, therefore, according to the fea-phrafe, is employed to *fifh the anchor*; which being previoufly *catted*, the fifh-hook is faftened upon its flukes; and the efforts of the tackle being tranfmitted to the hook, by means of the fifh-pendent, draws up that part of the anchor fufficiently high upon the bow to faften it, which is done by the *fhank-painter*. See that article.—There is alfo a davit of a fmaller kind occafionally fixed in the long-boat, and employed to weigh the anchor therein.

DAUPHIN, a title given, during the exiftence of royalty in France, to the eldeft fon and prefumptive heir of the crown; on account of the province of Dauphiné, which in 1343 was given to Philip de Valois, on this condition, by Humbert dauphin of the Viennois. The dauphin, in his letters patent, ftyled himfelf,

By the grace of God, eldest son of France, and dauphin of Viennois. DAUPHIN was anciently the title or appellation of the prince of Viennois in France.

DAUPHINS, or *Delphins*, in literary hiftory, a name given to the commentators on the ancient Latin authors, who were employed by order of Louis XIV. of France, for the benefit of the prince, under the care and direction of M. de Montaufier his governor, and Boffuet and Huet his preceptors. They were 39 in number.

DAUPHINY, a late province of France, bounded on the W. by the Rhone, on the N. by the Rhone and Savoy, on the S. by Provence, and on the E. by the Alps. Hence the heir-apparent of the late crown of France was called the Dauphin: a title which he derived from the following circumftance. In 1349, Hubert II. count of Dauphiny, being inconfolable for the lofs of his only fon, whom he had let fall from a window of his palace at Grenoble into the Ifere, entered into a convent of Jacobins, and ceded Dauphiny (which, moreover, he had with difficulty defended againft the attempts of Amadeus, duke of Savoy) to Philip, a younger fon of Philip of Valois, for 120,000 florins of gold (each of the value of 20 fols, or 12d. Englifh) on this condition, that the eldeft fon of the king of France fhould be ftyled the Dauphin. Charles V. furnamed the Wife, grandfon of Philip of Valois, firft bore this title in 1530. Two thirds of Dauphiny are interfected by mountains, which afford good pafturage, plenty of timber; fir trees, in particular, for the building of fhips; and very fcarce fimples. In thefe mountains, which are branches of the Alps, are bears, chamois (a kind of wild goat, whofe fkin is much valued) marmots, eagles, hawks, &c. A number of children go from town to town, and gain a livelihood by making the marmot dance. The vallies afford wheat, and the hills, in the vicinity of the Rhone, excellent wines, olives, and filk. Mines of iron, copper, and lead, have been worked here to great advantage; and they have likewife been fuccefsful in working a mine of gold (the only one in France) at Gardette, nine leagues from Grenoble. The principal rivers of Dauphiny are the Rhone, Durance, Ifere, and Drome. It now forms the departments of Drome, Ifere, and Upper Alps; including an extent of country 40 leagues long from N. to S. and 36 broad from E. to W.

DAURAT (John), an eminent French poet, born in 1507. In the reign of Henry II. he was preceptor to the king's pages, and Charles IX. who took great delight in his converfation, and honoured him with the title of his poet; but his generofity and want of management placed him in that clafs of learned men who have been very near ftarving. Conformably to the tafte of the age, he had fo much fkill in making anagrams, that feveral illuftrious perfons gave him their names to anagrammatife: he alfo undertook to explain the Centuries of Noftradamus. Making verfes was a difeafe in him: for no book was printed, nor did any perfon of confequence die, but Daurat made fome verfes on the occafion; as if he had been poet in ordinary, or his mufe had been a hired mourner, to the whole kingdom. Scaliger tells us, that he fpent the latter part of his life in endeavouring to find all the bible in Homer. He died in 1588.

DAY, according to the moft natural and obvious fenfe of the word, fignifies that fpace of time during which it continues to be light; in contradiftinction to night, being that partition of time wherein it is dark: but the fpace of time in which it is light being fomewhat vague and indeterminate, the time between the rifing and the fetting of the fun is ufually looked on as the day; and the time which lapfes from its fetting to its rifing again, the night.

The word *day* is often taken in a large fenfe, fo as to include the night alfo; or to denote the time of a whole apparent revolution of the fun round the earth; in which fenfe it is called by fome a natural day, and by others an artificial one but, to avoid confufion, it is ufual to call it in the former fenfe fimply the *day*, and in the latter a *nychthemeron*; by which term that acceptation of it is aptly denoted, as it implies both day and night. The nychthemeron is divided into twenty-four parts, called *hours*; which are of two forts, equal and unequal or temporary. See the article HOUR, and CHRONOLOGY, page 521.

DAY-*Coal*, in natural hiftory, a name given by the miners of England, and the common people who live in coal countries, to that feam or ftratum of coal which lies uppermoft in the earth. The fame vein or ftratum of coal ufually runs a great way through the country, and dips and rifes in the earth at different places; fo that this upper ftratum, or day-coal, is, in the various parts of the fame ftratum, fometimes near the furface, and fometimes many fathoms deep. The fubterranean fires found in fome of our coal-countries feed principally on this coal; and are nearer to or farther from the furface as it rifes or finks.

DAY-*Fly*. See EPHEMERIS.

DAY-*Net*, among fowlers. See NET.

DAYS *of Grace*, are thofe granted by the court at the prayer of defendant or plaintiff. In commerce, *Days of grace*, are the three days allowed for the payment of a bill of exchange, &c. after the fame has become due. It is the cuftom to give ten days in France and Dantzic; eight at Naples; fix at Venice, Amfterdam, Rotterdam, and Antwerp; four at Francfort; five in Leipfic; twelve at Hamburgh; fix in Portugal; fourteen in Spain; thirty in Genoa, &c. In Britain the days of grace are given and taken as a matter of courfe, the bill being only paid on the laft day: but in other countries, where the time is much longer, it would be reckoned difhonourable for a merchant to take advantage of it; bills are therefore paid on the very day they fall due.

DAY's-*Man*, in the north of England, an arbitrator or perfon chofen to determine an affair in difpute.

Intercalary DAYS. See INTERCALARY *Days*.

DAY's-*Work*, among feamen, the reckoning or account of the fhip's courfe during 24 hours, or between noon and noon, according to the rules of trigonometry. See DEAD-*Reckoning*.

DAZE, in natural hiftory, a name given by our miners to a glittering fort of ftone, which often occurs in their works; and, as it is an unprofitable fubftance, is one of thofe things they call *weeds*. The word *daze* takes in with them every ftone that is hard and glittering; and therefore it comprehends the whole genus of the telangia or ftony nodules, which have the flakes of talk in their fubftance: thefe, according to the colour of the ftony matter they are bedded in, and their own colour, give the names of *black daze, white, red,* and *yellow daze,* to thefe ftones.

DEACON, DIACONUS, a perfon in the loweft degree of holy orders, whofe bufinefs is to baptife, read in the church, and affift at the celebration of the eucharift. The word is formed from the Latin *Diaconus*, of the Greek διακονος, minifter, fervant. Deacons were inftituted feven in number, by the apoftles, *Acts*, chap. vi. which number was retained a long time in feveral churches. Their office was to ferve in the Agapæ, and to diftribute the bread and wine to the communicants. Another part of the office of deacons, was to be a fort of monitors and directors to the people in the exercife of their public devotions in the church; for which purpofe they made ufe of certain known forms of words, to give notice when each part of the fervice began. Whence they are fometimes called *cirokerukes*, "the holy criers of the church."

Deacons had, by licence and authority from the bifhop, a power to preach, to reconcile penitents and grant them abfolution, and to reprefent their bifhops in general councils. Their office out of the church was to take care of the neceffitous, fuch as orphans, widows, prifoners, and all the poor and fick who had any title to be maintained out of the revenues of the church; to inquire into the morals and converfation of the people, and

to make their report thereof to the bifhop. Whence, on account of the variety of bufinefs, it was ufual to have feveral deacons in the fame church.

In the Romifh church, it is the deacon's office to incenfe the officiating prieft or prelate; to lay the corporal on the altar; to receive the patten or cup from the fubdeacon, and prefent them to the perfon officiating; to incenfe the choir; to receive the pax from the officiating prelate, and carry it to the fubdeacon; and at the pontifical mafs, when the bifhop gives the bleffing, to put the mitre on his head, and to take off the archbifhop's pall and lay it on the altar. In England, the form of ordaining deacons declares that it is their office to affift the prieft in the diftribution of the holy communion; in which, agreeably to the practice of the ancient church, they are confined to the adminiftering the wine to the communicants. A deacon in England is not capable of any ecclefiaftical promotion; yet he may be a chaplain to a family, curate to a beneficed clergyman, or lecturer to a parifh-church. He may be ordained at 23 years of age *anno currente*; but it is exprefsly provided, that the bifhop fhall not ordain the fame perfon a prieft and deacon in the fame day. Deacons, according to St. Paul, fhould be chafte, fincere, and blamelefs; neither great drinkers, nor given to filthy lucre: they fhould hold the myftery of the faith in a pure confcience; and fhould be well approved before they are admitted to the miniftry. In the church of Scotland, the deacon's office is only to take care of the poor.

DEACONESS, *a female deacon*; an order of women who had their diftinct offices and fervices in the primitive church. This office appears as ancient as the apoftolical age; for St. Paul calls Phebe a fervant of the church of Cenchrea. The original word is διακονος, anfwerable to the Latin word *miniftra*. Tertullian calls them *viduæ*, widows, becaufe they were commonly chofen out of the widows of the church; and, for the fame reafon, Epiphanius, and the council of Laodicea, calls them πρεσβυτιδας, elderly women, becaufe none but fuch were ordinarily taken into this office. For, indeed, by fome ancient laws, thefe four qualifications were required in every one that was to be admitted into this order. 1. That fhe fhould be a widow. 2. That fhe fhould be a widow that had borne children. 3. A widow that was but once married. 4. One of a confiderable age, 40, 50, or 60 years old: though all thefe rules admitted of exceptions. Concerning their ordination, whether it was always performed by impofition of hands, the learned are much divided in their fentiments. Baronius and Valefius think they were not, and make no other account of them than as mere layperfons. But the author of the Conftitutions, fpeaking of their ordination, requires the bifhop to ufe impofition of hands, with the form of prayer which is there recited. We are not, however, to imagine, that this ordination gave them any power to execute any part of the facerdotal office. They were only to perform fome inferior fervices of the church, and thofe chiefly relating to the women, for whofe fakes they were ordained. One part of their office was to affift the minifter at the baptizing of women, to undrefs them for immerfion, and to drefs them again, that the whole ceremony might be performed with all the decency becoming fo facred a rite. Another part of their office was to be private catechifts to the women-catechumens who were preparing for baptifm. They were likewife to attend the women that were fick and in diftrefs; to minifter to martyrs and confeffors in prifon; to attend the women's gate in the church; and laftly, to affign all women their places in the church, regulate their behaviour, and prefide over the reft of the widows; whence in fome canons they are ftyled προκαθημεναι, "governeffes." This order, which fince the 10th or 12th century has been wholly laid afide, was not abolifhed every where at once, but continued in the Greek church longer than in the Latin, and in fome of the Latin churches longer than in others.

DEACONRY, DIACONATE, the order or miniftry of a deacon or deaconefs. See DEACON and DEACONESS.

DEACONRY, *Diaconia*, is alfo a name ftill referved to the chapels and oratories in Rome, under the direction of the feveral deacons, in their refpective regions or quarters. To the deaconries were annexed a fort of hofpitals or boards for the diftribution of alms, governed by the regionary deacons, called *Cardinal deacons*, of whom there were feven, anfwering to the feven regions, their chief being called the *archdeacon*. The hofpital adjoining to the church of the deaconry had an adminiftrator for the temporal concerns, called the *father of the deaconry*, who was fometimes a prieft and fometimes a layman. At prefent there are fourteen of thefe deaconries or hofpitals at Rome, which are referved to the cardinals.

DEAD LANGUAGES. See PHILOLOGY.

Prefervation of DEAD *Bodies*. See EMBALMING.

Feaft of the DEAD. See FEAST *of the dead*.

DEAD-*Lights*, certain wooden ports which are made to faften into the cabin windows, to prevent the waves from gufhing into the fhip in a high fea. As they are made exactly to fit the windows, and are ftrong enough to refift the waves, they are always fixed in on the approach of a ftorm, and the glafs lights taken out, which muft otherwife be fhattered to pieces by the furges, and fuffer great quantities of water to enter the veffel.

DEAD-*Men's-Eyes*, or *Dead-Eyes*, in the fea-language, a kind of blocks with many holes in them, but no fheevers, whereby the fhrowds are faftened to the chains; the crow-feet reeve alfo through thefe holes: and, in fome fhips, the mainftays are fet tight in them; but then they have only one hole, through which the lanyards go feveral times. See plate 89.

DEAD'S *Part*, in Scots law, that half of a teftator's effects which his widow cannot claim.

DEAD-*Reckoning*, in navigation, the judgement or eftimation which is made of the place where a fhip is fituated; without any obfervation of the heavenly bodies. It is difcovered by keeping an account of the diftance fhe has run by the log, and of her courfe fteered by the compafs; and by rectifying thefe data by the ufual allowance for drift, lee-way, &c. according to the fhip's known trim. This reckoning, however, is always to be corrected, as often as any good obfervation of the fun can be obtained.

DEAD-*Sea*, in geography, a lake of Judea, into which the river Jordan difcharges itfelf; being about 70 miles long and 20 broad. See ASPHALTITES.

DEAD-*Tops*, a difeafe incident to young trees, and cured by cutting off the dead parts clofe to the next good twig or fhoot, and claying them over as in grafting.

DEAD-*Water*, at fea, the eddy-water juft aftern of a fhip; fo called becaufe it does not pafs away fo fwift as the water running by her fides does. They fay that a fhip makes much dead-water when fhe has a great eddy following her ftern.

DEADLY-CARROT. See THAPSIA.

DEADLY-*Feud*, in Englifh law-books, a profeffion of irreconcileable enmity, till a perfon is revenged by the death of his enemy. The word *feud* is derived from the German *Fehd*; which, as Hottoman obferves, fignifies *modo bellum, modo capitales inimicitias*. Such enmity and revenge was allowed by law in the time of the Saxons, viz. if any man was killed, and a pecuniary fatisfaction was not made to the kindred, it was lawful for them to take up arms and revenge themfelves on the murderer: which was called *deadly feud*. And this probably was the original of an APPEAL.

DEAFNESS, the ftate of a perfon who wants the fenfe of hearing; or that difeafe of the ear which prevents its due reception of founds. See SURGERY. Deafnefs generally arifes either from defect or compreffion of the auditory nerve; or from

ſome collection of matter in the cavities of the inner ear; or from the auditory paſſage being ſtopped up by the hardened ſecretions; or, laſtly, from ſome excreſcence, or ſwelled gland, or ſome foreign body introduced within it.

Thoſe born deaf are alſo dumb, as not being able to learn any language, at leaſt in the common way. However, as the eyes in ſome meaſure ſerve them for ears, they may underſtand what is ſaid by the motion of the lips, tongue, &c. of the ſpeaker; and even accuſtom themſelves to move their own, as they ſee other people do, and by this means learn to ſpeak.— Thus it was that Dr. Wallis taught two young gentlemen born deaf to know what was ſaid to them, and to return pertinent anſwers. The inſtruction of perſons in this unfortunate predicament has ſince been very ſucceſsfully carried on by Meſſrs. Telfair, Braidwood, and others.

It is obſervable, that deaf perſons, and ſeveral others thick of hearing, hear better and more eaſily if a loud noiſe be raiſed at the time when we ſpeak to them: which is owing, no doubt, to the greater tenſion of the ear-drum on that occaſion. Dr. Wallis mentions a deaf woman, who if a drum were beat in the room could hear any thing very clearly; ſo that her huſband hired a drummer for a ſervant, that by this means he might hold converſation with his wife. But with regard to this opinion there may be much deception; the ſenſe of feeling being ſo nearly allied to that of hearing as to convey certain vibrations which afford information to the mind, although the party be completely deaf.

DEAL, a thin kind of fir-planks, of great uſe in carpentry. They are formed by ſawing the trunk of the tree into a great many longitudinal diviſions, of greater or leſs thickneſs according to the purpoſes they are intended to ſerve. A very good method of ſeaſoning planks of deal and fir is to throw them into ſalt water as ſoon as they are ſawed, and keep them there three or four days, frequently turning them; in this caſe they will be rendered much harder, by drying afterwards in the air and ſun; but neither this, nor any other method yet known, will preſerve them from ſhrinking. Rods of deal expand laterally, or croſs the grain, in moiſt weather, and contract again in dry; and thence have been found to make an uſeful hygrometer.

Deal, a ſeaport in Kent, which, though pretty large, has neither market nor fair. It is ſeated on the ſeaſhore, and is a member of Sandwich, governed by a mayor and jurats. It has a church, a chapel, and about 1000 houſes. The inhabitants amount to about 4500; but as no manufacture is carried on here, the people chiefly depend on the ſeafaring men who reſort hither. This place is defended by a caſtle built by Henry VIII. and near it are two others. Between this place and the Goodwin Sands are the Downs, where the ſhips uſually ride at going out or coming home. It is ſeven miles S. by E. of Sandwich, and 72 E. by S. of London. E. long. 1. 29. N. lat. 51. 13.

DEAN, an eccleſiaſtical dignity in cathedral and collegiate churches, and head of the chapter.

Rural Dean, called alſo *Arch-preſbyter*, originally exerciſed juriſdiction over ten churches in the country, and afterwards became only the biſhop's ſubſtitute, to grant letters of adminiſtration, probate of wills, &c. to convocate the clergy; and to ſignify to them ſometimes by letter the biſhop's will, and to give induction to the archdeacon. Their office is now loſt in that of the archdeacons and chancellors.

Dean *of a Monaſtery*, was a ſuperior eſtabliſhed under the abbot, to eaſe him in taking care of ten monks; whence he was called *decanus*.

Dean *and Chapter*, are the council of the biſhop, to aſſiſt him with their advice in affairs of religion, and alſo in the temporal concerns of his ſee. When the reſt of the clergy were ſettled in the ſeveral pariſhes of each dioceſe, theſe were reſerved for the celebration of divine ſervice in the biſhop's own cathedral; and the chief of them, who preſided over the reſt, obtained the name of *decanus* or *dean*, being probably at firſt appointed to ſuperintend ten canons or prebendaries.

All ancient deans are elected by the chapter by *conge d'elire* from the king, and letters miſſive of recommendation, in the ſame manner as biſhops; but in thoſe chapters that were founded by Henry VIII. out of the ſpoils of the diſſolved monaſteries, the deanery is donative, and the inſtallation merely by the king's letters patent. The chapter conſiſting of canons or prebendaries, are ſometimes appointed by the king, ſometimes by the biſhop, and ſometimes elected by each other.

The dean and chapter are the nominal electors of a biſhop. The biſhop is their ordinary and immediate ſuperior; and has, generally ſpeaking, the power of viſiting them, and correcting their exceſſes and enormities. They had alſo a check on the biſhop at common law; for till the ſtatute 32 Hen. VIII. c. 28. his grant or leaſe would not have bound his ſucceſſors, unleſs confirmed by the dean and chapter.

Dean *of Guild*, that magiſtrate of a royal borough in Scotland, who is head of the merchant-company; having cognizance of mercantile cauſes within the borough.

DEANERY, the office of a Dean. Deaneries and prebends may become void like a biſhopric, by death, by deprivation, or by reſignation either to the king or biſhop. If a dean, prebendary, or other ſpiritual perſon, be made a biſhop, all the preferments of which he was before poſſeſſed are void; and the king may preſent to them in right of his prerogative royal. But they are not void by the election, but only by the conſecration.

DEATH is generally conſidered as the ſeparation of the ſoul from the body; in which ſenſe it ſtands oppoſed to life, which conſiſts in their union. An animal body, by the actions inſeparable from life, undergoes a continual change. Its ſmalleſt fibres become rigid; its minute veſſels grow into ſolid fibres no longer pervious to the fluids; its greater veſſels grow hard and narrow; and every thing becomes contracted, cloſed and bound up: whence the dryneſs, immobility, and extenuation, obſerved in old age. At length, in the proceſs of theſe changes, death itſelf becomes inevitable, as the neceſſary conſequence of life. But it is rare that life is thus long protracted, or that death ſucceeds merely from the decays and impairment of old age. Diſeaſes, a long and horrid train, cut the work ſhort. The ſigns of death are in many caſes very uncertain; they have proved ſuch in ſo many inſtances, that it ought to be a rule never to inter a deceaſed perſon, till indiſputable marks of putrefaction appear. In many caſes of apparent death from ſuffocation, convulſions, &c. the methods of reſuſcitation recommended by the Humane Society ſhould be uſed. See Drowning.

Death *in Law*. In law, there is a natural death and a civil death: natural, where nature itſelf expires; civil, where a perſon is not actually dead, but adjudged ſo by law. Thus, if any perſon, for whoſe life an eſtate is granted, remains beyond ſea, or is otherwiſe abſent, ſeven years, and no proof made of his being alive, he ſhall be accounted naturally dead.

Brothers of Death, a denomination uſually given to the religious of the order of St. Paul, the firſt hermit. They are called *brothers of death, fratres a morte*, on account of the figure of a death's head, which they were always to have with them, in order to keep perpetually before them the thoughts of death. This order, by its conſtitutions made in 1620, does not ſeem to have been eſtabliſhed long before pope Paul V. Louis XIII. in 1621, permitted them to ſettle in France. The order was probably ſuppreſſed by pope Urban VIII.

Death-*Watch*, in natural hiſtory, a little inſect famous for a ticking noiſe, like the beat of a watch, which ſuperſtitious people take for a preſage of death in the family where it is heard: whence it is alſo called *pediculus fatidicus*, *mortiſaga*, *pulſatorius*, &c. There are two kinds of death-watches. Of the firſt we have a good account in the Phil. Tranſ. by Mr. Allen. It is a ſmall beetle, 5-16ths of an inch long, of a dark-brown colour, ſpotted; having pellucid wings under the vagina, a large cap or helmet on the head, and two antennæ proceeding from beneath the eyes, and doing the office of proboſcides. The part it beats with, he obſerved, was the extreme edge of the face, which he chooſes to call the upper-lip, the mouth being protracted by this bony part, and lying underneath out of view. This account is confirmed by Dr. Derham; with this difference, that inſtead of ticking with the upper-lip, he obſerved the inſect to draw back its mouth, and beat with its forehead. That author had two death-watches, a male and a female, which he kept alive in a box ſeveral months; and could bring one of them to beat whenever he pleaſed, by imitating its beating. By this ticking noiſe he could frequently invite the male to coition with the other. When the male found he got up in vain, he would get off again, beat very eagerly, and then up again: whence the ingenious author concludes thoſe pulſations to be the way whereby theſe inſects woo one another, and find out and invite each other to copulation.

The ſecond kind of death-watch is an inſect in appearance quite different from the firſt. The former only beats ſeven or eight ſtrokes at a time, and quicker; the latter will beat ſome hours together without intermiſſion; and his ſtrokes are more leiſurely, and like the beat of a watch. This latter is a ſmall greyiſh inſect, much like a louſe when viewed with the naked eye.

It is very common in all parts of the houſe in the ſummer-months. It is very nimble in running to ſhelter, and ſhy of beating when diſturbed; but will beat very freely before you, and alſo anſwer the beating, if you can view it without giving it diſturbance, or ſhaking the place where it lies, &c. The author cannot ſay whether they beat in any other thing, but he never heard their noiſe except in or near paper. As to their noiſe, the ſame perſon is in doubt whether it be made by their heads, or rather ſnouts, againſt the paper; or whether it be not made after ſome ſuch manner as graſhoppers and crickets make their noiſe. He inclines to the former opinion. The reaſon of his doubt is, that he obſerved the animal's body to ſhake and give a jerk at every beat, but could ſcarce perceive any part of its body to touch the paper. But its body is ſo ſmall and near the paper, and its motion in ticking ſo quick, that he thinks it might be, yet he not perceive it. The ticking, as in the other, he judges to be a wooing act; as having obſerved another, after much beating, come and make offers to the beating inſect, who, after ſome offers, left off beating, and got upon the back of the other. When they were joined, he left off again; and they continued ſome hours joined tail to tail, like dog and bitch in coition. Whether this inſect changes its ſhape, and becomes another animal or not, he cannot ſay; though he has ſome cauſe to ſuſpect that it becomes a ſort of fly. It is at firſt a minute white egg, much ſmaller than the nits of lice; though the inſect is near as big as a louſe. In March it is hatched, and creeps about with its ſhell on. When it firſt leaves its ſhell, it is even ſmaller than its egg; though that be ſcarce diſcernible without a microſcope. In this ſtate it is perfectly like the mites in cheeſe. From the mite-ſtate they grow gradually to their mature perfect ſtate. When they become like the old ones, they are at firſt very ſmall, but run about much more ſwiftly than before.

DEBENTURE, a term of trade uſed at the cuſtom-houſe for a kind of certificate ſigned by the officers of the cuſtoms, which intitles a merchant exporting goods to the receipt of a bounty or draw-back. All merchandizes that are deſigned to be taken on board for that voyage being entered and ſhipped, and the ſhip being regularly cleared out, and ſailed out of port on her intended voyage, debentures may be made out from the exporter's entries, in order to obtain the draw-backs, allowances, bounties, or premiums; which debentures for foreign goods are to be paid within one month after demand. And in making out theſe debentures, it muſt be obſerved, that every piece of vellum, parchment, or paper, containing any debenture for drawing back cuſtoms or duties, muſt, before writing, be ſtamped, and pay a duty of 8d.

The forms of debentures vary according to the merchandiſe exported. In the execution of debentures for tobacco, it muſt be particularly obſerved, 1. That debentures for the ſame quantity may be made on one or more parchments. 2. That the exporter's oath muſt be printed, ſpecifying whether he acts for himſelf or on commiſſion. 3. If exported to any other foreign ports than Ireland, the word *Ireland* muſt be added to the oath after *Great Britain*. 4. That as no tobacco may be conſumed on board of ſhips of war in Europe but what has paid full duties, and been manufactured in Great Britain, no drawback is to be allowed for tobacco exported in any man of war. 5. That the eight pounds *per* hogſhead of 350 pounds, or more, allowed for draught at importation, muſt not be deducted on exportation. 6. That debentures for tobacco exported to Ireland muſt not be paid till a certificate be produced, teſtifying the landing thereof. 7. That no perſons may ſwear to the exportation but ſuch as are permitted to ſwear to debentures for other goods. In debentures for all other foreign goods, no perſon may be admitted to ſwear to the exportation but the true exporter, either as a proprietor, or who, being employed by commiſſion, is concerned in the direction of the voyage. All kinds of debentures, before delivered or paid to the exporters, are entered into a ſeparate book kept for that purpoſe by the collector and comptroller of the cuſtoms.

DEBILITY, among phyſicians, a relaxation of the ſolids, occaſioning various diſeaſes.

DEBRECHEN, a town of Upper Hungary, about 77 miles eaſt of Buda. E. long. 21. 10. N. lat. 47. 45.

DEBRUIZED, in heraldry, a term peculiar to the Engliſh, by which is intimated the grievous reſtraint of any animal, debarred of its natural freedom, by any of the ordinaries being laid over it.

DEBT, in law, any thing due to another, whether it be money, goods or ſervices; or the action brought for recovering the ſame. See Law.

National Debt. See Funds and National *Debt*.

DEBTOR, a perſon who owes any thing to another; in contradiſtinction to creditor, which is he to whom the debt is owing.

Debtor, in merchants' accounts. See the article Book-keeping.

DECADE, a word uſed by ſome old writers for the number ten, and *decades* for an enumeration by tens. The word is formed from the Latin *decas*, which is derived from a Greek word of the ſame import. The word has been more peculiarly appropriated to the number of books, *q. d. decades*, into which the Roman Hiſtory of Titus Livius is divided. Hence alſo came *decadal* arithmetic, the Decameron of Boccacio, &c. The French have adopted the computation of time by *decades* in their new calendar.

DECAGON, in geometry, a plain figure with ten ſides and ten angles.

DECAGYNIA, from δεκα *ten*, and γυνη a *woman*, the name of an order, or ſecondary diviſion, in the claſs decandria,

of the ſexual method, conſiſting of plants whoſe flowers are furniſhed with ten ſtamina and the ſame number of ſtyles; which laſt are conſidered by Linnæus and the ſexualiſts as the female organs of generation in plants. Neurada and American nightſhade furniſh examples.

DECALOGUE, the ten precepts or commandments delivered by God to Moſes, after engraving them on two tables of ſtone. The Jews, by way of excellence, call theſe commandments the *ten words*, from whence they had afterwards the name of *decalogue*: but it is to be obſerved, that they joined the firſt and ſecond into one, and divided the laſt into two. They underſtand that againſt ſtealing to relate to the ſtealing of men, or kidnapping; alleging, that the ſtealing one another's goods or property is forbidden in the laſt commandment. The emperor Julian objected to the decalogue, that the precepts it contained (thoſe only excepted which concern the worſhip of falſe gods, and the obſervation of the ſabbath) were already ſo familiar to all nations, and ſo univerſally received, that they were unworthy, for that very reaſon, to be delivered, by ſo great a legiſlator, to ſo peculiar a people. The church of Rome has ſtruck the ſecond commandment quite out of the decalogue; and to make their number complete, hath ſplit the tenth into two: the reaſon of which may be eaſily conceived.

DECAN, a kingdom of Aſia, in the peninſula on this ſide the Ganges, bounded on the ſouth by the kingdom of Biſnagar, on the weſt by the ocean, on the north by Moguliſtan, and on the eaſt by the mountains which ſeparate it from Golconda.

DECANDRIA, from δεκα *ten*, and ανηρ a *huſband*, Linnæus's tenth claſs, comprehending thoſe hermaphrodite plants which bear flowers with ten ſtamina. See BOTANY, p. 40.

DECANTATION, among chemiſts, &c. the gently pouring off a liquor from its fæces, by inclining the lip or canthus of the veſſel; whence the name.

DECANUS, in Roman antiquity, an officer who preſided over the other ten officers, and was head of the contubernium, or ſergeant of a file of ſoldiers.

DECAPROTI, DECEMPRIMI, in Roman antiquity, officers for gathering the tributes and taxes. The decaproti were alſo obliged to pay for the dead, or to anſwer to the emperor for the quota parts of ſuch as died out of their own eſtates.

DECASPERMUM, in botany; a genus of the monogynia order, belonging to the icoſandria claſs of plants. The calyx is a turbinated perianthium, quinquefid at the apex. The corolla has five roundiſh petals. The ſtamina are many filiform filaments, a little ſhorter than the corolla. The pericarpium is a dry globular, decemlocular berry, with ſolitary egg-ſhaped ſeeds.

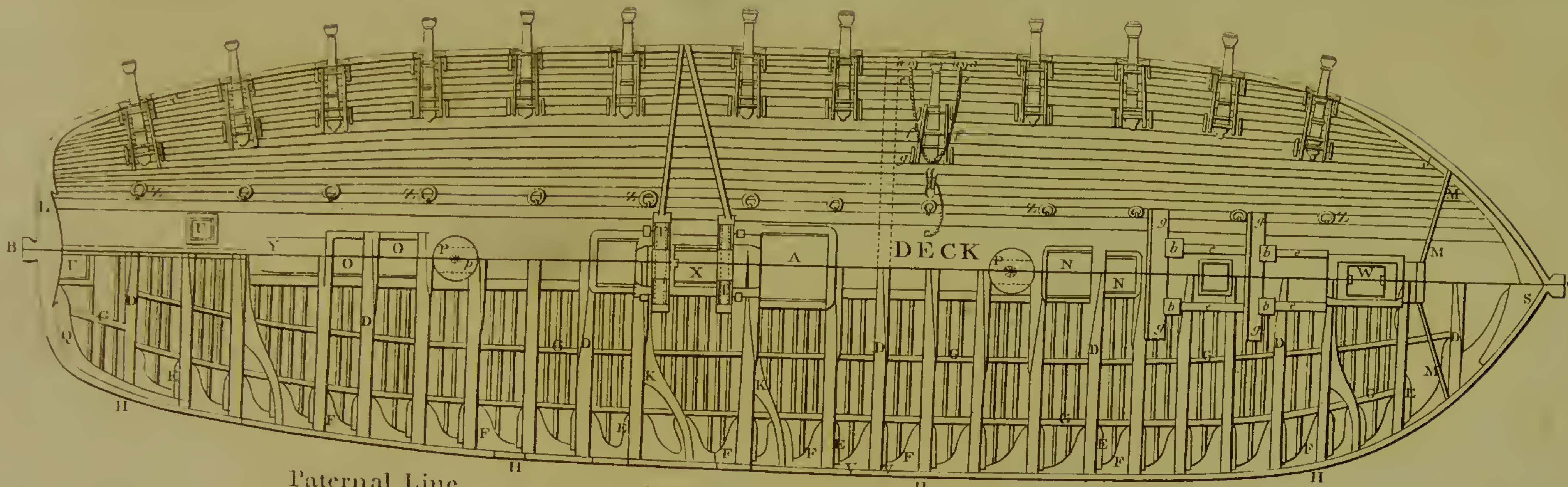
DECASTYLE, in the ancient architecture, a building with an ordnance of ten columns in front, as the temple of Jupiter Olympius was.

DECEMBER, the laſt month in the year, wherein the ſun enters the tropic of Capricorn, and makes the winter ſolſtice. In Romulus's year, December was the tenth month, whence the name, viz. from *decem* "ten:" for the Romans began their year in March. The month of December was under the protection of Veſta. Romulus aſſigned it 30 days, Numa reduced it to 29, which Julius Cæſar increaſed to 31. Under the reign of Commodus, this month was called, by way of flattery, *Amazonius*, in honour of a courteſan whom that prince paſſionately loved, and had got painted like an Amazon: but it only kept the name during that emperor's life. At the latter end of this month they had the *juveniles ludi*; and the country people kept the feaſt of the goddeſs Vacuna in the fields, having then gathered in their fruits and ſown their corn; whence ſeems to be derived our popular feſtival called *harveſt-home*.

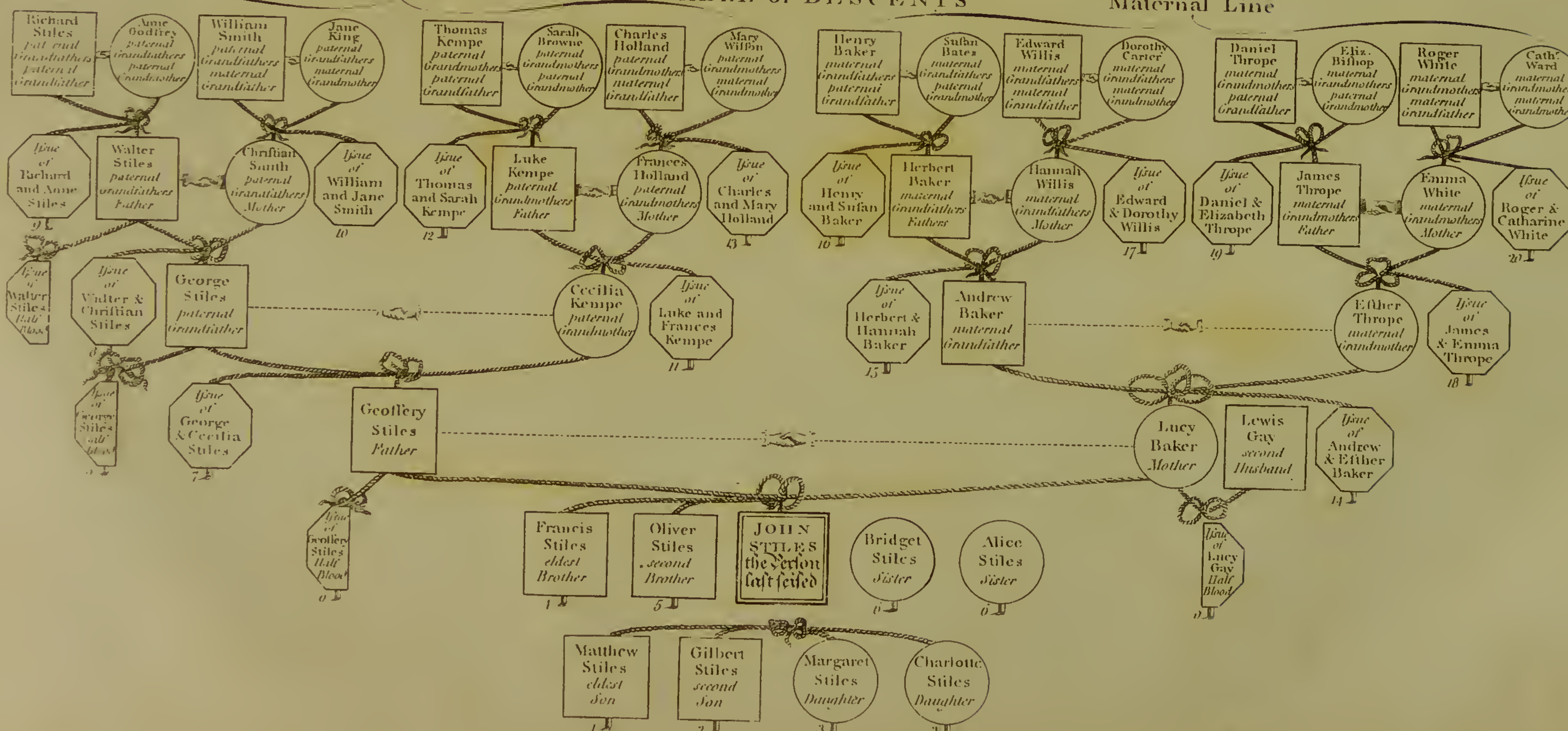
DECEMPEDA, Δεκαπους, *ten-feet rod*, an inſtrument uſed by the ancients in meaſuring. The decempeda was a rule or rod divided into ten feet; whence its name, from *decem* "ten," and *pes* "a foot." The foot was ſubdivided into twelve inches, and each inch into ten digits. The decempeda was uſed both in meaſuring of land, like the chain among us; and by architects to give the proper dimenſions and proportions to the parts of their buildings, which uſe it ſtill retains. Horace, lib. ii. od. 15. blaming the magnificence and delicacy of the buildings of his time, obſerves that it was otherwiſe in the times of Romulus and Cato; that in the houſes of private perſons there were not then known any porticoes meaſured out with the decempeda, nor turned to the north to take the cool air.

DECEMVIRI, ten magiſtrates of abſolute authority among the Romans. The privileges of the patricians raiſed diſſatisfaction among the plebeians; who, though freed from the power of the Tarquins, ſtill ſaw that the adminiſtration of juſtice depended upon the will and caprice of their ſuperiors, without any written ſtatute to direct them, and convince them that they were governed with equity and impartiality. The tribunes complained to the ſenate, and demanded that a code of laws might be framed for the uſe and benefit of the Roman people. This petition was complied with; and three ambaſſadors were ſent to Athens and all the other Grecian ſtates, to collect the laws of Solon and of all the other celebrated legiſlators of Greece. Upon the return of the commiſſioners it was univerſally agreed, that ten new magiſtrates called *Decemviri* ſhould be elected from the ſenate to put the project into execution. Their power was abſolute, all other offices ceaſed after their election, and they preſided over the city with regal authority. They were inveſted with the badges of the conſul, in the enjoyment of which they ſucceeded by turns; and only one was preceded by the faſces, and had the power of aſſembling the ſenate and confirming decrees. The firſt decemvirs were Appius Claudius, T. Genutius, P. Sextus, Sp. Veturius, C. Julius, A. Manlius, Ser. Sulpitius, Pluriatius, T. Romulus, Sp. Poſthumius, in the year of Rome 302. Under them the laws, which had been expoſed to public view, that every citizen might ſpeak his ſentiments, were publicly approved of as conſtitutional, and ratified by the prieſts and augurs in the moſt ſolemn and religious manner. They were ten in number, and were engraved on tables of braſs; two were afterwards added, and they were called the laws of the twelve tables, *leges duodecim tabularum*, and *leges decemvirales*. The decemviral power, which was beheld by all ranks of people with the greateſt ſatisfaction, was continued; but in the third year after their creation the decemvirs became odious on account of their tyranny, and the attempt of Ap. Claudius to raviſh Virginia totally aboliſhed that office. The people were ſo exaſperated againſt them, that they demanded them from the ſenate to burn them alive. Conſuls were again appointed, and tranquillity re-eſtabliſhed in the ſtate. There were other officers in Rome called decemvirs, who were originally appointed in the abſence of the prætor to adminiſter juſtice. Their appointment became afterwards neceſſary, and they generally aſſiſted at ſales, called *ſubhaſtationes*, becauſe a ſpear, *haſta*, was fixed at the door of the place where the goods were expoſed to ſale. They were called *decemviri litibus judicandis*. The officers whom Tarquin appointed to guard the Sibylline books were alſo called *decemviri*. They were originally two in number, called *duumviri*, till the year of Rome 388, when their number was increaſed to ten, five of which were choſen from the plebeians and five from the patricians. Sylla increaſed their number to fifteen, called *quindecemvirs*.

DECENNALIA, ancient Roman feſtivals, celebrated by the emperors every tenth year of their reign, with ſacrifices, games, and largeſſes for the people. The emperor Auguſtus firſt inſtituted theſe ſolemnities, in which he was imitated by his ſucceſſors. At the ſame time the people offered up vows



Paternal Line
TABLE of DESCENTS
Maternal Line



Barlow sculp

for the emperor, and for the perpetuity of the empire; which were therefore called *vota decennalia*. Auguſtus's view in eſtabliſhing the decennalia was to preſerve the empire and the ſovereign power without offence or reſtraint to the people. For during the celebration of this feaſt, that prince uſed to ſurrender up all his authority into the hands of the people; who, filled with joy, and charmed with the goodneſs of Auguſtus, immediately delivered it him back again.

DECHALES (Claudius Francis Milliet), an excellent mathematician, mechanic, and aſtronomer, deſcended from a noble family, and born at Chamberry in 1611. His principal performances are an edition of Euclid's elements of geometry, in which the unſerviceable propoſitions are rejected, and the uſes of thoſe retained, annexed; a diſcourſe on fortification; and another on navigation. Theſe with others have been collected, firſt in 3 vols. folio, and afterwards in 4, under the title of *Mundus Mathematicus:* being indeed a complete courſe of mathematics. He died in 1678, profeſſor of mathematics in the univerſity of Turin.

DECIDUOUS, an appellation chiefly uſed in reſpect of plants: thus, the calyx or cup of a flower is ſaid to be *deciduous*, when it falls along with the flower-petals; and, on the contrary, it is called *permanent*, when it remains after they are fallen. Again, deciduous leaves are thoſe which fall in autumn; in contradiſtinction to thoſe of the ever-greens, which remain all the winter. See DEFOLIATION.

DECIL, in aſtronomy, an aſpect or poſition of two planets, when they are diſtant from each other a tenth part of the zodiac.

DECIMAL ARITHMETIC, the art of computing by decimal fractions. See ARITHMETIC.

DECIMATION, a puniſhment inflicted by the Romans, on ſuch ſoldiers as quitted their poſts, or behaved themſelves cowardly in the field. The names of the guilty were put into an urn or helmet, and as many were drawn out as made the tenth part of the whole number, and thoſe were put to the ſword, and the others ſaved. This was called *decimare*; a word of the ancient Roman militia, who, to puniſh whole legions when they had failed in their duty, made every tenth ſoldier draw lots, and put him to death for an example to the others. As the Romans had their *decimatio*, they had alſo the *viceſimatio*, and even *centeſimatio*, when only the 20th or 100th man ſuffered by lot.

DECIPHERING, the art of finding the alphabet of a cipher. For the art both of Ciphering and Deciphering, ſee the article CIPHER.

DECIUS Mus, a celebrated Roman conſul, who, after many glorious exploits, devoted himſelf to the gods manes for the ſafety of his country in a battle againſt the Latins, about 340 years before the Auguſtan age.

DECK *of a* SHIP (from *decken*, Dan. to cover); the planked floors of a ſhip, which connect the ſides together, and ſerve as different platforms to ſupport the artillery and lodge the men, as alſo to preſerve the cargo from the ſea in merchant veſſels. As all ſhips are broader on the lower deck than on the next above it, and as the cannon thereof are always heavieſt, it is neceſſary that the frame of it ſhould be much ſtronger than that of the others; and for the ſame reaſon the ſecond or middle deck ought to be ſtronger than the upper deck or fore-caſtle.

Ships of the firſt and ſecond rates are furniſhed with three whole decks, reaching from the ſtem to the ſtern, beſides a forecaſtle and a quarter-deck, which extends from the ſtern to the mainmaſt; between which and the forecaſtle a vacancy is left in the middle, opening to the upper deck, and forming what is called the *waiſt*. There is yet another deck above the hinder or aftmoſt part of the quarter-deck, called the *poop*, which alſo ſerves as a roof for the captain's cabin or couch. The inferior ſhips of the line of battle are equipped with two decks and a half; and frigates, ſloops, &c. with one gun-deck and a half, with a ſpar-deck below to lodge the crew.

The decks are formed and ſuſtained by the beams, the clamps, the water-ways, the carlings, the ledges, the knees, and two rows of ſmall pillars called *ſtanchions*, &c. See thoſe articles.

That the figure of the deck, together with its correſponding parts, may be more clearly underſtood, we have exhibited a plan of the lower-deck of a 74 gun ſhip in Plate 90. And as both ſides of the deck are exactly ſimilar, the pieces by which it is ſupported appear on one ſide, and on the other ſide the planks of the floor of which it is compoſed, as laid upon thoſe upper pieces. A, is the principal or main hatch-way. B, the ſtern poſt. C, the ſtem. D, the beams, compoſed of three pieces, as exhibited by D, in one of which the dotted lines ſhow the arrangement of one of the beams under the other ſide of the deck. E, part of the vertical or hanging knees. F, the horizontal or lodging knees, which faſten the beams to the ſides. G, the carlings, ranging fore and aft, from one beam to another. H, the gun-ports. I, the pump dales, being large wooden tubes, which return the water from the pumps into the ſea. K, the ſpurs of the beams, being curved pieces of timber ſerving as half-beams to ſupport the decks, where a whole beam cannot be placed on account of the hatchways. L, the wing-tranſom, which is bolted by the middle to the ſtern-poſt, and whoſe ends reſt upon the faſhion-pieces. M, the bulk-head or partition, which incloſes the manger, and prevents the water which enters at the hawſe-holes from running aft between decks. N N, the fore hatchway. O O, the after hatch-way. P, the drum-head of the gear capſtern. P p, the drum head of the main capſtern. Q, the wing-tranſom knee. R, one of the breaſt-hooks under the gun-deck. S, the breaſt-hook of the gun-deck. T T, the ſtation of the chain-pumps. V, the breadth and thickneſs of the timbers at the height of the gun-deck. U U, ſcuttles leading to the gunner's ſtore-room, and the bread room. W, the ſtation of the fore-maſt. X, the ſtation of the main-maſt. Y, the ſtation of the mizen-maſt. Z, the ring-bolts of the decks, uſed to retain the cannon whilſt charging. *a*, *a*, the ring-bolts of the ſide whereon the tackles are hooked that ſecure the cannon at ſea. *c*, *a*, *a*, *d*, the water-ways, through which the ſcupper holes are pierced, to carry the water off from the deck into the ſea. *b*, *b*, plan of the foremoſt and aftmoſt cable-bits, with their croſs-pieces g g, and their ſtandards e e.

Thus we have repreſented, on one ſide, all the pieces which ſuſtain the deck with its cannon; and on the other ſide, the deck itſelf, with a tier of 32 pounders planted in battery thereon. In order alſo to ſhow the uſe of the breeching and train-tackle, one of the guns is drawn in as ready for charging. The number of beams by which the decks of ſhips are ſupported, is often very different, according to the practice of different countries; the ſtrength of the timber of which the beams are framed; and the ſervices for which the ſhip is calculated. As the deck which contains the train of a fire-ſhip is furniſhed with an equipage peculiar to itſelf, the whole apparatus is particularly deſcribed in the article *Fire*-BARREL.

Fluſh-DECK implies a continued floor laid from ſtem to ſtern, upon one line, without any ſtops or intervals.

Half-DECK, a ſpace under the quarter-deck of a ſhip of war, contained between the foremoſt bulk-head of the ſteerage and the fore-part of the quarter-deck. In the colliers of Northumberland the ſteerage itſelf is called the *half-deck*, and is uſually the habitation of the crew.

DECLAMATION, a ſpeech made in public, in the tone and manner of an oration, uniting the expreſſion of action to the propriety of pronunciation, in order to give the ſentiment its full impreſſion upon the mind. According to the manners

and cuftoms of the prefent age, public harangues are made only, 1. In the pulpit. 2. In the fenate, in council, or other public affembly. 3. By public profeffors. 4. On the theatre.

I. With regard to the declamation of the pulpit, the dignity and fanctity of the place, and the importance of the fubject, require the preacher to exert t e utmoft powers of his voice to produce a pronunciation that is perfectly diftinct and harmonious, and that he obferve a deportment and action which is expreffive and graceful. No man, therefore, who is deftitute of a voice, fhould afcend the pulpit, and there act the part of a pantomime before his audience. The preacher fhould not, however, roar like a common cryer, and rend the ear with the voice of thunder; for fuch kind of declamation is not only without meaning and without perfuafion, but highly incongruous with the meek and gentle expreffions of the gofpel. He fhould likewife take particular care to avoid a monotony; his voice fhould rife from the beginning, as it were by degrees, and its greateft ftrength fhould be exerted in the application. Each inflection of the voice fhould be adapted to the phrafe, and to the meaning of the words; and each remarkable expreffion fhould have its peculiar inflexion. The dogmatic requires a plain uniform tone of voice only; and the menaces of the gofpel demand a greater force than do its promifes and rewards: but the latter fhould not be pronounced in the foft tone of a flute, nor the former with the loud found of a trumpet. The voice fhould ftill retain its natural tone in all its various inflexions. Happy is that preacher, to whom nature has given a voice that is at once ftrong, flexible, and harmonious.

An air of complacency and benevolence, as well as devotion, fhould be conftantly vifible in the countenance of the preacher. But every appearance of affectation muft be carefully avoided: for nothing is fo difguftful to an audience, as even the femblance of diffimulation. Eyes conftantly rolling, turned towards heaven, and ftreaming with tears, rather denote a hypocrite, than a man poffeffed of the real fpirit of religion, and that feels the true import of what he preaches. An air of affected devotion infallibly deftroys the efficacy of all that the preacher can fay, however juft and important it may be. On the other hand, he muft avoid every appearance of mirth or raillery, or of that cold and unfeeling manner which is fo apt to freeze the hearts of his hearers.

The body fhould be in general erect, and in a natural and eafy attitude. The perpetual movement, or contortion of the body, has a ridiculous effect in the pulpit, and makes the figure of a preacher and a harlequin much too fimilar. But, on the other hand, he fhould not remain conftantly upright and motionlefs, like a fpeaking ftatue.

The motions of the hands give a ftrong expreffion to a difcourfe; but they fhould be conftantly decent, grave, noble, and expreffive. The preacher who is inceffantly in action, who is perpetually clafping his hands, or who menaces with a clenched fift, or counts his arguments on his fingers, will only excite mirth among his auditory. In a word, declamation is an art that the facred orator fhould ftudy with the utmoft affiduity. The defign of a fermon is to convince, to affect, and to perfuade. The voice, the countenance, and the action, which are to produce this triple effect, are therefore the objects to which the preacher fhould particularly apply himfelf.

II. The declamation of a minifter or ftatefman in the fenate, in council, or other public affembly, is of a more unconfined nature. To perfuade, to move the paffions, and gain an afcendancy in a public affembly, the orator fhould himfelf feel the force of what he fays, and the declamation fhould only exprefs that internal fenfation. But nothing fhould be carried to excefs. A fuavity in the tone of voice, a dignity of deportment, a graceful action, and a certain tranquillity of countenance, fhould conftantly accompany the ftatefman when he fpeaks in public, even when he is moft earneftly engaged in debate, or when he is addreffing his fovereign in perfon. A pleafing tone of voice, and a diftinct pronunciation, prejudice the hearers greatly in the fpeaker's favour. A young man may improve thefe to a furprifing degree. Demofthenes, who had a natural impediment in his fpeech, was accuftomed to go to the fea-fhore, and partly filling his mouth with pebbles, he declaimed with a loud voice. The ftones by degrees gave a volubility to his tongue, and the roaring of the waves reconciled him infenfibly to the noife of the multitude.

III. The principal object of a public profeffor is the inftruction of the ftudious youth: for which purpofe, he is to convince and perfuade. Every tone of voice, every expreffion of the countenance, or action of the body, which can produce this effect by enforcing the words, fhould therefore be employed by thofe who are to teach the fciences. There is, moreover, one very effential reflection which every profeffor ought to make, and which is, that the chair from which he harangues is furrounded by young ftudents, naturally poffeffed of vivacity, not unfrequently ludicrous, and for the moft part previoufly inftructed in the preparatory fciences. They are therefore conftantly inclined to criticife, to jeft, and to ridicule: for which reafon, the profeffor fhould endeavour to infpire them with refpect and attention, by a grave, commanding, and venerable countenance, and carefully avoid all appearance of grimace in his action, and every kind of affectation in his difcourfe, that he may not afford the leaft opportunity of pleafantry.

IV. We are now come to *theatric declamation*. 1. This was very different among the ancients from what it is, and ought to be, with us, from the nature of the thing itfelf, and from the difference of circumftances. Numberlefs paffages in Quintilian, and other ancient hiftorians, critics, grammarians, and commentators, evidently prove, that the ancient dramatic declamation was fubfervient to the rules of the mufical rhythmus; and by this, according to Ariftides (De Mufica lib. i.), their action as well as recital was regulated. But to explain this feeming paradox, it will be neceffary to make here fome preliminary remarks. The ancients gave a much more extenfive fignification than we do to the word *mufic (mufica)*, which they derived from the mufes, or at leaft from fome of them. It is for this reafon that the fame Ariftides and Quintilian define it to be "an art that teaches all that relates to the ufe of the voice, and the manner of performing all the motions of the body with grace:" *Ars decoris in vocibus & motibus*. Therefore, poetry, declamation, dancing, pantomimes, and many other geftures and exercifes, were fubfervient to this art.

2. That part of general mufic which taught the art of declamation and gefture according to the rules of an eftablifhed method (and which we perform by inftinct, or at moft by the aid of common fenfe), was diftinguifhed by the name of *hypocritic mufic*: and this mufical art was called by the Greeks *orchefis*; and by the Romans *faltatio*. It was, however, fo far from being an advantage to the ancients to have had this art, which we have not, that it was, on the contrary, a mark of great imperfection. For, in the firft place, it was an inftance of high abfurdity to reprefent a tragedy, or comedy, before an audience of twenty thoufand people, the far greateft part of whom could neither hear nor fee what paffed to any good purpofe, unlefs they were poffeffed of organs which we have not. The theatres of London and Paris may conveniently contain about a thoufand perfons; and that is found fufficient in the moft populous cities, where there are feveral places of entertainment on the fame day, and where the people are reafonable enough to fucceed each other in their diverfions. As the features of the face could not be diftinguifhed at fo great a diftance, and ftill lefs the alteration of countenance in order to reprefent the different paffions, they were obliged to have recourfe to *mafks*; a

wretched, childifh invention, that deftroyed all the ftrength and variety of expreffion. Their action became extravagant; and, at the fame time, fubfervient to a regular mechanifm, which prevented all the refinement, and all the pleafure of furprife, in the performance; and muft have had an effect horribly difagreeable to thofe who were placed near the ftage.

3. The egregious imperfection of their language likewife, which confifted of fyllables long and fhort, whofe duration was determined by a fet meafure of time, and their manner of tuning thefe fyllables, after the method of the orchefis of the Greeks, was another difadvantage. For by this means they determined by notes or characters placed after the long and fhort fyllables, not only the nature, but the duration, of each action. Now, nothing could be more affected, more conftrained and difguftful, than fuch a method of declaiming. How far fuperior in this refpect are the moderns, who confult nature alone in their theatric declamation; who can make the audience hear each figh; who can accompany it with a proper attitude; who can inceffantly vary their action; who can feize the lucky moment, and make the countenance fully exprefs the fenfations of the mind! Nature does all here; and art, infinitely inferior to nature, did all among the ancients. Modern declamation cannot be fubfervient to a mufical rhythmus, feeing we fpeak rapidly, and without affectation. Our actors learn their art without art, from nature itfelf, affifted by reflection; and they arrive at a degree of excellence infinitely greater than that of the ancients, by a method far more fimple, and by efforts incomparably more eafy.

4. We do not, moreover, precifely know what the theatric declamation of the ancients was; nor what were the mufical inftruments which accompanied that declamation. The title to the Eunuch of Terence fays, for example, "that Flaccus, the freedman of Claudius, made the mufic of that piece, in which he employed the two flutes, the right and the left." Thefe flutes, it is likely, gave the tone to the actor, which muft have had a very odd effect on the audience. Moft of the ancient pieces have fimilar titles. They who would be particularly informed of the art of declaiming among the Greeks and Romans, may read to advantage the Critical Reflections on Poetry and Painting by the Abbé du Bos. The third part of that work confifts entirely of learned refearches and ingenious reflections on this filly practice of the ancients. But as this art has happily no place in modern declamation, and can at beft ferve only to make a parade of erudition, we fhall fay no more of it, but pafs to matters of real utility.

5. We think there is good reafon to believe, moreover, that the moft polifhed nations of modern Europe do not accompany their difcourfes in general with fo many gefticulations, as did the Greeks, the Romans, and other inhabitants of warm climates. They appear to have found the method of animating a difcourfe, and giving it an expreffion, by the fimple inflections of the voice, and by the features of the countenance; which is far more decent, more juft and rational, than all thofe contortions which perpetually derange the natural attitude of the body and its members, and give the fpeaker the air of a harlequin.

6. *Expreffion*, therefore, forms at once the effence and the end of declamation; and the means of producing it confifts in a pronunciation that is fonorous, diftinct, and pleafing, fupported by an action that is decent and proper to the fubject. If the beft dramatic poet has need of a good declaimer or actor to make his writing produce its proper effect, the actor has likewife need of a good poet to enable him to pleafe and affect by his action: for it is to little purpofe that he endeavours to charm his auditory by uniting with nature all the powers of art, if the poet has not furnifhed him with fentiments that are rational and affecting.

7. The actor, in ftudying his part before a large mirror, where he can fee his whole figure, in order to determine the moft proper expreffion for every thought, fhould confult nature, and endeavour to imitate her. But, in this imitation, he fhould take care not to make too fervile a copy. He has this to obferve, in common with his colleagues, the mafters in all the polite arts. The theatre is intended to exhibit an imitation of nature, and not nature itfelf. Tragedy and comedy form pictures of human life; but thefe pictures are alfo pieces of perfpective, which require ftrokes fomewhat ftronger than nature, that they may be difcerned at a diftance. The actor is elevated to a confiderable height from the ground; he is furrounded by fcenery, he is feparated from the audience by the orcheftra, and he fpeaks in verfe: all this is not natural; but the fpectator is to accede to this neceffary illufion, in order to promote his own pleafure, which would not be fo great as it is were all thefe matters otherwife difpofed. Declamation, therefore, fhould fomewhat exceed, but never lofe fight of, nature.

8. The tone of the actor's voice fhould be natural, but regulated by the extent of the theatre; fufficiently loud to be heard by all the audience, but not fo violent as to rend their ears. A pure and graceful pronunciation, without any provincial accent, is likewife a great merit in an actor; and he fhould alfo habituate himfelf to fpeak in a manner perfectly diftinct. It is a capital point in the pronouncing of verfe, not to feparate the two hemiftichs, by refting too long on the *cæfura* in the middle, or dwelling on the end of each hemiftich: for, by fo doing, the actor falls into a monotony, an infufferable uniformity of cadence, in a piece that confifts of fome thoufand verfes. The gradations of the voice demand alfo a very judicious obfervance. The fpeaker, who begins in a high tone, will find it very difficult to fuftain it through the whole piece; and he, who clamours inceffantly, will find his lungs fail him in thofe parts where the vehemence of paffion requires the ftrongeft efforts. If we may be allowed the expreffion, the ftrongeft touches, the boldeft figures, will not there ftand out from the picture in a ftriking manner.

9. The deportment of an actor fhould be conftantly graceful, decent, and proper to the character he reprefents. An old man has a different pofition of body from a young petit-maitre; an aged queen from a young princefs; a noble gallant from a valet de chambre. A rational obfervance of nature, and an imitation of the beft actors, are here the fureft guides. The fame may be faid of the action of the hands, the theatric ftep, &c. An inanimated figure, a body in the pofition of a ftatue, and hands immoveable, are as difpleafing in the fcene, as a player whofe inceffant gefticulation refembles the action of a puppet.

10. Every actor who afpires to make his art fomething more than merely mechanical, will begin by enabling himfelf readily to repeat his part, that the defect of his memory may not embarrafs his action. When he is fo far a mafter of it, he will make it the fubject of ferious reflection in his clofet; endeavour to feize the true fenfe of the author; and to find out that expreffion of each fentiment and paffion, which is the moft natural, the moft ftriking, and beft adapted to the ftage; and which he will cultivate by repeated effays, till he is able to render it in its full force.

DECLENSION, in grammar, an inflection of nouns according to their feveral cafes; as nominative, genitive, dative, &c. See GRAMMAR.

DECLINATION, in aftronomy, the diftance of any celeftial object from the equinoctial, either northward or fouth-

ward. It is either true or apparent, according as the real or apparent place of the object is confidered. See Astronomy.

Declination, *of the Sea Compafs* or *Needle*, is its variation from the true meridian of any place.

Declination *of a Plane* or *Wall*, in dialling, is the horizontal arch contained between the plane and the prime vertical circle, if you reckon from eaft to weft; or between the meridian and the plane, reckoning from north to fouth. Many ways are ufed for finding this declination: but the moft eafy and practicable is by a declinator. See Declinator.

DECLINATOR, or Declinatory, an inftrument chiefly ufed in practical dialling, for taking the declinations, inclinations, or reclinations of the planes on which the dials are to be delineated. See Dialling.

DECLIVITY, denotes the reverfe of Acclivity.

DECOCTION, in pharmacy, ufually fignifies either the action of boiling a fubftance in water, or the water itfelf in which the fubftance has been boiled. It is only applicable to matters containing fome principles foluble in water: fuch, particularly, as animal and vegetable matters. See Pharmacy.

DECOMPOSITION, in chemiftry, ufually fignifies the difunion or feparation of the conftituent parts of bodies. It differs from mere mechanical divifion, in that when a body is chemically decompofed, the parts into which it is refolved are effentially different from the body itfelf; but though a mechanical force is applied to it ever fo long, or with ever fo much violence, the minuteft particles into which the body may be reduced, ftill retain their original nature. Thus, for example, though we fuppofe nitre, or any other falt, to be reduced to ever fo fine powder, each particle retains the nature of nitre, as much as the largeft unpounded mafs; but if oil of vitriol is applied, a decompofition takes place, and one of the component parts of the nitre rifes in the form of a fmoking acid fpirit, which never could have been fufpected to lie hid in the mild neutral falt.

DECORATION, in architecture, any thing that adorns and enriches a building, church, triumphal arch, or the like, either without fide or within. The orders of architecture contribute greatly to decoration; but then the feveral parts of thofe orders muft have their juft proportions, characters, and ornaments; otherwife the fineft order will bring confufion rather than richnefs. See Architecture. Decorations in churches are paintings, vafes, feftoons, &c. occafionally applied to the walls; and with fo much conduct and tafte, as not to take off any thing from the form of the architecture: as is much practifed in Italy at the folemn feafts.

Decoration is more particularly applied to the fcenes of theatres. In operas, and other theatrical performances, the decorations muft be frequently changed conformably to the fubject. The ancients had two kinds of decorations for their theatres: the firft, called *verfatiles*, having three fides, or faces, which were turned fucceffively to the fpectators: the other called *ductiles*, fhowing a new decoration by drawing or fliding another before it. This latter fort is ftill ufed, and apparently with much greater fuccefs than among the ancients, who were obliged to draw a curtain whenever they made a change in the decoration; whereas on our ftage the change is made in a moment, and almoft without being perceived.

DECORUM, in architecture, is the fuitablenefs of a building, and the feveral parts and ornaments thereof, to the ftation and occafion.

DECOUPLE, in heraldry, the fame as uncoupled; thus a chevron decouple is a chevron wanting fo much of it towards the point, that the two ends ftand at a diftance from one another, being parted and uncoupled.

DECOY, in naval affairs, a ftratagem employed by a fhip of war to betray a veffel of inferior force into an incautious purfuit, till fhe has drawn her within the range of her cannon, or what is called within *gunfhot*. It is ufually performed by painting the ftern and fides in fuch a manner as to difguife the fhip, and reprefent her either much fmaller and of inferior force, or as a friend to the hoftile veffel, which fhe endeavours to enfnare, by affuming the emblems and ornaments of the nation to which the ftranger is fuppofed to belong. When fhe has thus provoked the adverfary to chafe, in hopes of acquiring a prize, fhe continues the decoy, by fpreading a great fail, as endeavouring to efcape; at the fame time that her courfe is confiderably retarded by an artful alteration of her trim till the enemy approaches. Decoying is alfo performed to elude the chafe of a fhip of a fuperior force in a dark night, by throwing out a lighted cafk of pitch into the fea, which will burn for a confiderable time and mifguide the enemy. Immediately after the cafk is thrown out, the fhip changes her courfe, and may eafily efcape, if at any tolerable diftance from the foe.

Decoy, among fowlers, a place made for catching wild-fowl. A decoy is generally made where there is a large pond furrounded with wood, and beyond that a marfhy and uncultivated country: if the piece of water is not thus furrounded, it will be attended with noifes and other accidents which may be expected to frighten the wild-fowl from a quiet haunt, where they mean to fleep, during the day-time, in fecurity. If thefe noifes or difturbances are wilful, it hath been held that an action will lie againft the difturber. As foon as the evening fets in, the decoy rifes (as they term it), and the wild-fowl feed during the night. If the evening be ftill, the noife of their wings, during their flight, is heard at a very great diftance, and is a pleafing though rather melancholy found. This rifing of the decoy in the evening, is in Somerfetfhire called *radding*.

The decoy-ducks are fed with hempfeed, which is thrown over the fkreens in fmall quantities, to bring them forwards into the pipes or canals, and to allure the wild-fowl to follow, as this feed is fo light as to float.

There are feveral *pipes*, as they are called, which lead up a narrow ditch that clofes at laft with a funnel-net. Over thefe pipes (which grow narrower from their firft entrance) is a continued arch of netting fufpended on hoops. It is neceffary to have a pipe or ditch for almoft every wind that can blow, as upon this circumftance it depends which pipe the fowl will take to: and the decoy-man always keeps on the leeward fide of the ducks, to prevent his fcent reaching their fagacious noftrils.

All along each pipe, at certain intervals, are placed fkre is made of reeds, which are fo fituated that it is impoffible the wild-fowl fhould fee the decoy-man, before they have paffed on towards the end of the pipe, where the purfe-net is placed. The inducement to the wild-fowl to go up one of thefe pipes is, becaufe the decoy-ducks trained to this, lead the way, either after hearing the whiftle of the decoy-man, or enticed by the hempfeed; the latter will dive under water whilft the wild-fowl fly on, and are taken in the purfe.

It often happens, however, that the wild-fowl are in fuch a ftate of fleepinefs and dozing, that they will not follow the decoy-ducks. Ufe is then generally made of a dog, that is taught his leffon: he paffes backwards and forwards between the reed fkreens (in which are little holes, both for the decoy-man to fee, and the little dog to pafs through); this attracts the eye of the wild-fowl, who, not choofing to be interrupted, advance towards the fmall and contemptible animal, that they may drive him

away. The dog all the time, by the direction of the decoy-man, plays among the skreens of reeds, nearer and nearer the purse-net; till at last, perhaps, the decoy-man appears behind a skreen, and the wild-fowl not daring to pass by him in return, nor being able to escape upwards on account of the net-covering, rush on into the purse-net. Sometimes the dog will not attract their attention, if a red handkerchief or something very singular is not put about him.

The general season for catching fowl in decoys, is from the latter end of October till February: the taking of them earlier is prohibited by an act 10 Geo. II. c. 32. which forbids it from June 1st to October 1st, under the penalty of five shillings for each bird destroyed within that space.

The Lincolnshire decoys are commonly set at a certain annual rent, from 5 to 20 pounds a-year: and there is one in Somersetshire that pays 30l. The former contribute principally to supply the markets in London. Amazing numbers of ducks, wigeons, and teal, are taken: by an account sent us of the number caught a few winters past, in one season, and in only ten decoys, in the neighbourhood of Wain-fleet, it appeared to amount to 31,200, in which are included several other species of ducks: it is also to be observed, that in the above particular, wigeon and teal are reckoned but as one, and consequently fell but at half price of the ducks. This quantity makes them so cheap on the spot, that we have been assured, several decoy-men would be content to contract for years to deliver their ducks at Boston, for 10d. per couple. The account of the numbers here mentioned, relates only to those that were sent to the capital.

It was customary formerly to have in the fens an annual *driving* of the young ducks before they took wing. Numbers of people assembled, who beat a vast tract, and forced the birds into a net placed at the spot where the sport was to terminate. Thus a hundred and fifty dozens have been taken at once: but this practice, being supposed detrimental, has been abolished by act of parliament.

DECREE, in the civil law, is a determination which the emperor pronounces upon hearing a particular cause between the plaintiff and defendant.

Decrees *of Councils*, are the laws made by them, to regulate the doctrine and policy of the church.

Decrees *in Chancery*, are the decisions of the lord-chancellor, upon a full hearing of the merits of a cause.

DECREMENT, in heraldry, signifies the wane of the moon from the full to the new. The moon in this state is called *moon decrescent*, or in *decours*; and when borne in coat armour, faces to the left side of the escutcheon, as she does to the right side when in the increment.

DECREPITATION, in chemistry, signifies the quick separation of the parts of a body, occasioned by a strong heat, and accompanied with noise and crackling. This effect is most frequently produced by water contained betwixt the parts of the decrepitating body, when these parts have a certain degree of adhesion together. This water being quickly reduced into vapour by the heat suddenly applied to it, rarefies and bursts with noise the parts which compress it. The bodies most subject to decrepitation are certain salts, such as common salt, vitriolated tartar, nitre of lead, &c. the decrepitation of all which proceeds from the water of their crystallization. Clays which are not perfectly dry, and flints, are also subject to decrepitation.

DECRETAL, in the canon law, a letter of a Pope determining some point or question in the ecclesiastical law. The decretals compose the second part of the canon law. The first genuine one, acknowledged by all the learned as such, is a letter of Pope Siricius, written in the year 385, to Himerus bishop of Tarragona, in Spain, concerning some disorders which had crept into the churches of Spain. Gratian published a collection of decretals, containing all the ordinances made by the popes till the year 1150. Gregory IX. in 1227, following the example of Theodosius and Justinian, formed a constitution of his own, collecting into one body all the decisions and all the causes which served to advance the papal power; which collection of decretals was called the *pentateuch*, because it contains five books.

DECUMARIA, in botany; a genus of the monogynia order, belonging to the dodecandria class of plants; and in the natural method ranking under those of which the order is doubtful. The calyx is decaphyllous, superior; the petals ten; the fruit unknown.

DECUMATES Agri, tithed fields, or granted on a tithe, as appears from Tacitus, to that rabble of Gauls who succeeded the Marcomanni, that had till then proved a check to the Roman conquest up the Rhine; and hence probably their name, people living on the marches or limits of the empire. In Cicero we have Ager Decumans, which is of the same import with the Ager Decumas of Tacitus.

DECUPLE proportion, that of ten to one.

DECURIO, a subaltern officer in the Roman armies. He commanded a decuria, which consisted of ten men, and was the third part of a turma, or the 30th part of a legio of horse, which was composed of 380 men. There were certain magistrates in the provinces called *decuriones municipales*, who formed a body to represent the Roman senate in free and corporate towns. They consisted of ten; whence the name, and their duty extended to watch over the interests of their fellow-citizens, and to increase the revenues of the commonwealth. Their court was called *curia decurionum* and *minor senatus*; and their decrees, called *decreta decurionum*, were marked with D. D. at the top. They generally styled themselves *civitatum patres curiales*, and *honorati municipiorum senatores*. They were elected with the same ceremonies as the Roman senators. They were to be at least 25 years of age, and to be possessed of a certain sum of money. The election happened in the kalends of March.

DECURRENT leaf. See Botany, p. 48, and pl. 53.

DECURY, ten persons ranged under one chief or leader, called the *decurio*. The Roman cavalry was divided into decuries, which were subdivisions of a century, each century containing ten decuries.

DECUSSATION, a term in geometry, optics, and anatomy, signifying the crossing of two lines, rays, or threads, when they meet in a point, and then go on separately from one another.

DECUSSORIUM, a surgeon's instrument, which, by pressing gently on the dura mater, causes an evacuation of the pus collected between the cranium and that membrane, through the perforation made by the trepan.

DEDHAM, a town of Essex, with a market on Tuesday. It has an ancient large church, which has a fine Gothic steeple. It is six miles N. of Colchester, and 58 N. E. of London. E. lon. 1. 0. N. lat. 52. 1.

DEDICATION, the act of consecrating a temple, altar, statue, palace, &c. to the honour of some deity. The use of dedications is very ancient, both among the worshippers of the true God, and among the heathens; the Hebrews call it חנכה *hhanucbah*, "imitation;" which the Greek translators render ἐγκαίνια, and ἐγκαινισμός, "renewing."

In the scripture we meet with dedications of the tabernacle, of altars, of the first and second temple, and even of the houses of private persons. There are also dedications of vessels, and garments of the priests and Levites, and even of the men themselves.

The heathens had also dedications of temples, altars, and images of their gods, &c. Nebuchadnezzar held a solemn dedication of his statue, *Dan.* iii. 2. Pilate dedicated gilt bucklers at Jerusalem to Tiberius, *Philo de legat.* Petronius would have dedicated a statue to the emperor in the same city, *ibid.* p. 791. Tacitus, *Hist.* lib. iv. c. 53. mentions the dedication of the capitol, upon rebuilding it by Vespasian, &c.

The Jews celebrated the anniverſary of the dedication of their temple every year for eight days. This was firſt enjoined by Judas Maccabeus, and the whole ſynagogue, in the year of the Syro-Macedonian era 148, *i. e.* 164 years before Chriſt. The heathens had the like anniverſaries, as that of the dedication of the temple of Parthenope, mentioned by Lycophron. Under Chriſtianity, dedication is only applied to a church; and is properly the confecration thereof performed by a biſhop, with a number of ceremonies preſcribed by the church.

The Chriſtians finding themſelves at liberty under Conſtantine, in lieu of their ruinous churches, built new ones in every place; and dedicated them with a deal of ſolemnity. The dedication was uſually performed in a ſynod; at leaſt they aſſembled a number of biſhops to aſſiſt at the ſervice. We have the deſcription of thoſe of the churches at Jeruſalem and Tyre in Euſebius, and many others in later writers.

Dedication, in literature, is an addreſs prefixed to a book ſoliciting patronage, or teſtifying reſpect for the perſon to whom it is made. The dedication of the fourth part of Mr. Edwards's Hiſtory of Birds, is curious: *To* God! *the* one *eternal! the incomprehenſible! the omnipreſent! omniſcient and almighty Creator of all things that exiſt! from orbs immeaſurably great to the minuteſt points of matter, this Atom is dedicated and devoted, with all poſſible gratitude, humiliation, and worſhip, and the higheſt adoration both of body and mind, by his moſt reſigned, low and humble creature,* G. E.

DEE (John), a famous mathematician and aſtrologer, was born (July 1527) in London, where his father was a wealthy vintner. In 1542 he was ſent to St. John's college, Cambridge. After five years cloſe application to mathematical ſtudies, particularly aſtronomy, he went to Holland, in order to viſit ſeveral eminent mathematicians on the continent. Having continued abroad near a year, he returned to Cambridge, and was there elected one of the fellows of Trinity college, then firſt erected by king Henry VIII. In 1548 he took the degree of Maſter of Arts; and, in the ſame year, left England a ſecond time; his ſtay at home being rendered uneaſy to him, by the ſuſpicions that were entertained of his being a conjurer; ariſing partly from his application to aſtronomy, but eſpecially on account of a piece of machinery in the Ειρηνη of Ariſtophanes, which he exhibited to the univerſity, and in which he repreſented the Scarabeus flying up to Jupiter, with a man and a baſket of victuals on its back. Theſe ſuſpicions he could never after ſhake off: nor did his ſubſequent conduct by any means tend to clear him of the imputation. He was, in fact, a ſtrange mixture of talent and credulity; being at once a philoſopher, an alchymiſt, and a necromancer. He died at Mortlake, in Surry, in the year 1608, aged 81; leaving a large family, and many works, behind him. A black ſtone into which Dee uſed to call his ſpirits, was in the collection of the earls of Peterborough, whence it came to lady Elizabeth Germaine. It was next the property of the late duke of Argyle, and is now Mr. Walpole's. It appears upon examination to be nothing but a poliſhed piece of cannel-coal. That Dee was a man of conſiderable acquirements, is beyond a doubt; his mathematical knowledge is generally allowed: but, unleſs we ſuppoſe him a wicked impoſtor, which is by no means improbable, we muſt tranſmit him to poſterity as one of the moſt fooliſh, ſuperſtitious necromancers of his time. Neverthelefs, the celebrated Dr. Hook, many years after Dee's death, took it into his head to prove that his journal, publiſhed by Caſaubon, was entirely cryptographical, concealing his political tranſactions, and that he was employed by queen Elizabeth as a ſpy.

DEE, a fine river in N. Wales; held in great veneration by our Britiſh anceſtors, and the theme of many a poet ſince. Some trace its head to the foot of the lofty mountain Arun, which Spenſer, in his Fairy Queen, makes the reſidence of the ſage Timon, foſter-father to prince Arthur. This is in the N. W. angle of Merionethſhire; but others trace it no farther than to the lake of Bala, whence it flows through a fine vale, in a N. E. direction to Denbighſhire, viſits the W. border of Cheſhire, to which it ſerves for ſome time as a boundary; then croſſing over to Cheſter, it flows thence to the ſea, making a broad ſandy eſtuary, which ſeparates Cheſhire from Flintſhire. By embankments made here, much land has been gained from the tide, and a narrow, but deeper, channel, fitter for navigation, has been formed from Cheſter half way to the ſea. The Dee is navigable from near Elleſmere, in Shropſhire, to Cheſter; but, at this city, the continuity of the navigation is broken by a ledge of rocks, running acroſs the bed of the river, and cauſing a ſort of caſcade. There are two rivers of this name in Scotland.

DEED, an inſtrument written on paper or parchment, comprehending ſome contract, bargain, or agreement between the parties thereto, in relation to the matter therein contained.

DEEMSTERS, or Demsters, from the Saxon *dema*, judge or umpire. All controverſies in the Iſle of Man are decided without proceſs, writings, or any charges, by certain judges, choſen yearly from among themſelves, called *deemſters*; there being two of them for each diviſion of the iſland: they ſit as judges in all courts, either for life or property; and with the advice of 24 keys, declare what is law in uncommon emergencies.

DEEPING, a town of Lincolnſhire, with a market on Thurſday. It is ſeated on the river Welland, in a fenny ground, ſix miles E. of Stamford, and 90 N. of London. W. lon. 0. 21. N. lat. 52. 42.

DEER, in zoology. See Cervus. The method of hunting deer in the iſland of Ceylon is very particular. The huntſmen go out in the night, and only two uſually go together; the one of theſe carries upon his head an earthen veſſel, in which there is ſome fire burning and flaming; the ingredients are generally ſmall ſticks cut into pieces, and common roſin. Of this the other man carries a ſupply about him to repleniſh the pot when it grows low. The perſon who has the fire upon his head, carries in one hand a ſtaff, on which there are fixed eight bells; and the larger theſe are, the better. This man goes firſt into the woods, and the other follows cloſe behind with a ſpear in his hand. As ſoon as the deer hears the noiſe of the bells, he turns towards the place whence the ſound comes; and ſeeing the fire, he eagerly runs up to it, and ſtands gazing at a ſmall diſtance: the ſecond man has nothing then to do but to kill him with the ſpear; for he ſees neither of them. Not only deer, but even elks and hares are thus taken; for they gaze at the fire, and never ſee the men. The profits of this ſort of hunting are very large, and the danger nothing; for though there are numbers of tygers, elephants, and wild boars, in theſe woods, the huntſmen are in no danger from them while the fire burns, for they all run away from it.

DE facto, ſomething actually in fact, or exiſting; in contradiſtinction to *de jure*, where a thing is only ſo in juſtice, but not in fact; as a king *de facto*, is a perſon who is actually in poſſeſſion of a crown, but has no legal right to the ſame; and a king *de jure*, is the perſon who has a juſt right to the crown, though he is not in poſſeſſion of it.

DEFAMATION, the ſpeaking ſlanderous words of another; for which the ſlanderer is puniſhable, according to the nature of his offence, either by action upon the caſe at common law, or by ſtatute in the eccleſiaſtical court.

DEFAULT, in law, is generally taken for non-appearance in court, on a day aſſigned; but imports any omiſſion of that which we ought to do, for which judgment may be given againſt the defaulter.

DEFEASANCE, or Defeisance, in law, a condition relating to ſome certain deed, which being performed, the deed is defeated and rendered void, as if it had never been made. The

difference between a common condition and a defeasance is, that the condition is annexed to, or inserted in, the deed; and a defeasance is a deed by itself concluded and agreed on between the parties, and having relation to another deed.

DEFECATE, in chemistry, a term applied to a body freed and purged from fæces and impurities.

DEFECTION, the act of abandoning or relinquishing a party or interest a person had been engaged in. The word is formed of the Latin *deficio*, to fall off.

DEFECTIVE, in general, an appellation given to things which want some of the properties that naturally they ought to have. Thus,

DEFECTIVE OF *Deficient Nouns*, in grammar, are such as want either a whole number, a particular case, or are totally indeclinable. See NOUN. The term *defective* is also applied to a verb that has not all its moods and tenses. See VERB, MOOD, &c.

DEFENCE, in fortification, all sorts of works that cover and defend the opposite posts, as flanks, casements, parapets, &c. See FORTIFICATION.

Line of DEFENCE, a supposed line drawn from the angle of the curtin, or from any other part in the curtin, to the flanked angle of the opposite bastion.

DEFEND, in general, signifies much the same with protecting, or keeping off injuries offered to any person either by enemies or otherwise.

DEFEND, in our ancient laws and statutes, signifies to prohibit or forbid: as *Usuarios* defendit *quoque rex Edwardus ne remanerent in regno.* L. L. Edw. Conf. c. 37. & 5 Rich. 2. c. 7. In which sense Chaucer also uses it in the following passage:

> "Where can you say in any manner age,
> "That ever God *defended* marriage."

In 7 Edw. I. there is a statute intitled, "*Statutum de* defensione *portandi arma*," &c. And "it is defended by law to distrain on the highway;" *Coke on Littl.* fol. 161.

DEFENDANT, in law, is the person sued in an action personal; as *tenant* is he who is sued in an action real. See ACTION.

DEFENDER *of the* FAITH *(Fidei Defensor)*, a peculiar title belonging to the king of England; as *Catholicus* to the king of Spain. These titles were given by the popes of Rome. That of *Fidei Defensor* was first conferred by Leo X. on king Henry VIII. for writing against Martin Luther; and the bull for it bears date *quinto idus Octob.* 1521. It was afterwards confirmed by Clement VII. But the pope, on Henry's suppressing the houses of religion at the time of the Reformation, not only deprived him of his title, but deposed him from his crown also: though in the 35th year of his reign, his title, &c. was confirmed by parliament; and hath continued to be used by all succeeding kings to this day. Chamberlayne says, the title belonged to the kings of England before that time, and for proof of this appeals to several charters granted to the university of Oxford. So that pope Leo's bull was only a renovation of an ancient right.

DEFENDERS, were anciently notable dignitaries both in church and state, whose business was to look to the preservation of the public weal, to protect the poor and helpless, and to maintain the interests and causes of churches and religious houses. See PROTECTOR. The council of Chalcedon, can. 2. calls the defender of a church Εκδικος. Codin, *de officiis aulæ Const.* makes mention of defenders of the palace. There were also a defender of the kingdom, *defensor regni*; defenders of cities, *defensores civitatis*; defenders of the people, *defensores plebis*; of the poor, fatherless, widows, &c. About the year 420, each patriarchal church began to have its defender; which custom was afterwards introduced into other churches, and continued to later days under other names; as those of *Advocate*, and *Advowee*. In the year 407, we find the council of Carthage asked the emperor, for defenders, of the number of *Scholastici*, i. e. advocates who were in office; and that it might be allowed them to enter and search the cabinets and papers of the judges and other civil magistrates, whenever it should be found necessary for the interest of the church.

DEFILE, in fortification, a straight narrow passage, through which a company of horse or foot can pass only in file, by making a small front.

DEFINITE, in grammar, is applied to an article that has a precise determinate signification; such as the article *the* in English, *le* and *la* in French, &c. which fix and ascertain the noun they belong to, to some particular; as *the king*, *le roi*: whereas, in the quality *of king*, *de roi*, the articles *of* and *de* mark nothing precise, and are therefore indefinite.

DEFINITION, in general, a short description of a thing by its properties; or, in logic, the explication of the essence of a thing by its kind and difference.

DEFINITIVE, a term applied to whatever terminates a process, question, &c. in opposition to provisional and interlocutory.

DEFLAGRATION, in chemistry, the kindling or setting fire to any substance or liquid in order to separate its combustible from its incombustible parts, and thereby judge of the proportions which each bears to the other. This short process has been often recommended for trying the strength of brandies and other vinous spirits. Mr. Geoffroy's method is this: Take a cylindric vessel two inches high, and as much in diameter, consisting of thin plate silver, that metal being much less liable to rust than copper; this vessel must be fitted with a little rectangular gage exactly graduated into lines, half lines, &c. then the vessel being set level upon a copper case made to contain it, a parcel of the brandy to be examined is poured in, to the height of 16 lines. This height is to be exactly hit by pouring in more than enough at first, and then sucking out the overplus with a very small tube. Then the vessel being heated a little, so as just to make the liquor fume, it is to be set on fire and left to go out of itself; at the instant when the flame expires, the gage is plunged perpendicularly into the vessel, and the lines and quarters exactly noted which the liquor wants of its former height: this difference gives the precise quantity of alcohol or pure spirit contained in the liquor. Thus, if eight lines of residue are left, this being the half of the 16 lines of the original filling, it is plain, that the liquor contained one half spirit, or was something below proof. If only four lines remained, it was nearly double proof, or of a middle nature betwixt alcohol and common proof-spirit.

DEFLECTION *of the* RAYS *of* LIGHT, a property which Dr. Hook observed in 1675, and read an account of before the Royal Society, March 18, the same year. He says he found it different both from reflection and refraction, and that it was made towards the surface of the opaque body, perpendicularly. This is the same property which Sir I. Newton calls INFLECTION.

DEFLORATION, or DEFLOWERING, the act of violating or taking away a woman's virginity. See VIRGINITY. Death or marriage is decreed by the civil law in case of defloration. The ancients had so much respect for virgins, that they would not put them to death till they had first procured them to be deflowered. It is said, the natives of the coast of Malabar pay strangers to come and deflower their brides. In Scotland, and the northern parts of England, it was a privilege of the lords of the manor, granted them by king Ewen, that they should have the first night's lodging with their tenants' wives. King Malcolm III. allowed the tenants to redeem this service at a certain rate, called *marcheta*, consisting of a certain number of cows.

Buchanan ſays it was redeemed with half a mark of ſilver. The ſame ſcandalous cuſtom had place in Wales, Flanders, Frieſeland, France, and ſome parts of Germany.

DEFLUXION, a term uſed by the old phyſicians to ſignify a falling of the humours from a ſuperior to an inferior part of the body; as when a ſwelling of the foot relieved an affection of the head or ſtomach.

DE FOE (Daniel), a writer famous for politics and poetry, was bred a hoſier; which profeſſion however he ſoon forſook, and became one of the moſt enterpriſing authors that any age has produced. When diſcontents ran high at the revolution, and king William was obliged to diſmiſs his Dutch guards, De Foe, who had true notions of civil liberty, ridiculed the enemies of government in his well-known poem, called *The True-born Engliſhman*, which had a prodigious ſale. The next ſatire he wrote was entitled *Reformation of Manners*; aimed at ſome perſons of high rank, who rendered themſelves a diſgrace to their country. When the eccleſiaſtics in power breathed too much of a ſpirit of perſecution, De Foe wrote a tract called *The Shorteſt Way with the Diſſenters:* for which he was called to account, and explained himſelf with great firmneſs. He was afterwards ſentenced to the pillory for attacking ſome public meaſures; which ſo little intimidated him, that, in defiance of their uſage, he wrote *A Hymn to the Pillory*. It would be endleſs to enumerate all his publications: but the following are the principal: *The Hiſtory of the Plague in 1665*; a novel entitled *The Hiſtory of Colonel Jack*; *A new Voyage round the World by a Company of Merchants*, printed for Betteſworth, 1725; *The Hiſtory of Roxana*; *Memoirs of a Cavalier*; *The Hiſtory of Moll Flanders*; a book entitled *Religious Courtſhip*, which has undergone upwards of 20 editions; and the *Life and Adventures of Robinſon Cruſoe*, an admirable performance, of which there have been editions without number, but concerning which there is an anecdote that does the author of it no credit as to the better part of a writer's character, honeſty. When captain Woods Rogers touched at the iſland of Juan Fernandes, in the South Sea, he brought away Alexander Selkirk, a Scots ſailor, who had been left aſhore there, and had lived on that deſolate place above four years. When Selkirk came back to England, he wrote a narrative of his adventures, and put the papers into the hands of De Foe, to digeſt for publication; who ungenerouſly converted the materials into the Hiſtory of Robinſon Cruſoe, and returned Selkirk his papers again! a fraud for which, in a humane view, the diſtinguiſhed merit of that romance can never atone. Daniel De Foe died at Iſlington in 1731. All his productions of the romantic ſpecies, but eſpecially the two laſt mentioned, are much in vogue among country readers; and on account of their moral and religious tendency, very probably do a great deal of good. Robinſon Cruſoe is a performance ſtrictly *unique*, both in the plan and execution. Our praiſes however muſt be confined to the firſt volume, which probably was all that the author intended. The ſecond, which conſiſts of low ribaldry, was either written by another hand, or, if by De Foe, brought forth from motives of gain, and with a view of profiting in a greater degree by the popularity of the firſt volume. Robinſon Cruſoe is particularly diſtinguiſhed by M. Rouſſeau; and ſelected as the moſt proper book (when books *are* proper) to be put into the hands of a child. See the TREATISE ON EDUCATION, p. 200.

DEFOLIATION, from *de*, and *folium* a leaf; the fall of the leaves. A term oppoſed to *frondeſcentia*, the annual renovation of the leaves, produced by the unfolding of the buds in ſpring. See FRONDESCENTIA. Moſt plants in cold and temperate climates ſhed their leaves every year: this happens in autumn, and is generally announced by the flowering of the common meadow ſaffron. The term is only applied to trees and ſhrubs; for herbs periſh down to the root every year, loſing ſtem, leaves and all.

All plants do not drop their leaves at the ſame time. Among large trees, the aſh and the walnut, although lateſt in unfolding, are ſooneſt diveſted of them: the latter ſeldom carries its leaves above five months. On the oak and horn-beam, the leaves die and wither as ſoon as the cold commences; but remain attached to the branches till they are puſhed off by the new ones, which unfold themſelves in the following ſpring. Theſe trees are doubtleſs a kind of evergreens: the leaves are probably deſtroyed only by cold; and perhaps would continue longer on the plant, but for the force of the ſpring-ſap, joined to the moiſture.

In mild and dry ſeaſons, the lilac, privet, yellow jeſſamine of the woods, and maple of Crete, preſerve their leaves green until ſpring, and do not drop them till the new leaves are beginning to appear. The fig-tree, and many other trees that grow between the tropics, are of this particular claſs of evergreens. The trees in Egypt, ſays Doctor Haſſelquiſt, caſt their leaves in the latter end of December and beginning of January, having young leaves ready before all the old ones are fallen off; and, to forward this operation of nature, few of the trees have buds: the ſycamore and willow, indeed, have ſome, but with few and quite looſe *ſtipulæ* or ſcales. Nature did not imagine buds ſo neceſſary in the ſouthern as in the northern countries; this occaſions a great difference between them.

Laſtly, ſome trees and ſhrubs preſerve their leaves conſtantly through the whole year; and are not in the leaſt influenced by clemency or inclemency of ſeaſons. Such are the firs, juniper, yew, cedar, cypreſs, and many other trees, hence denominated *evergreens*. Theſe preſerve their old leaves a long time after the formation of the new, and do not drop them at any determinate time. In general, the leaves of evergreens are harder, and leſs ſucculent, than thoſe which are renewed annually. The trees are generally natives of warm climates; as the alaternuſes of France and Italy, the evergreen oak of Portugal and Suabia.

The following table, reſpecting the mean times in which different trees ſhed their leaves, is founded upon obſervation.

Gooſeberry-tree and bladder-ſena,	Generally quit their leaves about	October 1ſt
Walnut and aſh,		——— 15th
Almond-tree, horſe cheſnut, and lime-tree,		——— 20th
Maple, hazle-nut, black poplar, and aſpen-tree,		——— 25th
Birch, plane-tree, mountain-oſier, falſe acacia, pear, and apple-tree,		November 1ſt
Vine, mulberry, fig, ſumac, and angelica-tree,		——— 10th
Elm-tree and willow,		——— 15th
Apricot and elder-trees,		——— 20th

It deſerves to be remarked, that an evergreen tree grafted upon a deciduous, determines the latter to retain its leaves. This obſervation is confirmed by repeated experiments, particularly by grafting the laurel, or cherry-bay, an evergreen, on the common cherry; and the ilex, or evergreen oak, on the oak.

DEFORCEMENT, in law, the caſting any one out of his land, or withholding of lands and tenements by force from the right owner.

DEFORMITY, the want of that uniformity neceſſary to conſtitute the beauty of an object. See BEAUTY. Deformity is either natural or moral. Theſe are both referred by Mr. Hutcheſon to an internal ſenſe; and our perception of them, as he ſuppoſes, ariſes from an original arbitrary ſtructure of our

own minds, by which certain objects, when obferved, are rendered the occafions of certain fenfations and affections.

That many objects give no pleafure to our fenfe is obvious. Many are certainly void of beauty; but then, fays this author, there is no form which feems neceffarily difagreeable of itfelf, when we dread no other evil from it, and compare it with nothing better of the kind. Many objects are naturally difpleafing and diftafteful to our external fenfes, as well as others pleafing and agreeable; as fmells, taftes, and fome feparate founds: but with regard to our fenfe of beauty, no compofition of objects which give not unpleafant fimple ideas, feems pofitively unpleafant or painful of itfelf, had we never obferved any thing better of the fame kind.

Had there been a fpecies of the form which we now denominate *ugly* or *deformed*, and had we never feen or expected greater beauty, we fhould have received no difguft from it; though the pleafure would not have been fo great in this form as in thofe we now admire. Our fenfe of beauty feems defigned to give us pofitive pleafure; but not pofitive pain or difguft, any farther than what arifes from difappointment.

There are indeed many faces which at firft view are apt to raife diflike. But this is generally not from any pofitive deformity; but either from want of expected beauty, or from the carrying fome natural indications of morally bad difpofitions, which we all acquire a faculty of difcerning in countenances, airs, and geftures. That this is not occafioned by any form pofitively difgufting, appears hence, that if, upon long acquaintance, we are fure of finding fweetnefs of temper, humanity, and cheerfulnefs, though the bodily form continues, it fhall give us no difguft. There are horrors raifed by fome objects, which are only the effect of fear for ourfelves, or compaffion towards others, when either reafon, or fome foolifh affociation of ideas, makes us apprehend danger; and not the effect of any thing in the form itfelf. For we find, that moft of thofe objects which excite horror at firft, when experience or reafon has removed the fear, may become the occafion of pleafure.

The cafual conjunction of ideas gives us difguft, where there is nothing difagreeable in the form itfelf. And this, in effect, is the caufe of moft of our fantaftic averfions to the figures of fome animals, &c. Thus ferpents of all kinds, and many infects, really beautiful enough, are beheld with averfion by many people, who have got fome accidental ideas of mifchief affociated to them. A fimilar reafoning is applied to our perception of moral beauty and deformity. *Inquiry into the Original of our Ideas of Beauty and Virtue*, paffim.

But it is more juft to diftinguifh between the fentiments of delight or difguft, excited in us by beautiful or deformed objects, which are effects of fome caufes, and the natural and real qualities of the perceived objects by which they are produced. There are objects, fays an excellent writer, which have a natural aptitude to pleafe or offend, or between which and the contemplating mind there is a neceffary congruity or incongruity; and though the actual perception of the underftanding, and confequent feeling of the heart, in contemplating the actions and affections of moral agents, may exift in very different degrees, on account of the incidental obftructions arifing from bodily indifpofition, mental prejudices and biaffes, and the affociation of ideas; yet, to every rational mind properly difpofed, morally good actions muft for ever be acceptable, and can never of themfelves offend; and morally evil actions muft for ever be difagreeable, and can never of themfelves pleafe. What is right in actions and characters is beautiful and amiable, and gives pleafure; what is wrong is deformed and odious, and excites difguft: right and pleafure, wrong and pain, are as diftinct as caufe and effect. It is no lefs abfurd to maintain, that the perception of virtue is nothing diftinct from the reception of the pleafure refulting from it, than to infer, with fome metaphyficians, that folidity, extenfion, and figure, are only particular modes of fenfation, becaufe attended, whenever they are perceived, with fome fenfations of fight or touch. Thus does this author fhow, that moral beauty and deformity are real qualities of certain actions; in which confifts their aptitude to pleafe or difguft. With refpect to natural beauty, he obferves, that uniformity amidft variety pleafes, becaufe of the natures of variety and uniformity, which are fuch, that whenever united, they are adapted to pleafe every free unbiaffed mind that difcerns them. He accounts for the pleafure they afford, without referring them to an arbitrary internal fenfe, by the following circumftances that attend them. They are more eafily comprehended by the mind: order and fymmetry give things their ftability and ftrength, and fubferviency to any valuable purpofe. Regularity and order evidence art and defign: diforder and confufion, whence deformity arifes, denote only the negation of regularity and order; or any arrangement and difpofition of things, which are not according to a law, rule, or plan, and prove not defign. Thefe are not pofitively difpleafing; except where we previoufly expected order, or where impotence or want of fkill appear, and the contriver has either failed of his defign or executed it ill.

In the work entitled "Fugitive Pieces," is preferved an excellent effay on Bodily Deformity by the late William Hay, Efq; who was himfelf what he defcribes, and who, while he rallies his own figure with great pleafantry, difcuffes the general fubject in a manner equally inftructive and agreeable. He confiders, the natural confequences of bodily deformity; how it affects the outward circumftances; and, laftly, what turn it gives to the mind. The reader will find much amufement and information refult from confulting this admirable effay.

DEFOSSION, Defossio, the punifhment of burying alive, inflicted among the Romans on veftal virgins guilty of incontinency. It is alfo a cuftom among the Hungarians to inflict this punifhment on women convicted of adultery. Heretics were alfo punifhed in this manner. See Burying.

DEGENERATION, or Degenerating, in general denotes the growing worfe, or lofing fome valuable qualities whereof a thing was formerly poffeffed. Some naturalifts have been of opinion, that things are capable of degenerating into quite a diftinct fpecies; but this is a mere chimera. All that happens in the degeneration of a plant, for inftance, is the lofing its ufual beauty, colour, fmell, &c. a circumftance entirely owing to its being planted in an improper foil, climate, &c.

DEGLUTITION, the action of fwallowing, which is performed by the fucceffive action of the mufcles of the throat. See Anatomy, page 173.

DEGRADATION, in our law-books called *difgradation* and *depofition*, the act of depriving or ftripping a perfon for ever of a dignity or degree of honour, and taking away the title, badge, and privileges thereof. The degradation of a peer, a prieft, a knight, a gentleman, an officer, &c. are performed with various ceremonies, particularly characteriftic of the occafion. Sir Andrew Harcla, earl of Carlifle, having been attainted and convicted of treafon, 18 Edw. II. *coram rege*, was degraded in the following way: After judgment was pronounced on him, his fword was broken over his head, and his fpurs hewn off his heels; Sir Anthony Lucy the judge faying to him, "Andrew, now thou art no knight, but a knave." By ftat. 13 Car. II. William Lord Monfon, Sir Henry Mildmay, and others, were degraded from all titles of honour, dignities, and pre eminences, and prohibited to bear or ufe the title of lord, knight, efquire, or gentleman, or any coat of arms, for ever afterwards. It has been maintained that the king may degrade a peer; but it appears from later authorities, that this cannot be done but by an act of parliament.

As to ecclefiaftics, we have an inftance of degradation before condemnation to death, in the eighth century, at Conftanti-

nople. It is in the perfon of the patriarch Conftantine, whom Conftantine Copronymus caufed to be executed. He was made to afcend the ambo; and the patriarch Nicetas fent fome of his bifhops to ftrip him of the pallium, and anathematized him: then they made him go out of the church backwards. But we have a much later inftance in our own hiftory: When Cranmer, archbifhop of Canterbury, was degraded by order of Queen Mary, they dreffed him in epifcopal robes, made only of canvas, put the mitre on his head, and the paftoral ftaff in his hand; and in this attire fhowed him to the people: which done, they ftripped him again piece by piece. At prefent they do not ftand fo much on the ceremony of degradation in order to the putting a prieft to death; by reafon of the delays and difficulties that it would occafion. Pope Boniface pronounced that fix bifhops were required to degrade a prieft; but the difficulty of affembling fo many bifhops rendered the punifhment frequently impracticable. In England, a prieft, after having been delivered to his ordinary, if he cannot purge himfelf of the crime laid at his door, his gown and other robes are ftripped over his ears by the common hangman; by which he is declared divefted of his orders.

It is decided however, that degradation does not efface the prieftly character. Degradation only feems to differ from depofition in a few ignominious ceremonies which cuftom has added thereto. Accordingly, in the bufinefs of Arnoul archbifhop of Rheims, fentenced in the council of Orleans in 991, it was deliberated what form they fhould follow in the depofition; whether that of the canons, that is, fimple depofition; or that of cuftom, viz. degradation. And it was declared, that he fhould furrender the ring, paftoral ftaff, and pallium; but that his robes fhould not be torn off. In effect, the canons prefcribe no more than a mere reading of the fentence. It is the reft, therefore, added thereto by cuftom, viz. the ftripping off the ornaments, and the tearing the pontifical veftments, that properly conftitutes degradation.

Degradation, in painting, expreffes the leffening the appearance of diftant objects in a landfcape, in the fame manner as they would appear to an eye placed at that diftance from them.

DEGREE, in geometry, a divifion of a circle, including a three hundred and fixtieth part of its circumference.

Degree *of Latitude*. See Latitude.

Degree *of Longitude*. See Longitude. A degree of the meridian on the furface of the globe is varioufly determined by various obfervers. Mr. Picart meafured a degree in the latitude of 49° 21′, and found it equal to 57060 French toifes. But the French mathematicians, who have lately examined Mr. Picart's operations, affure us, that the degree in that latitude is 57183 toifes. Our countryman, Mr. Norwood, meafured the diftance between London and York, and found it 905,751 Englifh feet; and finding the difference of latitudes 2° 28′, determined the quantity of one degree to be 367,196 Englifh feet, or 69 Englifh miles and 288 yards. Mr. Maupertuis meafured a degree in Lapland, in the latitude of 66° 20′, and found it 57438 toifes. A degree was likewife meafured at the equator by other French mathematicians, and found to contain 56767.8 toifes. Whence it appears, that the earth is not a fphere, but an oblate fpheroid.

Degree, in the civil and canon law, denotes an interval in kinfhip, by which proximity and remotenefs of blood are computed. See Consanguinity and Descent.

Degrees, in mufic, are the little intervals whereof the concords or harmonical intervals are compofed.

Degree, in univerfities, denotes a quality conferred on the ftudents or members thereof, as a teftimony of their proficiency in the arts or fciences, and entitling them to certain privileges.

DEJANIRA, in fabulous hiftory, daughter of Oeneus king of Ætolia, and wife to Hercules. The centaur Neffus endeavouring to ravifh her, was flain by Hercules with a poifoned arrow. Neffus, when dying, gave his bloody fhirt to Dejanira; affuring her, that it was a fovereign remedy to cure her hufband if ever he proved unfaithful. Some time after, Dejanira, thinking fhe had reafon to fufpect his fidelity, fent him the fhirt: which he had no fooner put on than he was feized with the moft excruciating torments. Being unable to fupport his pains, he retired to mount Oeta, and erecting a pile of wood fet fire to it, and threw himfelf into the flames; upon which Dejanira killed herfelf in defpair.

DEJECTION, in medicine, the act of voiding the excrements by the anus. See Anatomy, page 189.

DEIFICATION, in antiquity. See Apotheosis.

DEIPHON, in fabulous hiftory, a brother of Triptolemus, fon of Celeus and Metanira. When Ceres travelled over the world, fhe ftopped at his father's court, and undertook to nurfe him and bring him up. To reward the hofpitality of Celeus, the goddefs began to make his fon immortal, and every evening fhe placed him on burning coals to purify him from whatever mortal particles he ftill poffeffed. The uncommon growth of Deiphon aftonifhed Metanira, who wifhed to fee what Ceres did to make him fo vigorous. She was frightened to fee her fon on burning coals; and the fhrieks that fhe uttered difturbed the myfterious operations of the goddefs, and Deiphon perifhed in the flames.

DEISCAL, in the ancient Britifh cuftoms, the name of a ceremony originally ufed in the druidical worfhip, and retained in many places down to a very late period, as a civil ceremony towards perfons of particular diftinction. The temples of the ancient Britons were all circular; and the druids in performing the public offices of their religion, never neglected to make three turns round the altar, accompanied by all the worfhippers. This practice was fo habitual to the ancient Britons, that it continued in fome places many ages after the druids and their religion were both deftroyed. In the Scottifh ifles, the vulgar never come to the ancient facrificing and fire-hallowing cairns, but they walk three times round them, from eaft to weft, according to the courfe of the fun. This fanctified tour, or round by the fouth, is called *deifcal*, from *deas* or *defs*, "the right-hand," and *foil* or *ful*, "the fun;" the right hand being ever next the heap or cairn. In the fame ifles it is the cuftom and fafhion of the people to teftify their refpect for their chieftains, the proprietors of their feveral ifles, and other perfons of diftinction, by performing the deifcal round them in the fame manner. A gentleman giving an account of his reception in one of the weftern iflands, of which he was proprietor, defcribes the ceremony of the deifcal in this manner: "One of the natives would needs exprefs his high efteem for my perfon, by making a turn round about me fun-ways, and at the fame time bleffing me, and wifhing me all happinefs. But I bid him let alone that piece of homage, telling him I was fenfible of his good meaning towa ds me. But this poor man was very much difappointed, as were alfo his neighbours; for they doubted not but this ancient ceremony would have been very acceptable to me; and one of them told me that this was a thing due to my character from them, as to their chief and patron; and that they could not, and would not, fail to perform it."

DEISM, the doctrine or belief of the deifts. Deifm, from Θεος, *God*, may properly be ufed to denote natural religion, as comprehending thofe truths which have a real foundation in reafon and nature; and in this fenfe it is fo far from being oppofite to Chriftianity, that it is one great defign of the gofpel to illuftrate and enforce it. Thus fome of the deiftical writers have affected to ufe it. But deifm more precifely fignifies that fyftem of religion, relating both to doctrine and practice, which every man is to difcover for himfelf by the mere force of natural reafon, independent of all revelation, and exclufive of it;

and this religion Dr. Tindal and others pretend is so perfect, as to be incapable of receiving any addition or improvement even from divine revelation.

DEISTS, a class of people known also under the denomination of *Free-thinkers*. The deists hold, that, considering the multiplicity of religions, the numerous pretences to revelation, and the precarious arguments generally advanced in proof thereof, the best and surest way is to return to the simplicity of nature and the belief of one God; which is the only truth agreed to by all nations. They complain, that the freedom of thinking and reasoning is oppressed under the yoke of religion; and that the minds of men are ridden and tyrannized by the necessity imposed on them of believing inconceivable mysteries; and contend that nothing should be required to be assented to or believed but what their reason clearly conceives.

Dr. Clarke distinguishes four sorts of deists. 1. Those who profess to believe the existence of an eternal, infinite, independent, intelligent Being, who made the world, without concerning himself in the government of it. 2. Those who believe the being and natural providence of God, but deny the difference of actions as morally good or evil, resolving it into the arbitrary constitution of human laws; and therefore they suppose that God takes no notice of them. With respect to both these classes, he observes, that their opinions can consistently terminate in nothing but downright atheism. 3. Those who, having right apprehensions concerning the nature, attributes, and all-governing providence of God, seem also to have some notion of his moral perfections; though they consider them as transcendent, and such in nature and degree, that we can form no true judgment, nor argue with any certainty concerning them; but they deny the immortality of human souls; alleging that men perish at death, and that the present life is the whole of human existence. 4. Those who believe the existence, perfections, and providence of God, the obligations of natural religion, and a state of future retribution, on the evidence of the light of nature, without a divine revelation; such as these, he says, are the only true deists; but their principles, he apprehends, should lead them to embrace Christianity; and therefore he concludes that there is now no consistent scheme of deism in the world.

The first deistical writer of any note that appeared in this country was Herbert baron of Cherbury, who wrote in the last century. We might mention Hobbes, Blount, Toland, Collins, Woollaston, Tindal, Morgan, Chubb, Lord Bolingbroke, Hume, &c. Some have also joined Lord Shaftesbury to the number, and to these we might add the noted Thomas Paine.

But the friends of Christianity have no reason to regret the free and unreserved discussion which their religion has undergone. Objections have been stated and urged in their full force, and as fully answered: argument and raillery have been repelled; and the controversy between Christians and deists has called forth a great number of excellent writers, who have illustrated both the doctrines and evidence of Christianity in a manner that will ever reflect honour on their names, and be of lasting service to the cause of genuine religion and the best interests of mankind.

DEITY, *Godhead*; a common appellation given to God; and also by the poets to the heathen gods and goddesses.

DELAWARE, one of the United States of N. America, bounded on the N. by Pennsylvania, on the E. by Delaware river and bay, and on the S. and W. by Maryland. It contains about 14000 square miles, being 90 miles long and 16 broad. In many parts it is unhealthy, being seated in a peninsula, where the land is generally low and flat, which occasions the waters to stagnate, and subjects the inhabitants to intermittents. It is divided into the three counties of Newcastle, Kent, and Sussex. In 1787 the inhabitants were computed at 37,000.

DELAWARE, a fine river of N. America, which rising in the state of New York, in the Lake Ustayantho, takes a S. W. course till it crosses into Pennsylvania in lat. 42° Thence proceeding S. it divides New York from Pennsylvania, till it strikes the N. W. corner of New Jersey, in lat. 41° 24′; and it then passes off to the Atlantic Ocean, through Delaware bay, having New Jersey on the E. side, and Pennsylvania and the state of Delaware on the W. From the mouth of this bay, at Cape Henlopen, to Philadelphia, it is 118 miles, with a sufficient depth of water, all the way, for a 74 gun ship.

DELAWARE, a bay of N. America, which is 60 miles long, from Cape Henlopen to the entrance of the river Delaware at Bombay-hook. It is so wide, in some parts, that a ship, in the middle of it, cannot be seen from the land. It opens into the Atlantic N. W. and S. E. between Cape Henlopen on the right, and Cape May on the left. These capes are 18 miles apart.

DELEGATE, in a general sense, a deputy or commissioner. In a more particular sense, DELEGATES are commissioners appointed by the king under the great seal, to hear and determine appeals from the ecclesiastical court.

Court of DELEGATES, the great court of appeal in all ecclesiastical causes. These delegates are appointed by the king's commission under his great seal, and issuing out of chancery, to represent his royal person, and hear all appeals to him made by virtue of the statute 25 Henry VIII. c. 19. This commission is usually filled with lords spiritual and temporal, judges of the courts at Westminster, and doctors of the civil law. Appeals to Rome were always looked upon by the English nation, even in the times of Popery, with an evil eye, as being contrary to the liberty of the subject, the honour of the crown, and the independence of the whole realm; and were first introduced in very turbulent times, in the 16th year of king Stephen (A. D. 1151), at the same period (Sir Henry Spelman observes) that the civil and canon laws were first imported into England. But in a few years after, to obviate this growing practice, the constitutions made at Clarendon, 11 Hen. II. on account of the disturbances raised by Archbishop Becket and other zealots of the holy see, expressly declare, that appeals in causes ecclesiastical ought to lie from the archdeacon to the diocesan; from the diocesan to the archbishop of the province; and from the archbishop to the king; and are not to proceed any farther without special licence from the crown. But the unhappy advantage that was given in the reign of king John, and his son Hen. III. to the encroaching power of the Pope, who was ever vigilant to improve all opportunities of extending his jurisdiction to Britain, at length riveted the custom of appealing to Rome in causes ecclesiastical so strongly, that it never could be thoroughly broken off, till the grand rupture happened in the reign of Hen. VIII. when all the jurisdiction usurped by the Pope in matters ecclesiastical was restored to the crown, to which it originally belonged: so that the statute 25 Hen. VIII. was but declaratory of the ancient law of the realm. But in case the king himself be party in any of these suits, the appeal does not then lie to him in chancery, which would be absurd; but, by the 24 Henry VIII. c. 12. to all the bishops of the realm, assembled in the upper house of convocation.

DELEGATION, a commission extraordinary given to a judge to take cognizance of, and determine some cause which ordinarily does not come before him.

DELEN (Dirk Van), an eminent painter of architecture and perspective, was born at Heusden, but in what year is not known. He was a disciple of Francis Hals, in whose school he practised himself in those particular subjects which were most esteemed by that master, such as portraits and conversations; and by that means he acquired the skill to design figures with a great deal of spirit and correctness. But his predominant in-

clination directed him to paint architecture and perfpective; and thofe he fiudied with fo much care, as to make his works admired and coveted through the Low Countries. His fubjects were the infides of churches, filled with figures; grand temples; magnificent faloons and galleries, with people affembled at concerts of mufic, feafting, or dancing. Thofe fubjects he finifhed highly: his architecture was in a noble tafte; and the figures were well defigned, as well as grouped with a great deal of judgment. Several authors mention the performances of this mafter with great commendation, for the goodnefs of his invention, and neatnefs of his handling.

DELETERIOUS, an appellation given to things of a deftructive or poifonous nature. See Poison.

DELFT, a town of the united provinces, and capital of Delftland in Holland. It is a pretty large place, very clean and well built, with canals in the ftreets, planted on each fide with trees. The public buildings, efpecially the town-houfes, are very magnificent. Here are two churches: in one is the tomb of the prince of Orange, who was affaffinated; and in the other, that of Admiral Tromp. It has a fine arfenal, well furnifhed; is about two miles in circumference, and is defended againft inundations by three dams or dykes. Here is made a prodigious quantity of earthen ware called *delft-ware*; but the town has no other trade. It is pleafantly fituated among the meadows on the river Shie, in E. long. 4. 13. N. lat. 32. 6.

Delft-*Ware*, a kind of pottery of baked earth, covered with an enamel or white glazing, which gives it the appearance and neatnefs of porcelain. Some kinds of this enamelled pottery differ much from others, either in their fuftaining fudden heat without breaking, or in the beauty and regularity of their forms, of their enamel, and of the painting with which they are ornamented. In general, the fine and beautiful enamelled potteries, which approach the neareft to porcelain in external appearance, are at the fame time thofe which leaft refift a brifk fire. Again, thofe which fuftain a fudden heat, are coarfe, and refemble common pottery.

The bafis of this pottery is clay, which is mixed, when too fat, with fuch a quantity of fand, that the earth fhall preferve enough of its ductility to be worked, moulded, and turned eafily; and yet that its fatnefs fhall be fufficiently taken from it, that it may not crack or fhrink too much in drying or in baking. Veffels formed of this earth muft be dried very gently to avoid cracking. They are then to be placed in a furnace to receive a flight baking, which is only meant to give them a certain confiftence or hardnefs. And, laftly, they are to be covered with an enamel or glazing, which is done, by putting upon the veffels thus prepared, the enamel, which has been ground very fine, and diluted with water.

As veffels on which the enamel is applied are but flightly baked, they readily imbibe the water in which the enamel is fufpended, and a layer of this enamel adheres to their furface: thefe veffels may then be painted with colours compofed of metallic calces, mixed and ground with a fufible glafs. When they are become perfectly dry, they are to be placed in the furnace, included in cafes of baked earth called *feggars*, and expofed to a heat capable of fufing uniformly the enamel which covers them.—This heat given to fufe the enamel being much ftronger than that which was applied at firft to give fome confiftence to the ware, is alfo the heat neceffary to complete the baking of it. The furnace and colours ufed for painting this ware, are the fame as thofe employed for Porcelain. Delft ware is by no means fo much ufed in England as formerly.

DELHI, a province of Hindooftan Proper, bounded on the N. W. by Lahore, on the N. E. by Serinagur, on the E. by the Rohilla country, on the S. by Agra, and on the W. by Moultan. This province is in the moft wretched ftate that can be conceived. Having been the feat of continual wars for 50 years, the country is almoft depopulated; the lands, in courfe, lying wafte; the wretched inhabitants not daring to provide more than the bare means of fubfiftence, left they fhould attract the notice of thofe whofe trade is pillage. "Nothing," fays major Rennell, "but the natural fertility of the foil, and the mildnefs of the climate, could have kept up any degree of population, and rendered the fovereignty of it, at this day, worth contending for; fo that a tract of country that poffeffes every advantage that can be derived from nature, contains the moft miferable of inhabitants; fo dearly do mankind pay for the ambition of their fuperiors, who, mifcalculating their powers, think they can govern as much as they can conquer." This province is now all that remains to the Great Mogul of his once extenfive empire.

DELHI, the capital of a province of the fame name, in Hindooftan Proper, feated on the W. bank of the river Jumna. It is the nominal capital, at prefent, of all Hindooftan, and was the actual capital during the greateft part of the time fince the Mahometan conqueft. It was faid to contain, during the latter part of the laft century, 2,000,000 of inhabitants. But Bernier, an author of great veracity, who wrote in 1663, when the grandeur of the empire and its capital was at its height, does not juftify fo high a calculation; for he eftimates the circumference of Delhi at three leagues only, reckoning what was within the fortifications; befide which, he defcribes feveral fuburbs, but altogether, no extraordinary extent for a capital city of India; and he defcribes Agra to be confiderably larger. In 1738, when Nadir Shah invaded Hindooftan, he entered Delhi, and dreadful were the tumults, maffacres, and famine that followed: 100,000 of the inhabitants perifhed by the fword; and plunder, to the amount of 62,000,000l. fterling was faid to be collected. The fame dreadful calamities they endured on the fubfequent invafions of Abdalla, king of Candahar. Since the decline and downfall of the Mogul empire, we may expect, therefore, to find the prefent population to be very low. Delhi is 880 miles N. E. by N. of Bombay. E. lon. 77. 40. N. lat. 28. 37.

DELIA, in antiquity, a feftival celebrated every fifth year in the ifland of Delos, in honour of Apollo. It was firft inftituted by Thefeus, who at his return from Crete placed a ftatue there, which he had received from Ariadne. At the celebration they crowned the ftatue of the deity with garlands, appointed a choir of mufic, and exhibited horfe-races. They afterwards led a dance, in which they imitated by their motions the various windings of the Cretan labyrinth, from which Thefeus had extricated himfelf by Ariadne's affiftance.—There was another feftival of the fame name yearly celebrated by the Athenians in Delos.

Delia, a furname of Diana, becaufe fhe was born in Delos.

DELIAC, Deliacus, among the ancients, denoted a poulterer, or a perfon who fold fowls, fatted capons, &c. The traders in this way were called *Deliaci*; the people of the ifle of Delos firft practifed this occupation. They alfo fold eggs, as appears from Cicero, in his Academic Queftions, lib. iv. Pliny, lib. x. chap. 30. and Columella, lib. viii. cap. 8. likewife mention the *Deliaci*.

DELIBAMENTA, in antiquity, a libation to the infernal gods, always offered by pouring downwards. See Libation.

DELIBERATIVE, an appellation given to a kind or branch of rhetoric, employed in proving a thing, or convincing an affembly thereof, in order to perfuade them to put it in execution. To have a *deliberative* voice in an affembly, is when a perfon has a right to give his advice and his vote therein. In councils, the bifhops have deliberative voices; thofe beneath them have only confultative voices.

DELIMA, in botany; a genus of the monogynia order,

belonging to the polyandria clafs of plants; and in the natural method ranking with thofe of which the order is doubtful. There is no corolla; the calyx is five-leaved, with a two-feeded berry.

DELINQUENT, a guilty perfon, or one who has committed fome fault or offence for which he is punifhable. See CRIME.

DELIQUESCENCE, in chemiftry, fignifies the property which certain bodies have of attracting moifture from the air, and thereby becoming liquid. This property is never found but in faline fubftances, or matters containing them. It is caufed by the great affinity which thefe fubftances have with water. Though the immediate caufe of deliquefcence is the attraction of the moifture of the air; yet it remains to be fhown why fome falts attract this moifture powerfully, and others, though feemingly equally fimple, do not attract it at all. The vegetable alkali, for inftance, attracts moifture powerfully; the mineral alkali, though to appearance equally fimple, does not attract it at all. The acid of tartar by itfelf does not attract the moifture of the air; but if mixed with borax, which has a little attraction for moifture, the mixture is exceedingly deliquefcent. Some theories have been fuggefted, in order to account for thefe and other fimilar facts; but we are as yet too little acquainted with the nature of the atmofphere, and the relation its conftituent parts have to thofe of terreftrial fubftances, to determine any thing with certainty on this fubject.

DELIQUIUM, or DELIQUIUM *Animi* (from *delinquo*, "I fwoon"), a fwooning or fainting away; called alfo *fyncope*, *lipothymia*, *lipopfychia*, *eclyfis*, and *afphyxia*.

DELIQUIUM, from *deliquefco* "to be diffolved," in chemiftry, is the diffolution or melting of a falt or calx by fufpending it in a moift cellar. Any fixed alkali, fet in a cellar or other moift place, and in an open veffel, refolves or runs into a kind of liquor which was formerly called by the chemifts *oil* of tartar *per deliquium*.

DELIRIUM, from *deliro*, "to rave or talk idly." When the ideas excited in the mind do not correfpond to the external objects, but are produced by the change induced on the common fenfory, the patient is faid to be delirious. See MEDICINE.

DELIVERY, or CHILD-BIRTH. See MIDWIFERY.

DELMENHORST, a ftrong town of Germany, in the circle of Weftphalia, and county of Oldenburgh, belonging to Denmark; feated on the river Delm near the Wefer. E. long. 8. 37. N. lat. 53. 10.

DELOS, an ifland of the Archipelago, now called Dili. There are abundance of fine ruins, fuppofed to be of the temples of Diana, and Apollo, whofe birth-place it is faid to be. It is fix miles in circumference, but it is now quite deftitute of inhabitants. E. lon. 25. 59. N. lat. 37. 30.

So very facred was the ifland of Delos held by the ancients, that no hoftilities were practifed there, even by the nations that were at war with one another, when they happened to meet in this place. Of this Livy gives an inftance. He tells us, that fome Roman deputies being obliged to put in at Delos, in their voyage to Syria and Egypt, found the galleys of Perfeus king of Macedon, and thofe of Eumenes king of Pergamus, anchored in the fame harbour, though thefe two princes were then making war upon one another.—Hence this ifland was a general afylum, and the protection extended to all kinds of living creatures; for this reafon it abounded with hares, no dogs being fuffered to enter it. No dead body was fuffered to be buried in it, nor was any woman fuffered to lie-in there; all dying perfons, and women ready to be delivered, were carried over to the neighbouring ifland of Rhenæa.

DELPHINIA, in antiquity, feafts which the inhabitants of Egina celebrated in honour of Apollo, furnamed *Delphinius*, fo called, as it is pretended, becaufe he affumed the form of a dolphin to conduct Caftalius and his colony from the ifle of Crete to the *Sinus Criffæus Delphinium*, one of the courts of judicature of the Athenians; fo called from the proximity of the place, where they held their affemblies, to the temple of Apollo Delphinius.

DELPHINIUM, DOLPHIN-FLOWER, or LARKSPUR; a genus of the trigynia order, belonging to the polyandria clafs of plants; and in the natural method ranking under the 26th order, *Multifiliquæ*. There is no calyx; the petals are five; the nectarium bifid, and horned behind; the filiquæ three or one. There are feven fpecies; four are cultivated in gardens. Two of thefe are annual, and two perennial. They are herbaceous plants of upright growth, rifing from 18 inches to four feet in height, garnifhed with finely divided leaves, and terminated by long fpikes of pentapetalous flowers of blue, red, white, or violet colours. One fpecies, the *confolida*, is found wild in feveral parts of Britain, and grows in corn-fields. According to Mr. Withering, the expreffed juice of the petals, with a little alum, makes a good blue ink. The feeds are acrid and poifonous. When cultivated, the bloffoms often become double. Sheep and goats eat this plant; horfes are not fond of it; cows and fwine refufe it. The firft mentioned fpecies makes a very fine appearance in gardens, and is eafily propagated by feeds; being fo hardy, that it thrives in any foil or fituation.

DELPHINUS, or DOLPHIN; a genus of fifhes belonging to the order of Cete. There are three fpecies:

1. The *delphinus*, or dolphin. Hiftorians and philofophers feem to have contended who fhould invent moft fables concerning this fifh. It was confecrated to the gods, was celebrated in the earlieft time for its fondnefs of the human race, was honoured with the title of the *facred fifh*, and diftinguifhed by thofe of *boy-loving* and *philanthropift*. It gave rife to a long train of inventions, proofs of the credulity and ignorance of the times. Ariftotle fteers the cleareft of all the ancients from thefe fables, and gives in general a faithful hiftory of this animal; but the elder Pliny, Ælian, and others, feem to preferve no bounds in their belief of the tales related of this fifh's attachment to mankind. We know that at prefent the appearance of this fifh, and the porpeffe, are far from being efteemed favourable omens by the feamen; for their boundings, fprings, and frolics, in the water, are held to be fure figns of an approaching gale.

It is from their leaps out of that element, that they affume a temporary form that is not natural to them; but which the old painters and fculptors have almoft always given them. A dolphin is fcarce ever exhibited by the ancients in a ftraight fhape, but almoft always incurvated: fuch are thofe on the coin of Alexander the Great, which is preferved by Belon, as well as on feveral other pieces of antiquity: and the poets defcribe them much in the fame manner.

The natural fhape of the dolphin (fee Plate 87.) is almoft ftraight, the back being very flightly incurvated, and the body flender: the nofe is long, narrow, and pointed, not much unlike the beak of fome birds, for which reafon the French call it *l'oye de mer*. It has in all 40 teeth; 21 in the upper jaw and 19 in the lower; a little above an inch long, conic at their upper end, fharp-pointed, bending a little in. They are placed at fmall diftances from each other; fo that when the mouth is fhut, the teeth of both jaws lock into one another: the fpouthole is placed in the middle of the head; the tail is femilunar; the fkin is fmooth, the colour of the back and fides dufky, the belly whitifh: it fwims with great fwiftnefs; and its prey is fifh. It was formerly reckoned a great delicacy. This fpecies of dolphin, however, muft not be confounded with that to which feamen give the name; the latter being quite another kind of fifh, the *coryphæna hippuris* of Linnæus, and the *dorado* of the Portuguefe.

2. The *phocæna*, or porpeſſe. This ſpecies is found in vaſt multitudes in all parts of the Britiſh ſeas; but in greateſt numbers at the time when fiſh of paſſage appear, ſuch as mackarel, herrings, and ſalmon, which they purſue up the bays with the ſame eagerneſs as a dog does a hare. In ſome places they almoſt darken the ſea, as they riſe above water to take breath: but porpeſſes not only ſeek for prey near the ſurface, but often deſcend to the bottom in ſearch of ſand-eels and ſea-worms, which they root out of the ſand with their noſes in the ſame manner as hogs do in the fields for their food. Their bodies are very thick towards the head, but grow ſlender towards the tail, forming the figure of a cone. The noſe projects a little, is much ſhorter than that of the dolphin, and is furniſhed with very ſtrong muſcles, which enable it the readier to turn up the ſand. In each jaw are 48 teeth, ſmall, ſharp-pointed, and a little moveable: like thoſe of the dolphin, they are ſo placed as that the teeth of one jaw lock into thoſe of the other when cloſed. The eyes are ſmall; the ſpout-hole is on the top of the head; the tail ſemilunar. The colour of the porpeſſe is generally black, and the belly whitiſh; but they ſometimes vary. In the river St. Lawrence there is a white kind; and Dr. Borlaſe, in his voyage to the Scilly iſles, obſerved a ſmall ſpecies of cetaceous fiſh, which he calls *thornbacks*, from their broad and ſharp fin on the back. Some of theſe were brown, ſome quite white, others ſpotted: but whether they were only a variety of this fiſh, or whether they were ſmall grampuſes, which are alſo ſpotted, we cannot determine. The porpeſſe is remarkable for the vaſt quantity of fat that ſurrounds the body, which yields a great quantity of excellent oil: from this, or from their rooting like ſwine, they are called in many places *ſea-hogs*; the Germans call them *meerſchwein*; the Swedes *marſuin*; and the Engliſh *porpeſſe*, from the Italian *porco peſce*.—This was once a royal diſh, even ſo late as the reign of Henry VIII. and from its magnitude muſt have held a very reſpectable ſtation at the table; for in a houſehold book of that prince, extracts of which are publiſhed in the third volume of the Archæologia, it is ordered, that if a porpeſſe ſhould be too big for a horſe-load, allowance ſhould be made to the purveyor. This fiſh continued in vogue even in the reign of Elizabeth.

3. The *orca*, or grampus, is found from the length of 15 feet to that of 25. It is remarkably thick in proportion to its length, one of 18 feet being in the thickeſt place 10 feet diameter. With reaſon then did Pliny call this "an immenſe heap of fleſh armed with dreadful teeth." It is extremely voracious; and will not even ſpare the porpeſſe, a congenerous fiſh. It is ſaid to be a great enemy to the whale, and that it will faſten on it like a dog on a bull, till the animal roars with pain. The noſe is flat, and turns up at the end. There are 30 teeth in each jaw; thoſe before are blunt, round, and ſlender; the fartheſt ſharp and thick: between each is a ſpace adapted to receive the teeth of the oppoſite jaw when the mouth is cloſed. The ſpout-hole is in the top of the neck. The colour of the back is black, but on each ſhoulder is a large white ſpot; the ſides marbled with black and white: the belly of a ſnowy whiteneſs. Theſe fiſhes ſometimes appear on our coaſts; but are found in much greater numbers off the North Cape in Norway, whence they are called the *North-Capers*. Theſe and all other whales are obſerved to ſwim againſt the wind; and to be much diſturbed, and tumble about with unuſual violence, at the approach of a ſtorm.

4. The *beluga*, a ſpecies called by the Germans *weit-fiſch*, and by the Ruſſians *beluga*; both ſignifying "white fiſh:" but to this the laſt add *morſkaia*, or "of the ſea," by way of diſtinguiſhing it from a ſpecies of ſturgeon ſo named. The head is ſhort: noſe blunt: ſpiracle ſmall, of the form of a creſcent: eyes very minute: mouth ſmall: in each ſide of each jaw are nine teeth, ſhort, and rather blunt; thoſe of the upper jaw are bent and hollowed, fitted to receive the teeth of the lower jaw when the mouth is cloſed: pectoral fins nearly of an oval form: beneath the ſkin may be felt the bones of five fingers, which terminate at the edge of the fin in five very ſenſible projections. This brings it into the next of rank in the order of beings with the *Manati*. The tail is divided into two lobes, which lie horizontally, but do not fork, except a little at their baſe. The body is oblong, and rather ſlender, tapering from the back (which is a little elevated) to the tail. It is quite deſtitute of the dorſal fin. Its length is from 12 to 18 feet. It makes great uſe of its tail in ſwimming; for it bends that part under it, as a lobſter does its tail, and works it with ſuch force as to dart along with the rapidity of an arrow. It is common in all the Arctic ſeas; and forms an article of commerce, being taken on account of its blubber. They are numerous in the Gulph of St. Lawrence, and go with the tide as high as Quebec. There are fiſheries for them and the common porpeſſe in that river. A conſiderable quantity of oil is extracted; and of their ſkin is made a ſort of Morocco leather, thin yet ſtrong enough to reſiſt a muſket-ball. They are frequent in the Dwina and the Oby; go in ſmall families from five to ten, and advance pretty far up the rivers in purſuit of fiſh. They are uſually caught in nets, but are ſometimes harpooned. They bring only one young at a time, which is duſky; but they grow white as they advance in age, the change firſt commencing on the belly. They are apt to follow boats, as if they were tamed; and appear extremely beautiful, by reaſon of their reſplendent whiteneſs.

Delphinus, in aſtronomy, a conſtellation of the northern hemiſphere, whoſe ſtars in Ptolomy's catalogue are 10; in Tycho's the ſame; in Hevelius's 14; and in Flamſteed's 18.

DELPHOS, a town, or rather village, of Turky in Aſia, in the province of Libadia; occupying part of the ſite of the ancient Delphi. Chandler informs us, that ſome veſtiges of temples are viſible; and above them in the mountain ſide are ſepulchres, niches and horizontal cavities for the body, ſome covered with ſlabs. Farther on is a niche cut in the rock; with a ſeat, intended, it ſeems, for the accommodation of travellers wearied with the rugged track and the long aſcent. The monaſtery is on the ſite of the Gymnaſium. Strong terrace walls and other traces of a large edifice remain. The village is at a diſtance. Caſtalia is on the right hand as you aſcend to it, the water coming from on high and croſſing the road; a ſteep precipice, above which the mountain ſtill riſes immenſely, continuing on in that direction. The village conſiſts of a few poor cottages of Albanians covering the ſite of the temple and oracle. Beneath it to the ſouth is a church of St. Elias, with areas, terrace walls, arches, and veſtiges of the buildings once within the court. The concavity of the rock in this part gave to the ſite the reſemblance of a theatre. Turning to the left hand, as it were toward the extremity of one of the wings, you come again to ſepulchres hewn in the rock, and to a ſemicircular receſs or niche with a ſeat as on the other ſide. Higher up than the village, is the hollow of the Stadium, in which were ſome ſeats and ſcattered fragments.

Higher up, within the village, is a piece of ancient wall, concealed from view by a ſhade, which it ſupports. The ſtone is brown, rough, and ordinary, probably that of Parnaſſus. On the ſouth ſide are many inſcriptions, with wide gaps between the letters, which are negligently and faintly cut; all nearly of the ſame tenor, and very difficult to copy. They regiſter the purchaſe of ſlaves who had entruſted the price of their freedom to the god; containing the contract between Apollo and their owners, witneſſed by his prieſts and by ſome of the archons. This remnant ſeems to be part of the wall before Caſſotis; as above it is ſtill a fountain, which ſupplies the village with excellent water, probably from the ancient ſource.

The water of Caſtalia in the neighbourhood, from which the Pythia, and the poets who verſified her anſwers, were believed to derive a large ſhare of their inſpiration, deſcends through a cleſt of Parnaſſus; the rock on each ſide high and ſteep, ending in two ſummits; of which one was called *Hyampeia*, and had beneath it the ſacred portion of Autonous, a local hero as diſtinguiſhed as Phylacus. From this precipice the Delphians threw down the famous Æſop. By the ſtream, within the cleſt, are ſeen ſmall broken ſtairs leading to a cavity in which is water, and once perhaps up to the top. Grooves have been cut, and the marks of tools are viſible on the rock; but the current, inſtead of ſupplying a fountain, now paſſes over its native bed, and haſtens down a courſe deep-worn to join the Pliſtus. Cloſe by, at the foot of the eaſtern precipice, is a baſon with ſteps on the margin, once, it is likely, the bath uſed by the Pythia. Above, in the ſide of the mountain, is a petty church dedicated to St. John, within which are excavations reſembling niches, partly concealed from view by a tree.

DELTA, a part of Lower Egypt, which takes up a conſiderable ſpace of ground between the branches of the Nile and the Mediterranean. The ancients called it the iſle of Delta, becauſe it is in the ſhape of a triangle, like the Greek letter of that name. It is about 130 miles along the coaſt from Damietta to Alexandria, and 70 on the ſides, from the place where the Nile begins to divide itſelf. It is the moſt plentiful country of all Egypt, and it rains more here than in other parts: but the fertility is chiefly owing to the inundations of the Nile.

DELUGE, Diluvium, in Natural Hiſtory, a flood, or inundation of water, covering the earth, either in the whole or in part. We meet with various accounts of deluges in ancient hiſtory, both ſacred and profane: that which happened in Greece, in the time of Deucalion, called *diluvium Deucalioneum*, is famous: this deluge only overflowed Theſſaly. Its date is fixed to the year before Chriſt 1529, being the third year before the Iſraelites coming out of Egypt, according to the computation of Petavius, Rat. Temp. par. i. lib. i. cap. 7. The deluge of Ogyges happened near three hundred years before that of Deucalion, 1020 years before the firſt Olympiad, and 1796 before Jeſus Chriſt, according to the ſame author, Rat. Tem. par. i. lib. i. cap. 4. par. ii. lib. ii. cap. 5. This only ravaged Attica. Theſe two deluges are frequently mentioned, in ancient Greek authors, under the denomination of *cataclyſmus prior* and *poſterior*. Of the like kind were thoſe inundations in the Netherlands, which, in 1727, overwhelmed and covered with ſea all that part now called the Gulf Dollart in the United Netherlands; and in 1421, all that part ſituated between Brabant and Holland.

But the moſt memorable deluge is that which we particularly, by way of eminence, call the *deluge*, or the *univerſal deluge*, or *Noah's flood*; recorded in Scripture as a general inundation ſent by God to puniſh the corruption of the world, at that time, by deſtroying every thing (Noah and his family, and what was ſhut up with him in the ark, only excepted) from the face of the earth. This flood makes one of the moſt conſiderable epochas in chronology. Its hiſtory is given by Moſes, Gen. ch. vi. and vii. Its time is fixed, by the beſt chronologers, to the year from the creation 1656, anſwering to the year before Chriſt 2293. From this flood, the ſtate of the world is divided into *diluvian* and *antediluvian*.

The deluge has been, and remains, a ſubject of much enquiry and diſpute among naturaliſts, critics, &c. The points chiefly controverted may be reduced to three: firſt, its extent: viz. whether it were *general*, or *partial*; ſecondly, its natural cauſe; and, thirdly, its effects.

1. The immenſe quantity of water, requiſite to furniſh an univerſal deluge, has occaſioned ſeveral authors to ſuſpect it only partial. An univerſal deluge, they think, had been unneceſſary, conſidering the end for which it was brought: viz. to extirpate the wicked inhabitants. The world was then but new, and the people not very many: the holy Scriptures making only eight generations from Adam to Noah. It was but a ſmall part of the earth that could be yet inhabited: the country about the Euphrates, which is ſuppoſed to have been the ſcene of the firſt antediluvian inhabitants, was ſufficient to bear them all. Now Providence, ſay they, which ever acts wiſely and frugally, would never have diſproportioned the means to the end, ſo far as to overflow the whole globe, only to drown a little corner of it. They add, that, in the Scripture-language, the *whole earth* expreſſes no more than *all the inhabitants*; and on this principle advance, that an overflowing of the Euphrates and Tigris, with a vehement rain, &c. might anſwer all the phenomena of the deluge.

But the deluge was univerſal. God declared to Noah, Gen. vi. 17. that he was reſolved to deſtroy every thing that had breath under heaven, or had life on the earth, by a flood of waters: ſuch was the menace; ſuch the execution. The waters, Moſes aſſures us, covered the whole earth, buried all the mountains, and were no leſs than fifteen cubits above the higheſt of them: every thing periſhed therein; birds, beaſts, men, and all that had life, excepting Noah, and thoſe with him in the ark, Gen. vii. 19, &c. Can an univerſal deluge be more clearly expreſſed? If the deluge had only been partial, there had been no neceſſity to ſpend a hundred years in the building of an ark, and ſhutting up all the ſorts of animals therein, in order to re-ſtock the world: they had been eaſily and readily brought from thoſe parts of the world not overflowed, into thoſe that were; at leaſt, all the birds would never have been deſtroyed, as Moſes ſays they were, ſo long as they had wings to bear them to thoſe parts where the flood did not reach. If the waters had only overflowed the neighbourhood of the Euphrates and Tigris, they could not be fifteen cubits above the higheſt mountains; they could not have riſen to that height but they muſt ſpread themſelves, by the laws of gravity, over the reſt of the earth; unleſs, perhaps, they had been retained there by a miracle; and, in that caſe, Moſes, no doubt, would have related the miracle, as he did that of the waters of the Red ſea, and the river Jordan, which were ſuſtained in a heap, to give paſſage to the Iſraelites, Exod. xiv. 22. and Joſh. iii. 16. Add, that, in regions far remote from the Euphrates and Tigris, viz. in Italy, France, Switzerland, Germany, England, &c. there are frequently found in places many ſcores of leagues from any ſea, and even in the tops of high mountains, whole trees ſunk deep under-ground; as alſo teeth and bones of animals, fiſhes entire, ſea-ſhells, ears of corn, &c. petrified; which the beſt naturaliſts are agreed could never have come there but by the deluge; to which may be added the almoſt univerſal traditions of this great event in all countries of the globe.

2. The deluge being allowed univerſal, the philoſophers are ſolicitous to find water to effect it. Moſes brings it from two ſources: *the fountains of the great deep were broken up*; *and the windows of heaven were opened*. Dr. Burnet, in his Telluris Theoria ſacra, ſhews, that all the waters of the ocean were not near enough to cover the earth fifteen cubits above the tops of the higheſt mountains. According to his computation, no leſs than eight oceans were required. Suppoſing the ſea, therefore, drained quite dry, and all the clouds of the atmoſphere diſſolved into rain, we ſhould ſtill want much the greateſt part of the water of a deluge. To get clear of this embarraſſment, many of our beſt naturaliſts, as Steno, Burnet, Woodward, Scheuchzer, &c. adopt Des Cartes' ſyſtem of the formation of the earth. That philoſopher will have the primitive world to have been perfectly round and equal, without mountains, or vales; and accounts for its formation on mechanical principles, by ſuppo-

ſing it at firſt in the condition of a thick turbid fluid, replete with divers heterogeneous matters, which, ſubſiding by ſlow degrees, formed themſelves into different concentric ſtrata, or beds, by the laws of gravity; and thus, at length, left a dry, ſolid earth. Dr. Burnet improves on this theory: he ſuppoſes the primitive earth to have been no more than an orbicular cruſt, inveſting the face of the abyſs, or deep, which grew chinky, clave, burſt, and fell down into the water, and ſo drowned its inhabitants. The ſame theoriſt adds, that by this cataſtrophe the globe of the earth was not only ſhaken, and broken in a thouſand places, but the violence of the ſhock it then underwent ſhifted its ſituation; ſo that the earth, which before was placed directly under the zodiac, became thenceforth oblique to the ſame. Whence aroſe the difference of ſeaſons, which the antediluvian earth was not expoſed to.

Dr. Burnet's hypotheſis is very elegantly recited; but it not only contradicts the phyſical principles of nature, but is alſo utterly inconſiſtent with the ſacred text above cited, which expreſsly mentions mountains as the ſtandard of the height of the water; or with that other paſſage, Gen. viii. 22. where God, promiſing not to bring any more deluges, but that every thing ſhould be reſtored to its ancient ſtate, ſays, that *ſeed-time and harveſt, and cold and heat, and ſummer and winter, and day and night, ſhall ceaſe no more*. See Keil's Exam. of the Theory of the Earth.

Other authors, ſuppoſing a ſufficient fund of water in the abyſs, or ſea, are only concerned for an expedient to bring it forth: accordingly, ſome, as Mr. Ray, &c. have recourſe to a ſhifting of the earth's centre, which, drawing after it the water out of its channel, overwhelmed the ſeveral parts of the earth ſucceſſively. But this could only occaſion a partial deluge in that part of the globe towards which the centre of gravity was tranſlated: nor can the poſſibility of ſuch a tranſlation be allowed, ſince the centre of gravity is the neceſſary reſult of the materials compoſing our globe, and not alterable whilſt the parts remained in the ſame poſition.

Dr. Hook's opinion of the compreſſion of a ſhell of earth into a prolate ſpheroid, thereby preſſing out the water of an abyſs under the earth, may very well account for the waters overflowing two oppoſite zones of the globe; but the middle zone being by much the greater part of the earth's ſurface, muſt by this means be raiſed higher from the centre, and conſequently ariſe more out of the water than before.

Dr. Halley aſcribes the deluge to the ſhock of a comet, or ſome other ſuch tranſient body, whereby the polar and diurnal rotation of the globe would be inſtantly changed. The great agitation that muſt have been occaſioned by it in the ſea, he obſerves, would be ſufficient to account for all thoſe ſtrange appearances of heaping vaſt quantities of earth and high cliffs upon beds of ſhells, which were once the bottom of the ſea, and raiſing up mountains where none were before. Such a ſhock as this, impelling the ſolid parts, would occaſion the waters, and all fluid ſubſtances that were unconfined, as the ſea is, to run violently with an impetus towards that part of the globe where the blow was received, and that with force ſufficient to take with it the very bottom of the ocean, and remove it to the land. In this caſe, it is much more difficult to ſay, how Noah and his family could be preſerved, than how all other creatures were deſtroyed: ſuch a ſhock would change the length of the day and year, by altering the axis of the globe, according to the obliquity of the incidence of the ſtroke. It is objected to this ſyſtem, that ſuch a ſhock muſt have brought on the deluge inſtantaneouſly, and not gradually, as it is ſaid to have happened. Phil. Tranſ. No. 383, p. 120; or Abr. vol. vii. p. 1, &c.

The inquiſitive Mr. Whiſton, in his New Theory of the Earth, has a very ingenious hypotheſis, ſimilar to that ſuggeſted by Dr. Halley, with reſpect to the primary cauſe of the deluge, but much more largely applied and explained. He ſhews, from ſeveral remarkable coincidences, that a comet, deſcending in the plane of the ecliptic towards its perihelion, paſſed juſt before the earth on the firſt day of the deluge; the conſequences whereof would be, firſt, that this comet, when it came below the moon, would raiſe a prodigious, vaſt, and ſtrong tide, both in the ſmall ſeas, which, according to his hypotheſis, were in the antediluvian earth, for he allows no great ocean there, as in ours; and alſo in the abyſs, which was under the upper cruſt of the earth; and that this tide would riſe, and increaſe all the time of the approach of the comet towards the earth, and would be at its greateſt height when the comet was at its leaſt diſtance from it. By the force of which tide, as alſo by the attraction of the comet, he judges, that the abyſs muſt put on an elliptic figure, whoſe ſurface being conſiderably larger than the former ſpherical one, the outward cruſt of the earth, incumbent on the abyſs, muſt accommodate itſelf to that figure, which it could not do while it remained ſolid, and conjoined together. He concludes, therefore, that it muſt of neceſſity be extended, and at laſt broke, by the violence of the ſaid tides, and attraction; out of which, the included water iſſuing, was a great means of the deluge; this anſwering to what Moſes ſpeaks of the *fountains of the great deep being broken open*. Again, the ſame comet, he ſhews, in its deſcent towards the ſun, muſt have paſſed ſo cloſe by the body of the earth as to involve it in its atmoſphere, and tail, for a conſiderable time; and of conſequence it muſt have left a vaſt quantity of its vapours, both expanded and condenſed, on its ſurface; a great part of which, being afterwards rarefied by the ſolar heat, would be drawn up again into the atmoſphere, and afterwards return again in violent rains; and this he takes to be what Moſes intimates *by the windows of heaven being opened*; and particularly by the *forty days rain*. For as to the following rain, which, with this, made the whole time of raining a hundred and fifty days, Mr. Whiſton attributes it to the earth coming a ſecond time within the atmoſphere of the comet, as the comet was on its return from the ſun. Laſtly, to remove the vaſt orb of waters again, he ſuppoſes a mighty wind to have ariſen, which dried up ſome, and forced the reſt into the abyſs again through the clefts by which it came up: only a good quantity remained in the alveus of the great ocean, now firſt made, and in leſſer ſeas, lakes, &c.

To the credit of this theory, it muſt be obſerved, that it was at firſt only propoſed hypothetically; that is, the author only ſuppoſed ſuch a comet, merely as it would account well, and philoſophically, for the phenomena of the deluge; without any aſſurance, that there really was any comet ſo near the earth at that time; and the hypotheſis pleaſed even under ſuch circumſtances; but, upon farther conſideration, he has ſince, he thinks, proved, that there actually was a comet near the earth at that time, or 28th November, in the 2365th year of the Julian period, or the 2349th year before Chriſt, to which time he aſſigns the beginning of the deluge, viz. the ſame great comet which appeared again in 1680. The author no longer, therefore, looks upon it as an hypotheſis, but has republiſhed it in a particular tract, intituled, The Cauſe of the Deluge demonſtrated.

3. But the great difficulty ſtill remains. The orderly ſtrata, or layers of the earth, with the exuviæ, or remains of fiſhes, as their teeth, bones, ſhells, &c. both marine and fluviatile, found in the bodies even of the moſt ſolid ſtrata, and in flints, marbles, &c. are not yet accounted for. Thoſe who adhere to Des Cartes' ſyſtem, as Steno, &c. take the finding of the parts of terreſtrial and aquatic animals, branches of trees, leaves, &c. in the beds, or ſtrata of ſtone, to be a direct proof of the primitive fluidity of the earth. But then they are obliged to have recourſe to a ſecond formation of ſtrata, much later than the firſt; becauſe at the time of the firſt there was neither plant nor animal in being. Steno, therefore, maintains ſecond formations, occaſioned at different

times by extraordinary inundations, earthquakes, volcanos, &c. But Burnet, Woodward, Scheuchzer, &c. choose rather to attribute a second general formation to the deluge; without excluding, however, the particular ones of Steno. But the great objection against this system of fluidity, is mountains; for the whole globe being liquid, whence should such inequalities arise? Mr. Scheuchzer, rather than part with a system which seems so promising, gives into the opinion of those who hold, that, after the deluge, God, to remit the waters into their subterranean reservoirs, broke, and displaced, with his own almighty hand, a great number of strata, that were before horizontal, and raised them above the surface of the earth; whence it is, that the strata in mountains, though concentrical, are never horizontal. Hist. de l'Acad. 1708, p. 32.

Dr. Woodward, taking the several strata for the sediments of a deluge, and considering the circumstances of those fishes, shells, and other exuviæ, found in them, draws several inferences, which very much illustrate the effects of the deluge. As, first, that these marine bodies, and other spoils of salt-water fishes, were borne forth out of the sea, by the universal deluge; and, on the return of the water back again, were left behind upon the land. Secondly, that while the flood covered the globe, all the solid matters, as stones, metals, minerals, and fossils, were totally dissolved, and the cohesion of their corpuscles destroyed; and that their corpuscles, with those of the less solid bodies, as earth, flesh of animals, and vegetables, were sustained promiscuously in the water, and made one common mass. Thirdly, that all the mass, thus sustained, was at length precipitated to the bottom; and that, according to the laws of gravity, the heaviest settled first, and the rest in order. And that the matters, thus subsiding, constituted the several strata of stone, earth, coal, &c. Fourthly, that these strata were originally all parallel, even, and regular, and rendered the surface of the earth perfectly spherical; and that the whole mass of water lay upon them, and constituted a fluid sphere encompassing the globe. Fifthly, that after some time, by the force of an agent seated within the earth, these strata were broken on all sides of the globe, and their situation varied; being elevated in some places, and depressed in others; whence mountains, valleys, grottos, &c. with the channel of the sea, islands, &c. In one word, the whole terraqueous globe was put, by this disruption, and dislocation of the strata, into the condition we now behold it in. Sixthly, that upon the disruption of the strata, and the depression of some, and elevation of other parts, which happened towards the end of the deluge, the mass of water fell back again into the depressed and lowest parts of the earth, into lakes, and other cavities, and the channel of the ocean, and through the fissures, whereby this communicates with the abyss, which it filled till it came to an equilibrium with the ocean. Nat. Hist. of Earth, p. 1 and 2.

But of all the systems yet advanced, there seems none better calculated to solve the phenomena of these petrified exuviæ, than that of M. de la Pryme. The antediluvian world, according to this author, had an external sea, as well as land, with mountains, rivers, &c. and the deluge was effected by breaking the subterraneous caverns and pillars thereof, with dreadful earthquakes, and causing the same to be for the most part, if not wholly, absorbed and swallowed up, and covered by the seas that we now have. Lastly, this earth of ours arose out of the bottom of the antediluvian sea, and in its room; just as many islands are swallowed down, and others thrust up in their stead.

From this system, which is very agreeable to Scripture, the great difficulties which clog all the other systems, seem easily solved. It is no longer a wonder, that shells, and shell-fish, and the bones of fishes, and four-footed creatures, with fruits, &c. should be found in beds and quarries, in mountains and valleys, and the very bowels of the earth: for here they bred in the antediluvian sea; thither they were elevated with the hills and mountains, in the time of the deluge; and there they fell into, were absorbed, and buried in chasms, and holes, and clefts, that would necessarily happen in the extrusion of the earth. Phil. Transf. No. 266.

Mr. King has more lately adopted an hypothesis resembling this last. He ascribes the deluge to subterraneous fires found within the bowels of the earth, which, at the appointed time, burst forth with great violence under the sea, and raised up the bottom of the ocean, so as to pour out the waters over the face of what was before dry land, which by that means became the sea, and has since continued, and that which was before the bottom of the sea became dry land. An earthquake thus occasioned will account, he supposes, for the access of the deluge and the confused disposition of marine productions in the post-diluvian earth. Phil. Transf. vol. lvii. p. 44, &c. M. Buffon recites the principal hypotheses relating to the universal deluge, in his Hist. Nat. tom. i.

DEMADES, a famous Athenian, who from being a mariner became a great orator, and appeased Philip by his eloquence, after the famous victory over the Athenians at Cheronæa, in the 338th year B. C.

DEMAIN, or DEMESNE, in its popular sense, denotes the lord's manor-place, with the lands thereto belonging; which he and his ancestors have from time to time kept in their own manual occupation. See MANOR.

DEMAIN, or *Demesne*, in a law-sense, signifies, according to Hottoman, *patrimonium domini*, the *lord's patrimony*; called also *domain*, and by the civilians, *dominium*. The same author proveth those lands to be *demain*, which a man holdeth originally of himself; and those to be *feodum*, which he holdeth of a superior lord. In England, no common person has any demain, simply understood; for all depends either mediately, or immediately, on the crown. When a man, therefore, in pleading, would signify his land to be his own, he saith, that he is or was seised thereof in his *domain*, as of fee; whereby he means, that although his land be to him and his heirs for ever, yet it is no true *demain*, but depends upon a superior lord, and he holdeth by service, or rent in lieu of service, or by both service and rent.

DEMAIN is sometimes also taken, more largely, for lands and tenements held for life, &c. and sometimes more strictly for such only as are generally held in fee.

DEMAIN is sometimes again used for a distinction between those lands that the lord of a manor has in his own hands, or in the hands of his lessee, demised upon a rent, for a term of years, or life; and such other lands, pertaining to the said manor, which belong to the free or copy-holders. The reason why the copy-hold is accounted *demain*, is because they, who are tenants to it are judged in law to have no other right but at the will of the lord; so that it is reputed still, after a sort, to be in the lord's hands; and yet, in common speech, that is ordinarily called *demain* which is neither free nor copy-free.

DEMAIN, again, is used in a more special signification, in opposition to *frank-fee*. Thus, those lands, which were in the possession of Edward the Confessor are called *ancient demain*; and all others are called *frank-fee*; and the tenants who hold any of those former lands are called *tenants in ancient demain*; and the others, *tenants in frank-fee*, and also, *tenants at common law*. The reason is, because tenants in *ancient demain* cannot be sued out of the lord's court.

DEMAND, in its popular sense, denotes a calling for or requiring one's due. In law, it has a more special signification, as contradistinguished from *plaint*: for all civil actions are pursued either by demands or plaints; according to which the

purſuer is called either *demandant* or *plaintiff*: viz. in real actions, *demandant*; and in perſonal actions, *plaintiff*. See Plaintiff.

DEMESNE. See Demain.

DEMETRIA, a feſtival in honour of Ceres, called by the Greeks *Demeter*. It was then cuſtomary for the votaries of the goddeſs to laſh themſelves with whips made with the bark of trees. The Athenians had a ſolemnity of the ſame name in honour of Demetrius Poliorcetes.

DEMETRIUS Phalerus, a celebrated orator and peripatetic philoſopher, was the ſcholar of Theophraſtus. He acquired ſo much authority at Athens, that he governed the city for ten years; and ruled with ſo much wiſdom and virtue, that they ſet up 36 ſtatues in honour of him. Demetrius compoſed more works in proſe and verſe than any other peripatetic of his time; and his writings conſiſted of poetry, hiſtory, politics, rhetoric, harangues, and embaſſies. None of them are extant except his rhetoric, which is uſually printed among the *Rhetores Selecti*.

Demetrius, a cynic philoſopher, diſciple of Apollonius Tyanæus, in the age of Caligula. The emperor wiſhed to gain the philoſopher to his intereſt by a large preſent; but Demetrius refuſed it with indignation, and ſaid, If Caligula wiſhes to bribe me, let him ſend me his crown. Veſpaſian was diſpleaſed with his inſolence, and baniſhed him to an iſland. The cynic derided the puniſhment, and bitterly inveighed againſt the emperor. He died in a great old age; and Seneca obſerves, that "nature had brought him forth to ſhow mankind that an exalted genius can live ſecurely, without being corrupted by the vices of the world."

DEMI, formed from *dimidium*, a word uſed in compoſition with other words to ſignify *half*.

Demi-*Attici*, boroughs or larger villages of Attica. The Athenian tribes were diſtributed into Demi. Homer, in his catalogue, diſtinguiſhes the Athenians by the appellation *Demos*. And when Theſeus prevailed on them to quit the country and ſettle at Athens, they ſtill continued to frequent the Demi, and to perform their ſeveral religious ceremonies there.

Demi-*Culverin*, a piece of ordnance uſually $4\frac{1}{2}$ inches bore, 2700 pounds weight, 10 feet long, and carrying point blank 175 paces. A Demi-Culverin of the leaſt ſize is $4\frac{1}{4}$ inches bore, 10 feet long, and 2000 pounds weight. It carries a ball of 4 inches diameter and of 9 pounds weight, and its level range is 174 paces. A Demi-Culverin of the largeſt ſort is $4\frac{3}{4}$ inches bore, $10\frac{1}{3}$ feet long, and weighs 3000 pounds weight. It carries a ball $4\frac{1}{2}$ inches diameter, weighing 12 pounds 11 ounces, point blank 178 paces.

Demi-*God*. See Hero.

Demi-*Gorge*, in fortification, is that part of the polygon which remains after the flank is raiſed, and goes from the curtin to the angle of the polygon. It is half of the vacant ſpace or entrance into a baſtion.

Demi-*Quaver*, a note in muſic, two of which are equal to a quaver.

Demi-*Semi-Quaver*, in muſic, the ſhorteſt note, two of them being equal to a ſemi-quaver.

DEMISE, in law, is applied to an eſtate either in fee-ſimple, fee-tail, or for a term of life or years; and ſo it is commonly taken in many writs. The king's death is in law termed the demiſe of the king.

Demise, and Redemise, denote a conveyance where there are mutual leaſes made from one to another of the ſame land, or ſomething out of it.

DEMIURGE, from δημιος, which denotes a *public ſervant*, and εργον *work*, in the mythology of the eaſtern philoſophers, was one of the Æons employed by the ſupreme Deity in the creation of the world. The character they give him is a compound of ſhining qualities and inſupportable arrogance; and his exceſſive luſt of empire effaces his talents and virtues. He is repreſented as claiming dominion over the new world he has formed, as his ſovereign right; and excluding totally the ſupreme Deity from all concern in it, he demands from mankind, for himſelf and his aſſociates, divine honours.

DEMOCRACY, from δημος *people*, and κρατειν *to command or govern*; the ſame with a popular government, wherein the ſupreme power is lodged in the hands of the people: ſuch were Rome and Athens of old; but as to our modern republics, Baſil only excepted, their government comes nearer to ariſtocracy than democracy. The ſublime experiment of a democratic republic now carrying on among the French, will perhaps decide the queſtion, whether the happineſs of mankind is or is not moſt capable of being ſecured by this form of government.

DEMOCRITUS, one of the greateſt philoſophers of antiquity, was born at Abdera, a town of Thrace, about the 80th Olympiad; that is, about 460 years before Chriſt. He died, according to Diogenes Laertius, in the 361ſt year before the Chriſtian era, aged 109. It is ſaid that he put out his eyes, in order that he might meditate more profoundly on philoſophical ſubjects; but this has little probability. He was the author of many books, which are loſt; and from theſe Epicurus borrowed his philoſophy.

DEMOIVRE (Abraham), an eminent mathematician, was born at Vitri in Champagne, May 1667. The revocation of the edict of Nantz, in 1685, determined him to fly into England, ſooner than abandon the religion of his fathers. He laid the foundation of his mathematical ſtudies in France, and perfected himſelf at London; where a mediocrity of fortune obliged him to employ his talents in this way, and to read public lectures for his better ſupport. The *Principia Mathematica* of Newton, which chance is ſaid to have thrown in his way, made him comprehend at once, how little he had advanced in the ſcience he profeſſed. He fell hard to work: he ſucceeded as he went along; and he ſoon became connected with, and celebrated among, the firſt-rate mathematicians. His eminence and abilities ſoon opened to him an entrance into the Royal Society of London, and afterwards into the Academy of Sciences at Paris. His merit was ſo known and acknowledged by the former, that they judged him a fit perſon to decide the famous conteſt between Newton and Leibnitz. The collection of the academy of Paris contains no memoir of this author, who died at London Nov. 1754, ſoon after his admiſſion into it; but the Philoſophical Tranſactions of London have ſeveral, and all of them intereſting. He publiſhed alſo ſome capital works, ſuch as, *Miſcellanea Analytica, de ſeriebus & quadraturis*, &c. 1730, 4to. But perhaps he has been more generally known by his "Doctrine of Chances; or, Method of calculating the Probabilities of Events at Play." This work was firſt printed, 1718, in 4to, and dedicated to Sir Iſaac Newton: it was reprinted, 1738, with great alterations and improvements; and a third edition was afterwards publiſhed with additions, and "A Treatiſe on Annuities," dedicated to Lord Carpenter.

DEMONSTRABLE, a term uſed in the ſchools to ſignify that a thing may be clearly proved. Thus, it is demonſtrable, that the three angles of a triangle are equal to two right ones.

DEMONSTRATION, in logic, a ſeries of ſyllogiſms, all whoſe premiſes are either definitions, ſelf-evident truths, or propoſitions already eſtabliſhed. See Logic.

DEMONSTRATIVE, in grammar, a term given to ſuch pronouns as ſerve to indicate or point out a thing. Of this number are *hic, hæc, hoc*, among the Latins; and *this, that, theſe, thoſe*, in Engliſh.

DEMOSTHENES, the famous Athenian orator, was born

at Athens 381 B. C. He loft his father at feven years of age; and was placed under the conduct of guardians, who robbed him of his fubftance, and neglected his education. Demofthenes repaired this lofs by his love of eloquence and his extraordinary abilities. He became the difciple of Ifæus and Plato, and applied himfelf to ftudy the orations of Ifocrates. At the age of 17 he gave an early proof of his eloquence and abilities againft his guardians, from whom he obtained the retribution of the greateft part of his eftate. His rifing talents were, however, impeded by various natural defects. But thefe were at laft conquered by dint of refolution and unwearied attention. He declaimed by the fea-fhore, that he might be ufed to the noife of a tumultuous affembly; and with pebbles in his mouth, that he might correct a defect in his fpeech. He practifed at home with a naked fword hanging over his fhoulder, that he might check an ungraceful motion to which he was fubject. He alfo confined himfelf in a fubterraneous cave, to devote himfelf more clofely to ftudious purfuits; and to eradicate all curiofity of appearing in public, he fhaved one half of his head. In this folitary retirement, by the help of a glimmering lamp, he compofed the greateft part of his orations, which have ever been the admiration of every age; though his contemporaries and rivals inveighed againft them, and obferved that they fmelt of oil. His abilities as an orator raifed him to confequence at Athens, and he was foon placed at the head of government. In this public capacity he roufed his countrymen from their indolence, and animated them againft the encroachment of Philip of Macedonia. In the battle of Cheronæa, Demofthenes betrayed his pufillanimity, and faved his life by flight. After the death of Philip, he declared himfelf warmly againft his fon and fucceffor Alexander; and when the Macedonians demanded of the Athenians their orators, Demofthenes reminded his countrymen of the fable of the fheep, which delivered their dogs to the wolves. By the prevalence of party, however, he was forced to retire from Athens; and in his banifhment, which he paffed at Trœzen and Ægina, he lived with more effeminacy than true heroifm. When Antipater made war againft Greece after the death of Alexander, Demofthenes was publicly recalled from his exile, and a galley was fent to fetch him from Ægina. His return was attended with much fplendour, and all the citizens crowded at the Piræus to fee him land. But his triumph and popularity were fhort. Antipater and Craterus were near Athens, and demanded all the orators to be delivered up into their hands. Demofthenes fled to the temple of Neptune in Calauria; and when he faw that all hopes of fafety were vanifhed, he took a dofe of poifon, which he always carried in a quill, and expired on the day that the Thefmophoria were celebrated, 322 years before Chrift. The Athenians raifed a brazen ftatue to his honour, with an infcription tranflated into this diftich:

Si tibi par menti robur, Vir magne, fuiffet,
Græcia non Macedo fuccubuiffet hero.

Demofthenes has been defervedly called *the prince of orators*. Indeed no orator had ever a finer field than Demofthenes in his Olynthiacs and Philippics, which are his capital orations; and undoubtedly to the greatnefs of the fubject, and to that integrity and public fpirit which breathe in them, they owe a large portion of their merit. The fubject is, to excite the indignation of his countrymen againft Philip of Macedon, the public enemy of the liberties of Greece; and to guard them againft the treacherous meafures by which that crafty tyrant endeavoured to lull them into a neglect of their danger. To attain this end, we fee him ufe every proper means to animate a people diftinguifhed by juftice, humanity, and valour, but in many inftances become corrupt and degenerate. He boldly accufes them of venality, indolence, and indifference to the public good; while, at the fame time, he reminds them of their former glory, and of their prefent refources. His contemporary orators, who were bribed by Philip, and who perfuaded the people to peace, he openly reproaches as traitors to their country. He not only prompts to vigorous meafures, but teaches how they are to be carried into execution. His orations are ftrongly animated, and full of the impetuofity and ardour of public fpirit. His compofition is not diftinguifhed by ornament and fplendour: It is an energy of thought, peculiarly his own, which forms his character, and raifes him above his fpecies. He feems not to attend to words, but to things. We forget the orator, and think of the fubject. He has no parade and oftentation, no ftudied introductions: but is like a man full of his fubject; who, after preparing his audience by a fentence or two for the reception of plain truths, enters directly on bufinefs.

The ftyle of Demofthenes is ftrong and concife; though fometimes, it muft be confeffed, harfh and abrupt. His words are highly expreffive, and his arrangement firm and manly. Negligent of leffer graces, he feems to have aimed at that fublime which lies in fentiment. His action and pronunciation are faid to have been uncommonly vehement and ardent; which, from the manner of his writings, we fhould readily believe. His character appears to have been of the auftere rather than of a gentle kind. He is always grave, ferious, paffionate; never degrading himfelf, nor attempting any thing like pleafantry. If his admirable eloquence be in any refpect faulty, it is that he fometimes borders on the hard and dry. He may be thought to want fmoothnefs and grace; which is attributed to his imitating too clofely the manner of Thucydides, who was his great model for ftyle, and whofe hiftory he is faid to have tranfcribed eight times with his own hand. But thefe defects are more than atoned for by that mafterly force of mafculine eloquence, which, as it overpowered all who heard it, cannot in the prefent day be read without emotion.

Cicero calls him a perfect model, and fuch as he himfelf wifhed to be. Thefe two great princes of eloquence have been often compared together; but the judgment hefitates to which to give the preference. The Archbifhop of Cambray, however, feems to have ftated their merits with great juftice and perfpicuity in his Reflections on Rhetoric and Poetry. The paffage, tranflated, is as follows: "I do not hefitate to declare that I think Demofthenes fuperior to Cicero. I am perfuaded no one can admire Cicero more than I do. He adorns whatever he attempts. He does honour to language. He difpofes of words in a manner peculiar to himfelf. His ftyle has great variety of character. Whenever he pleafes, he is even concife and vehement; for inftance, againft Catiline, againft Verres, againft Antony. But ornament is too vifible in his writings. His art is wonderful, but it is perceived. When the orator is providing for the fafety of the republic, he forgets not himfelf, nor permits others to forget him. Demofthenes feems to efcape from himfelf, and to fee nothing but his country. He feeks not elegance of expreffion; unfought for he poffeffes it. He is fuperior to admiration. He makes ufe of language, as a modeft man does of drefs, only to cover him. He thunders, he lightens. He is a torrent which carries every thing before it. We cannot criticife, becaufe we are not ourfelves. His fubject enchains our attention, and makes us forget his language. We lofe him from our fight: Philip alone occupies our minds. I am delighted with both thefe orators; but I confefs that I am lefs affected by the infinite art and magnificent eloquence of Cicero, than by the rapid fimplicity of Demofthenes."

DEMPSTER *of* COURT, the name formerly given in Scotland to the common executioner or hangman.

DEMSTER, or DEEMSTER. See DEEMSTER.

DEMULCENTS, among phyficians, internal medicines

good to allay local irritation. Such are the roots of marsh-mallows, of white lilies, of liquorice, diluting and mucilaginous drinks, &c. of various kinds.

DEMURRAGE, in commerce, an allowance made to the master of a ship by the merchants, for staying in a port longer than the time first appointed for his departure.

DEMURRER, in law, a stop put to any action upon some point of difficulty which must be determined by the court before any further proceedings can be had in the suit.

DEN, a syllable which, added to the names of places, shows them to be situated in valleys or near woods; as Tenterden.

DENARIUS, in Roman antiquity, the chief silver coin among the Romans, worth in our money about sevenpence three farthings. As a weight, it was the seventh part of a Roman ounce.

DENARIUS is also used in our law-books for an English penny.

DENBIGHSHIRE, a county of Wales, bounded on the south by Merioneth and Montgomery shires, on the north by Flintshire and the Irish Sea, on the west by Caernarvon and part of Merionethshire. It is about 40 miles long and 21 broad. The air is wholesome, but sharp, the county being pretty hilly, and the snow lying long on the tops of the mountains. The soil in general is barren: but the vale of Clwyd, so called, from its being watered by that river, is a very fertile pleasant spot of great extent, and well inhabited. The chief commodities are black cattle, sheep, and goats, rye, called here *amelcorn*, and lead-ore. The county sends two members to parliament, viz. a knight for the shire, and a burgess for Denbigh the capital.

DENBIGH, the capital town of Denbighshire in N. Wales. It is seated on the side of a rocky hill, on a branch of the river Clwyd, and was formerly a place of great strength, with an impregnable castle, now demolished. It is pretty large, well built, and inhabited by tanners and glovers, and gives the title of Earl to the noble family of Fielding. W. long. 3. 30. N. lat. 53. 15.

DENDERMOND, a handsome and strong town of the Austrian Netherlands, in Flanders, with a strong citadel. It was taken by the allies in 1706, and by the French in 1745. It is surrounded by marshes and fine meadows, which the inhabitants can lay under water when they please. It is seated at the confluence of the Dender and Schelde. E. long. 4. 3. N. lat. 51. 3.

DENDRACHATES, in natural history, the name used by the ancients for an extremely elegant and beautiful species of agate, the ground of which is whitish, variegated with veins of a brighter white. These veins are beautifully disposed in a number of various figures; but generally in many concentric irregular circles, drawn round one or more points. It is common also, in various parts of this stone, to find very beautiful delineations of trees, mosses, sea-plants, and the like, so elegantly expressed, that many have erroneously taken them for real plants included in the substance of the stone; whence the name *dendrachates*.

DENDROMETER, from δένδρον *a tree*, and μετρέω *I measure*, an instrument lately invented by Messrs. Duncombe and Whittel, for which they obtained a patent, so called from its use in measuring trees. This instrument consists of a semicircle A, pl. 3. Vol. III. divided into two quadrants, and graduated from the middle; upon the diameter B there hangs a plummet L for fixing the instrument in a vertical position; there is also a chord D parallel to the diameter, and a radius E, passing at right angles through the diameter and chord. From a point on the radius hangs an altimeter C, between the chord and diameter, to which is fixed a small semicircle G, and a screw, to confine it in any position. The altimeter, which is contrived to form the same angle with the radius of the instrument as the tree forms with the horizon, is divided from its centre both ways into forty equal parts: and these parts are again divided into halves and quarters. Upon the small semicircle G, on which is accounted the quantity of the angle made by the altimeter and radius, are expressed degrees from 60 to 120, being 30 on each quadrant. The radius is numbered with the same scale of divisions as the altimeter. There is also a nonius to the small semicircle, which shows the quantity of an angle to every five minutes. On the back of the instrument the stock M of the sliding piece is confined to the axis N, which moves concentrically parallel to the elevation index F on the opposite side, to which it is fixed. This index is numbered by a scale of equal divisions with the altimeter and radius: at the end of the index is a nonius, by which the angles of elevation above, or of depression below, the horizon, measured upon the semicircle of the instrument, are determined to every five minutes. There is also a groove in the radius, that slides across the axis by means of a screw I, working between the chord and semicircle of the instrument; and this screw is turned by the key O. Upon the stock M is a sliding piece P, that always acts at right angles with the altimeter, by means of a groove in the latter. To the shank of the sliding piece is affixed a moveable limb Q, which forms the same angle with the altimeter as the bough forms with the body or trunk of the tree. This limb may be of any convenient length, divided into equal parts of the same scale with all the foregoing divisions. At the extremity of the fixed axis, on a centre, an index R, with telescopic sights, works horizontally upon the moveable limb of the sliding piece. Upon this horizontal index R may be fixed a small quadrant T, described with any convenient radius from the centre on which the index moves, and divided into 90 degrees, beginning at a right line drawn from the centre at right angles with the fiducial edge of the said index; and upon the extremity of the axis is a nonius, whereby to determine the quantity of an angle upon the quadrant every five minutes. There are also two small semicircular arches S, S, serving to keep the sights in a parallel position, each containing an equal number of degrees. Upon these arches is measured the angle, subtending a side equal to the difference of the altitudes of the observed objects above the plane of the horizon, and whose base is the nearest distance between the perpendiculars in which these objects are situated. The dendrometer is fitted to a theodolite, and may be used either with or without it as occasion requires.

The principal use of this instrument is for measuring the length and diameter of any tree, perpendicular or oblique, to an horizontal plane, or in any situation of the plane on which it rests, or of any figure, whether regular or irregular, and also the length and diameter of the boughs, by mere inspection; and the inventors of it have calculated tables, annexed to their account of the instrument itself, by the help of which the quantity of timber in a tree is obtained without calculation, or the use of the sliding rule. The instrument is rectified by setting it in a perpendicular position, by means of the plummet, and screwing it to the staff; then the altimeter is placed in the exact position of the tree, whether perpendicular, reclining, or inclining, and screwed fast. If the tree stands on level ground, the horizontal distance from the tree to the axis of the instrument is measured with a tape-line, and the radius is moved with the key till that distance be cut upon it by the inside of the diameter: but if the ground be slanting, the distance from the tree to the instrument is measured, and the elevation index is moved till the point of the tree from which the distance was measured is seen through the sights, and there screwed fast; and the radius is moved backwards or forwards with the key, till this distance is cut upon the elevation index by the perpendicular line of the altimeter; and the horizontal line will be

marked upon the radius by the infide of the diameter. In order to obtain the length of the tree, the elevation index is firft moved downwards, till the bottom of the tree cut by the horizontal wires is obferved through the fights, and the feet and inches marked by the index upon the altimeter below the point of fight or horizontal line are noted down: then the index is moved upwards till the part to which you would meafure, cut by the horizontal wires, is feen, and the feet and inches marked on the altimeter above the point of fight are noted: thefe two quantities added together give the exact length of the tree, which is inferted in a field-book. For the girth of the tree, the circumference in that part where the horizontal diftance was taken, is meafured with the tape-line; and a fixth part of this circumference is added to the diftance on the radius, which was before cut by the infide of the diameter, becaufe the tape-line, in taking the diftance, cannot be applied to the centre of the body of the tree; then the elevation index is lowered to that part of the tree of which the diameter is to be taken, and fcrewed faft. Set the moveable limb of the fliding piece quite ftraight, and the edge of the horizontal index upon the firft divifion of it. Turn the whole inftrument about to the left hand till you fee through the fights the left fide of the tree cut exactly by the perpendicular wires; then, the inftrument being fixed, move the fights only upon the fliding piece, till you fee the right fide of the tree cut alfo by the perpendicular wires; and you will find the true diameter marked by the horizontal index upon the fliding piece, which is to be entered in a diftinct column of the field-book.

For the boughs: let the diftance on the radius be now reduced to its former quantity, and the elevation index moved upwards till the bough is feen through the fights, and fcrewed faft. Set the moveable part of the fliding piece in a pofition parallel to the bough, and the edge of the horizontal index on the firft divifion of it. Turn the whole inftrument about till you fee through the fights the fhoot of the bough clofe to the trunk cut by the perpendicular wires; then move the fights till you fee the other end of the bough cut by the faid wires, and note the feet and inches marked by the horizontal index on the moveable limb of the fliding piece, which will give the true length of the bough to be inferted in the field-book. And the girth of the bough may be obtained by directing the fights to that part of it whofe girth is defired; then by moving the elevation index downwards till you fee the under fide of the bough cut by the horizontal wires, and there noting the feet and inches marked by the faid index on the altimeter; after which, let the elevation index be moved upwards, till the upper fide of the bough cut by the horizontal wires is feen; the feet and inches marked upon the altimeter are to be noted as before. The former quantity fubtracted from the latter will give the true diameter of the bough, which is entered in the field-book. The true folidity both of the body of the tree and of the boughs may be found from the diameter and lengths in tables calculated for this purpofe.

The dendrometer, fitted to a theodolite, may be applied to meafuring the heights and diftances of objects, acceffible or inacceffible, whether fituated in planes parallel or oblique to the plane in which the inftrument is placed. It may be alfo ufed for taking all angles, whether vertical, horizontal or oblique, in any pofition of the planes in which they are formed; and thus for facilitating the practical operations of engineering, land-furveying, levelling, mining, &c. and for performing the various cafes of plane trigonometry without calculation; of which the inventors have fubjoined to their account of this inftrument many examples.

DENDROPHORIA, in antiquity, the carrying of boughs or branches of trees; a religious ceremony fo called, becaufe certain priefts, called from thence *dendrophori*, tree-bearers, marched in proceffion, carrying the branches of trees in their hands in honour of fome god, as Bacchus, Cybele, Sylvanus, &c. The college of the dendrophori is often mentioned in ancient marbles; and we frequently fee in baffo relievos the bacchanals reprefented as men carrying little fhrubs or branches of trees.

DENEB, an Arabic term fignifying *tail*, ufed by aftronomers to denote feveral fixed ftars. Thus, *deneb elect*, fignifies the bright ftar in the lion's tail. *Deneb adigege*, that in the fwan's tail.

DENHAM (Sir John), an eminent Englifh poet, the only fon of Sir John Denham, chief baron of the exchequer in Ireland, and one of the lords commiffioners there, was born in Dublin in 1615; but his father, in 1617, being made a baron of the exchequer in England, he received his education in that country. In his youth he followed gaming more than any thing elfe; but, in 1641, publifhed a tragedy called the *Sophy*, which was much admired by the beft judges; and, in 1643, wrote his famous poem called *Cooper's Hill*, which Mr. Dryden pronounces will ever be the ftandard of good writing for majefty of ftyle. Denham was fent ambaffador from Charles II. to the king of Poland; and at the Reftoration was made furveyor-general of his majefty's buildings, and created knight of the Bath. On obtaining this poft, he is faid to have renounced his poetry for more important ftudies; though he afterwards wrote a fine copy of verfes on the death of Cowley. He died at his office in Whitehall in 1668; and his works have been often fince printed.

DENIER, a fmall French copper coin, of which twelve make a fol. There are two kinds of deniers, the one tournois, the other parifis, whereof the latter is worth a fourth part more than the former.

DENIZEN, in law, an alien made a fubject by the king's letters-patent; otherwife called *donaifon*, becaufe "his legitimation proceeds *ex donatione regis*, from the king's gift." A denizen is in a kind of middle ftate between an alien and a natural born fubject, and partakes of both of them. He may take lands by purchafe or devife, which an alien may not; but cannot take by inheritance; for his parent, through whom he muft claim, being an alien, had no inheritable blood, and therefore could convey none to the fon; and, upon a like defect of blood, the iffue of a denizen born before denization cannot inherit to him; but his iffue born after may. A denizen is not excufed from paying the alien's duty, and fome other mercantile burdens. And no denizen can be of the privy council, or either houfe of parliament, or have any office of truft civil or military, or be capable of any grant of lands, &c. from the crown.

DENMARK, a kingdom of Europe, bounded on the E. by the Baltic fea, on the W. and N. by the ocean, and on the S. by Germany. The country is generally flat, and the foil a barren fand. The air is rendered foggy by the neighbourhood of the feas and lakes, of which it is full. Denmark, properly fo called, confifts of Jutland and the iflands of Zealand and Funen, with the little ifles about them; but the king of Denmark's dominions contain the kingdom of Norway, and the duchies of Holftein, Oldenburg, and Delmenhorft. There is no confiderable river, and the winter continues feven or eight months. In the fummer the heat is very great, and the days are long. The commodities are corn, pulfe, horfes, and large beeves. The kingdom of Denmark was formerly limited and elective; but, in 1660, it was made abfolute and hereditary. This was the confequence of a revolution almoft unparalleled in hiftory; a free people voluntarily refigning their liberties into the hands of their fovereign. The inhabitants are Proteftants fince the year 1522, when they embraced the confeffion of Augfburg. The forces which the king of Denmark has ufually on foot are near 40,000. The revenues are computed at 500,000l. a year, which

ariſe from the crown lands and duties. The produce of Norway conſiſts in pitch, tar, fiſh, oil, and deal boards. Copenhagen is the capital.

DENNIS (John), the celebrated critic, was the ſon of a reputable tradeſman in London, and born in the year 1657. He received the firſt branches of education at the great ſchool in Harrow on the hill, where he commenced acquaintance and intimacy with many young noblemen and gentlemen, who afterwards made conſiderable figures in public affairs, whereby he laid the foundation of a very ſtrong and extenſive intereſt, which might, but for his own fault, have been of infinite uſe to him in future life. From Harrow he went to Caius-college Cambridge; where, after his proper ſtanding, he took the degree of bachelor of arts. When he quitted the univerſity, he made the tour of Europe; in the courſe of which he conceived ſuch a deteſtation for deſpotiſm, as confirmed him ſtill more in thoſe Whig principles which he had from his infancy imbibed.

On his return to England he became early acquainted with Dryden, Wycherly, Congreve, and Southerne; whoſe converſation inſpiring him with a paſſion for poetry, and a contempt for every attainment that had not ſomething of the *belles lettres*, diverted him from the acquiſition of any profitable art, or the exerciſe of any profeſſion. This, to a man who had not an independent income, was undoubtedly a misfortune: however, his zeal for the proteſtant ſucceſſion having recommended him to the patronage of the Duke of Marlborough, that nobleman procured him a place in the cuſtoms worth 120l. *per annum;* which he enjoyed for ſome years, till, from profuſeneſs and want of economy, he was reduced to the neceſſity of diſpoſing of it to ſatisfy ſome very preſſing demands. By the advice of Lord Halifax, however, he reſerved to himſelf, in the ſale of it, an annuity for a term of years; which term he outlived, and was, in the decline of his life, reduced to extreme neceſſity.

Mr. Theo. Cibber relates an anecdote of him, which we cannot avoid repeating, as it is not only highly characteriſtic of the man whoſe affairs we are now conſidering, but alſo a ſtriking and melancholy inſtance, among thouſands, of the diſtreſsful predicaments into which men of genius and literary abilities are perhaps apter than any others to plunge themſelves, by paying too ſlight an attention to the common concerns of life, and their own moſt important intereſts. "After that he was worn out (ſays that author) with age and poverty, he reſided within the verge of the court, to prevent danger from his creditors. One Saturday night he happened to ſaunter to a public-houſe, which in a ſhort time he diſcovered to be without the verge. He was ſitting in an open drinking room, when a man of a ſuſpicious appearance happened to come in. There was ſomething about the man which denoted to Mr. Dennis that he was a bailiff. This ſtruck him with a panic; he was afraid his liberty was at an end; he ſat in the utmoſt ſolicitude, but durſt not offer to ſtir leſt he ſhould be ſeized upon. After an hour or two had paſſed in this painful anxiety, at laſt the clock ſtruck twelve; when Mr. Dennis, in an ecſtacy, cried out, addreſſing himſelf to the ſuſpected perſon, "Now, Sir, bailiff or no bailiff, I don't care a farthing for you, you have no power now." The man was aſtoniſhed at his behaviour; and when it was explained to him, was ſo much affronted with the ſuſpicion, that, had not Mr. Dennis found his protection in age, he would probably have ſmarted for his miſtaken opinion. A ſtrong picture of the effects of fear and apprehenſion, in a temper naturally ſo timorous and jealous as Mr. Dennis's; of which the following is a ſtill more whimſical inſtance. In 1704 came out his favourite tragedy, *Liberty Aſſerted;* in which were ſo many ſtrokes on the French nation, that he thought they were never to be forgiven. He had worked himſelf into a perſuaſion that the King of France would inſiſt on his being delivered up, before he would conſent to a peace: and full of this idea of his own importance, when the congreſs was held at Utrecht, he is ſaid to have waited on his patron the Duke of Marlborough, to deſire that no ſuch article might be ſtipulated. The Duke told him he really had no intereſt then with the miniſtry; but had made no ſuch proviſion for his own ſecurity, though he could not help thinking he had done the French as much injury as Mr. Dennis himſelf. Another ſtory relating to this affair is, that being at a gentleman's houſe on the coaſt of Suſſex, and walking one day on the ſea-ſhore, he ſaw a ſhip ſailing, as he fancied, towards him; he inſtantly ſet out for London, in the fancy that he was betrayed; and congratulating himſelf on his eſcape, gave out that his friend had decoyed him down to his houſe, to ſurrender him up to the French.

Mr. Dennis, partly through a natural peeviſhneſs and petulance of temper, and partly perhaps for the ſake of procuring the means of ſubſiſtence, was continually engaged in a paper-war with his contemporaries, whom he ever treated with the utmoſt ſeverity: and, though many of his obſervations were judicious, yet he uſually conveyed them in language ſo ſcurrilous and abuſive, as deſtroyed their intended effect; and as his attacks were almoſt always on perſons of ſuperior abilities to himſelf, viz Addiſon, Steele, and Pope, their replies uſually turned the popular opinion ſo greatly againſt him, that, by irritating his teſty temper the more, it rendered him a perpetual torment to himſelf: till at length, after a long life of viciſſitudes, diſappointments, and turmoils, rendered wretched by indiſcretion, and hateful by malevolence, having outlived the reverſion of his eſtate, and reduced to diſtreſs, from which his having been daily creating enemies had left him ſcarcely any hopes of relief, he was compelled to what muſt be the moſt irkſome ſituation that can be conceived in human life, the receiving obligations from thoſe whom he had been continually treating ill. In the very cloſe of his days, a play was acted for his benefit at the little theatre in the Hay-market, procured through the united intereſts of Meſſrs. Thomſon, Mallet, and Pope; the laſt of whom, notwithſtanding the groſs manner in which Mr. Dennis had on many occaſions uſed him, and the long warfare that had ſubſiſted between them, intereſted himſelf very warmly for him; and even wrote an occaſional prologue to the play, which was ſpoken by Mr. Cibber. Not long after this, viz. on the 6th of January 1733, he died, being then in the 77th year of his age.

Mr. Dennis certainly was poſſeſſed of much erudition, and a conſiderable ſhare of genius. In proſe, he is far from a bad writer, where abuſe or perſonal ſcurrility does not mingle itſelf with his language. In verſe, he is extremely unequal; his numbers being at ſome times ſpirited and harmonious, and his ſubjects elevated and judicious; and at others, flat, harſh, and puerile.—As a dramatic author, he certainly deſerves not to be held in any conſideration. It was juſtly ſaid of him by a wit, that he was the moſt complete inſtructor for a dramatic poet, ſince he could teach him to diſtinguiſh good plays by his *precepts*, and bad ones by his *examples*.

DENOMINATOR, in arithmetic, a term uſed in ſpeaking of fractions. See Arithmetic, p. 318.

DENSITY *of* Bodies, is that property directly oppoſite to rarity, whereby they contain ſuch a quantity of matter under ſuch a bulk. Accordingly, a body is ſaid to have double or triple the denſity of another body, when their bulk being equal, the quantity of matter is in the one double or triple the quantity of matter in the other.

Density *of the Air*, is a property that has employed the later philoſophers, ſince the diſcovery of the Torricellian experiment. It is demonſtrated, that in the ſame veſſel, or even in veſſels communicating with each other, at the ſame diſtance from the centre, the air has every where the ſame denſity. The denſity of air, *cæteris paribus*, increaſes in proportion to the compreſſing powers. Hence the inferior air is denſer than the ſuperior;

the denfity, however, of the lower air is not proportional to the weight of the atmofphere on account of heat and cold, and other caufes perhaps, which make great alterations in denfity and rarity. However, from the elafticity of the air, its denfity muft be always different at different heights from the earth's furface; for the lower parts being preffed by the weight of thofe above, will be made to accede nearer to each other, and the more fo as the weight of the incumbent air is greater. Hence the denfity of the air is greateft at the earth's furface, and decreafes upwards in geometrical proportion to the altitudes taken in arithmetical progreffion. If the air be rendered denfer, the weight of bodies in it is diminifhed; if rarer, increafed; becaufe bodies lofe a greater part of their weight in denfer than in rarer mediums. Hence, if the denfity of the air be fenfibly altered, bodies equally heavy in a rarer air, if their fpecific gravities be confiderably different, will lofe their equilibrium in the denfer, and the fpecifically heavier body will preponderate. See Pneumatics.

DENTALIUM, in natural hiftory, a fhell-fifh belonging to the order of vermes teftacea. The fhell confifts of one tubulous ftraight valve, open at both ends. There are eight fpecies, diftinguifhed by the angles, ftriæ, &c. of their fhells.

DENTARIA, tooth-wort, or *Tooth-violet;* a genus of the filiquofa order, belonging to the tetradynamia clafs of plants; and in the natural method ranking under the 39th order, *Siliquofæ.* The filiqua parts with a fpring, and the valvules roll fpirally backwards; the ftigma is emarginated; the calyx clofing longitudinally. There are three fpecies, all of them hardy perennials; producing annual ftalks 12 or 18 inches high, adorned with many-lobed leaves, and fpikes of quadrupetalous cruciform flowers of a red or purple colour. They delight in fhady places; and are propagated either by feeds or parting the roots. The feeds may be fown in autumn or early in the fpring, in a fhady border of light earth; and when the plants are three inches high, they may be planted where they are to remain. The time for parting the roots is in October or November, or early in the fpring.

DENTATUS (Curius), a renowned difinterefted Roman general, whofe virtues render him more memorable than even his great military reputation, flourifhed 272 years B. C. He was thrice conful; he conquered the Samnites, Sabines, and Lucanians; and gave each citizen 40 acres of land, allowing himfelf no more. The ambaffadors of the Samnites making him a vifit, found him boiling turnips in a pipkin; upon which they offered him gold to come over to their intereft; but he told them, his defign was not to grow rich, but to command thofe who were fo. He defeated Pyrrhus near Tarentum, and received the honour of a triumph.

DENTELLA, in botany; a genus of the monogynia order, belonging to the pentandria clafs of plants. The calyx is a five-parted perianthium, with fmall fubulated leaves; the ftamina five fhort fubulated filaments; the antheræ fmall; the pericarpium a globular, bilocular capfule; the feeds egg-fhaped, and very numerous.

DENTIFRICE, a medicinal remedy for the teeth. There are various kinds; generally made of earthy fubftances finely pounded, and mixed with alum, or fome other aftringent fubftance. The common ufe of acids is pernicious, on account of their deftroying the enamel of the teeth.

DENTILES, or Dentils, in architecture, an ornament in corniches bearing fome refemblance to teeth, particularly ufed in the Ionic and Corinthian orders. See Architecture.

DENTISCALPRA, in furgery, an inftrument for fcaling the teeth; which being applied near the gums, fcrapes off the tartar that may have accumulated there.

DENTITION, the breeding or cutting of teeth in children. See Medicine.

DENUNCIATION, a folemn publication or promulgation of any thing. All veffels of enemies are lawful prizes, after denunciation or proclamation of war. The defign of the denunciation of excommunicated perfons is, that the fentence may be the more fully executed by the perfon's being more known.

DENYS, (St.) a famous town of France, in the department of Paris. Here king Dagobert built a magnificent church in 632, in which were the tombs of many of the French kings, of the conftable Guefclin, and of marfhal Turenne. In the treafury, among other curiofities, were the fwords of St. Lewis and the Maid of Orleans, and the fceptre of Charlemagne. The abbey of the late Benedictines, a magnificent piece of modern architecture, has more the appearance of a palace than a convent. St. Denys is feated on the river Crould, near the Seine, five miles N. of Paris. It is now called Franciade. E. lon. 2. 26. N. lat. 48. 56.

DEOBSTRUENTS, in pharmacy, fuch medicines as open obftructions. See Detergent.

DEODAND, in our cuftoms, a thing given or forfeited as it were to God, for the pacification of his wrath in a cafe of mifadventure, whereby a Chriftian foul comes to a violent end without the fault of any reafonable creature. As, if a horfe ftrike his keeper and kill him; if a man, in driving a cart, falls fo as the cart-wheel runs over him, and preffes him to death: if one be felling a tree, and gives warning to the ftanders by to look to themfelves, yet a man is killed by the fall thereof; in the firft place, the horfe; in the fecond, the cart-wheel, cart, and horfes; and in the third, the tree, is *Deodandus,* "*to be given to God,*" that is, to the king, to be diftributed to the poor by his almoner, for expiation of this dreadful event; though effected by irrational, nay, fenfelefs and dead creatures.

Omnia quæ movent ad mortem funt Deodanda:
What moves to death, or kills him dead,
Is *Deodand,* and forfeited.

This law feems to be an imitation of that in Exodus, chap. xxi. "If an ox gore a man, or a woman, with his horns, fo as they die; the ox fhall be ftoned to death, and his flefh not be eat; fo fhall his owner be innocent." Fleta fays, the Deodand is to be fold, and the price diftributed to the poor, for the foul of the king, his anceftors, and all faithful people departed this life.

DEPHLEGMATION, is an operation by which the fuperabundant water of a body is taken from it; and it is principally effected by evaporation or diftillation. Dephlegmation is alfo called *concentration,* particularly when acids are the fubject. See Concentration.

DEPHLOGISTICATED, in chemiftry, any thing deprived of the phlogifton fuppofed to be contained in it.

Dephlogisticated *Air,* or, according to the new chemical nomenclature, *Oxigenous Gas,* is an invifible elaftic fluid, of fomewhat greater fpecific gravity than that of the common atmofphere, and capable of fupporting animal life and flame for a much longer time than the air we commonly breathe. This fluid was firft difcovered by Dr. Prieftley, and a very fhort time after by Mr. Scheele, who appears to have been entirely unacquainted with what the Doctor had done. The methods of making it artificially are enumerated under the article Aerology: fee alfo the Treatife on Chemiftry, p. 400.

DEPILATORY medicines, thofe applied in order to take off the hair: fuch are lime, and other cauftic fubftances, which ought to be ufed with great caution. It is to be obferved alfo, that unlefs they deftroy the fkin, the roots of the hair remain unaffected, and the hair will grow again in a fhort time.

DEPONENT, in Latin grammar, a term applied to verbs which have active fignifications, but paffive terminations or conjugations, and want one of their participles paffive.

Deponent, in law, a perfon who makes a depofition. See Deposition.

DEPOPULATION, the act of diminifhing the number of people in any country, whether by war or bad government.

DEPORTATION, a fort of banifhment ufed by the Romans, whereby fome ifland or other place was allotted to a criminal for the place of his abode, with a prohibition not to ftir out of the fame on pain of death.

DEPOSIT, among civilians, fomething that is committed to the cuftody of a perfon, to be kept without any reward, and to be returned again on demand.

DEPOSITARY, in law, a perfon intrufted as keeper or guardian of a depofit.

DEPOSITION, in law, the teftimony given in court by a witnefs upon oath.

DEPOSITION is alfo ufed for the fequeftrating or depriving a perfon of his dignity and office. This depofition only differs from abdication, in that the latter is fuppofed voluntary, and the act of the dignitary or officer himfelf; and the former of compulfion, being the act of a fuperior power, whofe authority extends thereto. Some fay the depofition, and fome the abdication, of King James II. Depofition does not differ from deprivation: we fay, indifferently, a depofed or deprived bifhop, officer, &c. Depofition differs from fufpenfion, in that it abfolutely and for ever ftrips or divefts a prieft, &c. of all dignity, office, &c. whereas fufpenfion only prohibits, or reftrains, the exercife thereof. Depofition only differs from degradation, in that the latter is more formal, and attended with more circumftances, than the former; but in effect and fubftance they are the fame; thofe additional circumftances being only matter of fhow, firft fet on foot out of zeal and indignation, and kept up by cuftom, but not warranted by the laws or canons. See DEGRADATION.

DEPRECATION, in rhetoric, a figure whereby the orator invokes the aid and affiftance of fome one; or prays for fome great evil or punifhment to befall him who fpeaks falfely, either himfelf or his adverfary.

DEPRECATORY, or DEPRECATIVE, in theology, a term applied to the manner of performing fome ceremonics in the form of prayer. The form of abfolution is deprecative in the Greek church, being conceived in thefe terms, *May God abfolve you:* whereas it is in the declarative form in the Latin church, and in fome of the reformed churches, *I abfolve you.*

DEPRESSION *of the* POLE. When a perfon fails or travels towards the equator, he is faid to deprefs the pole; becaufe as many degrees as he approaches nearer the equator, fo many degrees will the pole be nearer the horizon. This phenomenon arifes from the fpherical figure of the earth.

DEPRESSOR, or DEPRIMENS, in anatomy, a name applied to feveral mufcles, becaufe they deprefs the parts they are faftened to. See ANATOMY, *Table of the Mufcles.*

DEPRIVATION, in the common law, the act of bereaving, divefting, or taking away a fpiritual promotion or dignity: as when a bifhop, vicar, prebendary, or the like, is depofed or deprived of his preferment, for fome matter or fault, in fact, or in law. It is of two kinds; *a beneficio,* and *ab officio.* See DEPOSITION.

DEPRIVATION *a beneficio* is, when for fome great crime a minifter is wholly and for ever deprived of his living or preferment: which differs from fufpenfion, in that the latter is only temporary.

DEPRIVATION *ab officio,* is when a minifter is for ever deprived of his order: which is the fame, in reality, with what we otherwife call *depofition* and *degradation*; and is ufually for fome heinous crime deferving death, and is performed by the bifhop in a folemn manner. See DEGRADATION.

DEPTFORD, a town three miles eaft of London, on the fouthern banks of the Thames; chiefly confiderable for its fine docks for building fhips, and the king's yard. E. long. 0. 4. N. lat. 51. 30.

DEPTH, the meafure of any thing from the furface downwards.

Meafuring of DEPTHS *by the Barometer,* depends on the fame principles on which heights are meafured by the fame inftrument. The menfuration of depths being chiefly applied to mines, is ftill more precarious than the menfuration of heights, on account of the various kinds of vapours with which thofe fubterranean regions are filled. See the article BAROMETER.

DEPTH *of a Squadron, or battalion,* is the number of men in a file; which in a fquadron is three, and in a battalion generally fix. See SQUADRON, FILE, &c. We fay, the battalion was drawn up fix *deep*; the enemy's horfe were drawn up five *deep.*

DEPURATION, is the freeing of any fluid from its heterogeneous matter or feculence. It is of three kinds: 1. Decantation; which is performed by letting the liquid to be depurated ftand for fome time in a pretty deep veffel, till the grofs fediment has fallen to the bottom; after which the clear fluid is poured off. 2. Defpumation; which is performed by means of the whites of eggs, or other vifcid matter, and is alfo called CLARIFICATION. 3. Filtration; in which the turbid liquor is expofed to pafs through fome porous fubftance, as paper or flannel, by which the clear part gradually paffes off.

DEPURATORY FEVER, a name given by Sydenham to a fever which prevailed much in the years 1661, 1662, 1663, and 1664. He called it depuratory, becaufe he fuppofed that nature regulated all the fymptoms in fuch a manner as to fit the febrile matter, prepared by proper concoction, for expulfion in a certain time, either by a copious fweat or a freer perfpiration.

DEPUTY, a perfon fent upon fome bufinefs by fome community. It denotes alfo one that exercifes an office in another's right; and the forfeiture or mifdemeanour of fuch deputy fhall caufe the perfon whom he reprefents to lofe his office.

DEPUTATUS, among the ancients, a name applied to perfons employed in making armour; and likewife to brifk active people, whofe bufinefs was to take care of the wounded in engagements, and carry them off the field.

DER, a fyllable frequently prefixed to the names of places in England. It is faid to fignify that fuch were formerly places where wild beafts herded together, fo called from the Saxon *deor, fera,* unlefs the fituation was near fome river.

DERBEND, a ftrong town of Afia, in Perfia, faid to have been founded by Alexander the Great. The walls are built with ftones as hard as marble: and near it are the remains of a wall which reached from the Cafpian to the Black Sea. It is feated near the Cafpian Sea, at the foot of Mount Caucafus. E. long. 50. 0. N. lat. 42. 8.

DERBY, the county-town of Derbyfhire, with two markets, on Wednefday and Friday. It is feated on the Derwent, over which is a handfome ftone bridge, and a fmall brook runs through the town, under feveral ftone bridges. It is a large, populous, well-built, and well-inhabited town, containing five churches, of which All Saints is the chief, whofe tower is as high as moft in the kingdom. The fhire-hall is a ftone building. In 1734 a machine was erected here by Sir Thomas Lombe, for the manufacturing of filk, the model of which he brought from Italy. It was the firft of its kind erected in England; and its operations are to wind, double, and twift the filk, fo as to render it fit for weaving. It has employed many hands in the town, but the work is now on the decline. Derby poffeffes alfo a confiderable manufactory of filk, cotton, and fine worfted ftockings; and has a fabric of porcelain, equal, if not fuperior, in quality to any in the kingdom. Several hands are employed in the lapidary and jewellery branches; and the work of this kind, executed here, is in high eftimation. Derbyfhire

and foreign marbles are also wrought here into a variety of ornamental articles. The malting trade is likewise carried on in this town, from which the Derwent is navigable to the Trent. Derby sends two members to parliament, and is governed by a mayor, nine aldermen, &c. The rebels came as far as this town in 1745, and then returned to Scotland. It is 36 miles N. of Coventry, and 126 N. W. by N. of London. W. long. 1. 25. N. lat. 52. 58.

DERBY-SHIRE, an English county, bounded on the N. by Yorkshire; on the E. by Nottinghamshire; on the S. by Leicestershire and a point of Warwickshire; on the W. by Staffordshire; and on the N. W. by Cheshire. It extends 59 miles in length from N. to S. and 34 from E. to W. where broadest; but in the S. part it is not above six. It is divided into six hundreds, in which are 11 market towns, and 106 parishes. It is seated in the diocese of Lichfield and Coventry, and sends four members to parliament; two for the county, and two for the town of Derby. The air, especially on the E. side, is wholesome and agreeable: but in the mountains of the Peak, towards the N. it is sharp and cold. The N. and W. parts are hilly and stony. The hills in the northern part of the county, by attracting the passing clouds, cause the rain to descend there in greater abundance than on the circumjacent counties. Little timber, or even underwood, grows here, and the fields are universally enclosed by stone walls. The S. and E. parts have rich lands, that are pleasant and fertile, producing most kinds of grain, particularly barley. Even the N. W. part, called the Peak, is abundantly rich; for the bleak mountains abound in the best lead, with marble, alabaster, millstones, iron, coal, and a coarse sort of crystal; and the intermediate valleys are fruitful in grass. The *terra ponderosa*, or heavy earth, is here found in great quantities, as well as in some other parts of the kingdom. This kind of earth seems to be the medium substance between earths and ores, and such connective series is observable throughout nature, in animals, vegetables, and fossils. Dr. Crawford has lately discovered in this heavy earth important medical virtues, particularly in the cure of scrophulous diseases. The principal rivers are the Derwent, Dove, Erwash, and Trent.

DEREHAM, a town of Norfolk, with a market on Friday. Its market is noted for woollen yarn. It is 14 miles W. of Norwich, and 100 N. N. E. of London. E. long. 1. 0. N. lat. 52. 42.

DERELICTS, from *de*, and *relinquo* "I leave," in the civil law, are such goods as are wilfully thrown away, or relinquished by the owner.

DERELICT is also applied to such lands as the sea receding from leaves dry, and fit for cultivation. If they are left by a gradual recess of the sea, they are adjudged to belong to the owner of the adjoining lands; but when an island is formed in the sea, or a large quantity of new land appears, such derelict lands belong to the king.

DERHAM (Doctor William), a very celebrated English philosopher and divine, born in 1657. In 1682 he was presented to the vicarage of Wargrave in Berkshire; and in 1689 to the valuable rectory of Upminster in Essex; which latter lying at a convenient distance from London, afforded him an opportunity of conversing and corresponding with the greatest virtuosos of the nation. Applying himself there with great eagerness to natural and experimental philosophy, he soon became a distinguished member of the Royal Society, whose Philosophical Transactions contain a great variety of curious and valuable pieces, the fruits of his laudable industry. In his younger years he published his Artificial Clockmaker, which has been often printed: and in 1711, 1712, and 1714, he preached those sermons at Boyle's lecture, which he afterwards digested under the well known titles of *Physico-Theology* and *Astro-Theology*, and enriched with valuable notes and copper-plates. The last thing he published of his own composition was *Christo-Theology*, a demonstration of the divine authority of the Christian religion, being the substance of a sermon preached at Bath in 1729. This great good man, after spending his life in the most agreeable as well as improving study of nature, died at Upminster in 1735; and, besides many other works, left a valuable collection of curiosities, particularly specimens of birds and insects of this island. It may be necessary just to observe, that Dr. Derham was very well skilled in medical as well as in physical knowledge; and was constantly a physician to the bodies as well as the souls of his parishioners.

DERIVATION, in medicine, is when a part affected with inflammation is relieved by the disease being attracted from thence, and brought on in another part; thus a blister is applied to the neck to draw away inflammation from the eyes.

DERIVATION, in grammar, the affinity one word has with another, by having been originally formed from it. See DERIVATIVE.

DERIVATIVE, in grammar, a word which takes its origin from another word, called its *primitive*. Such is the word *derivative* itself, which takes its origin from the primitive *rivus*, a rivulet or channel, out of which lesser streams are drawn; and thus *manhood*, *deity*, *lawyer*, &c. are *derived* from *man*, *deus*, *law*, &c.

DERMESTES, in zoology, a genus of insects belonging to the order of coleoptera. See plate 81. The antennæ are clavated, with three of the joints thicker than the rest; the breast is convex; and the head is inflected below the breast. The species are pretty numerous. 1. The *lardarius* is of an oblong form, and of a dim black colour, easily distinguishable by a light brown stripe that occupies transversely almost the anterior half of the elytra. That colour depends on small grey hairs situated on that part. The stripe is irregular at its edges, and intersected through the middle by a small transversal streak of black spots, three in number on each of the elytra, the middlemost of which is somewhat lower than the rest, which gives the black streak a serpentine form. Its larva, that is oblong, somewhat hairy, and divided into segments alternately dark and light coloured, gnaws and destroys preparations of animals preserved in collections, and even feeds upon the insects; it is also to be found in old bacon. 2. The *domesticus* varies greatly in size and colour, some being found of a dark brown, others of a much lighter hue. The form of it is oblong, almost cylindrical. The elytra are striated, the thorax is thick and rather gibbous. This little animal, when touched, draws in its head under its thorax, and its feet beneath its abdomen, remaining so motionless that one would think it dead. This is the same insect which makes in wooden furniture those little round holes that reduce it to powder. 3. The *violaceus* is a beautiful little insect: its elytra are of a deep violet blue. The thorax is covered with greenish hairs: the legs are black. The whole animal being of a glittering brilliancy renders it a pleasing object. The larva, as well as the perfect insect, inhabits the bodies of dead animals. 4. The *fumatus* is of a light brown colour, except the eyes, which are black. It is, however, sometimes more or less deep. The thorax is margined, and the insect has the whole carriage of a scarabæus; but its antennæ have the character of those of the dermestæ. This little creature is found in dung. It also frequently finds its way into houses. 5. The *ferrugineus* is the largest of the genus; its colour is a rusty iron, having many oblong, velvety, black spots upon the elytra, which give the insect a gloomy yet elegant appearance. The antennæ differ from the preceding species; the three last articulations being considerably longer, thicker, and not perfoliated. There are 25 other species, distinguished by their colour. Many varieties of this genus, as well as the larvæ,

are to be met with in dried ſkins, bark of trees, wood, ſeeds, flowers, the carcaſes of dead animals, &c.

DERNIER RESORT. See RESORT.

DEROGATION, an act contrary to a preceding one, and which annuls, deſtroys, and revokes it, either in whole or in part.

DEROGATORY, a clauſe importing derogation. A derogatory clauſe in a will, is a certain ſentence, cipher, or ſecret character, which the teſtator inſerts, and of which he reſerves the knowledge to himſelf alone, adding a condition, that no will he may make hereafter is to be reckoned valid, if this derogatory clauſe is not inſerted expreſsly and word for word. It is a precaution invented by lawyers againſt latter-wills extorted by violence, or obtained by ſuggeſtion.

DERP, a town of Livonia, and capital of a palatinate of the ſame name, with a biſhop's ſee, and an univerſity. It is ſubject to the Ruſſians, and lies near the river Ambeck. E. long. 31. 55. N. lat. 30. 40.

DERVIS, or DERVICH, a name given to a ſort of monks among the Turks, who lead a very auſtere life, and profeſs extreme poverty, though they are allowed to marry. The word is originally Perſian, דרויש, ſignifying a "beggar," or perſon who has nothing: and becauſe the religious, and particularly the followers of Mevelava, profeſs not to poſſeſs any thing, they call both the religious in general, and the Mevelavites in particular, *Dervifes* or *Derviches*. The derviſes, called alſo *Mevelavites*, are a Mahometan order of religious; the chief or founder whereof was one Mevelava. They are now very numerous. Their chief monaſtery is that near Cogna in Natolia, where the general makes his reſidence, and where all the aſſemblies of the order are held; the other houſes being all dependent on this, by a privilege granted to this monaſtery under Ottoman I.

The derviſes affect a great deal of modeſty, patience, humility, and charity. They always go bare-legged and open-breaſted, and frequently burn themſelves with hot irons to inure themſelves to patience. They always faſt on Wedneſdays, eating nothing on thoſe days till after ſun-ſet. Tueſdays and Fridays they hold meetings, at which the ſuperior of the houſe preſides. One of them plays all the while on a flute, and the reſt dance, turning their bodies round and round with the greateſt ſwiftneſs imaginable. Long cuſtom to this exerciſe from their youth has brought them to ſuch a habitude, that it does not diſcompoſe them at all. This practice they obſerve with great ſtrictneſs, in memory of Mevelava their patriarch's turning miraculouſly round, as they pretend, for the ſpace of four days, without any food or refreſhment; his companion Hamſa playing all the while on a flute: after which he fell into an ecſtacy, and therein received wonderful revelations for the eſtabliſhment of his order. They believe the flute an inſtrument conſecrated by Jacob and the ſhepherds of the Old Teſtament, becauſe they ſang the praiſes of God upon it. They profeſs poverty, chaſtity and obedience, and really obſerve them while they remain derviſes; but if they chooſe to go out and marry, they are always allowed.

The generality of derviſes are mountebanks: ſome apply themſelves to legerdemain, poſtures, &c. to amuſe the people; others give in to ſorcery and magic: but all of them, contrary to Mahomet's precept, are ſaid to drink wine, brandy, and other ſtrong liquors, to give them the degree of gaiety their order requires. Beſide their great ſaint Mevelava, there are particular ſaints honoured in ſome particular monaſteries: as Kiderele, greatly revered in the monaſteries of Egypt, and held by ſome to be St George; and by others, with more probability, the prophet Elias. The derviſes are great travellers; and, under pretence of preaching, and propagating their faith, are continually paſſing from one place to another: on which account they have been frequently uſed as ſpies.

There are alſo derviſes in Perſia, called in that country *Abdals*, q. d. *ſervants of God*. They lead a very penurious, auſtere life, and preach the Alcoran in the ſtreets, coffee-houſes, and wherever they can meet with auditors. The Perſian derviſes retail little but fables to the people, and are in the utmoſt contempt among the men of ſenſe and letters. There are in Egypt two or three kinds; thoſe that are in convents, are in a manner of the religious order, and live retired; though there are of theſe ſome who travel and return again to their convents. Some take this character, and yet live with their families, and exerciſe their trades: of this kind are the dancing derviſes at Damaſcus, who go once or twice a-week to a little uninhabited convent; and perform their extraordinary exerciſes; theſe alſo ſeem to be a good people: but there is a third ſort of them who travel about the country, and beg, or rather oblige people to give; for whenever they ſound their horn ſomething muſt be given them. The people of theſe orders, in Egypt, wear an octagonal badge, of a greeniſh white alabaſter, at their girdles, and a high ſtiff cap without any thing round it.

DESAGULIERS (John Theophilus), who introduced the practice of reading public lectures in experimental philoſophy in the metropolis, and who made ſeveral improvements in mechanics, was the ſon of the reverend John Deſaguliers, a French proteſtant refugee, and was born at Rochelle in 1683. His father brought him to England an infant; and at a proper age placed him at Chriſt-church College, Oxford: where he ſucceeded Dr. Keil in reading lectures on experimental philoſophy at Hart Hall. The magnificent duke of Chandos made Dr. Deſaguliers his chaplain, and preſented him to the living of Edgeware, near his ſeat at Cannons; and he was afterwards chaplain to Frederic prince of Wales. He read lectures with great ſucceſs to the time of his death in 1749. He communicated many curious papers printed in the Philoſophical Tranſactions; publiſhed a valuable *Courſe of Experimental Philoſophy*, in 2 vols. 4to. and gave an edition of *Gregory's Elements of Catoptrics and Dioptrics*, with an Appendix on reflecting teleſcopes, 8vo. He was a member of the Royal Society, and of ſeveral foreign academies.

DESART, a large extent of country entirely barren, and producing nothing. In this ſenſe ſome are ſandy deſarts; as thoſe of Lop, Xamo, Arabia, and ſeveral others in Aſia; in Africa, thoſe of Libya and Zara; others are ſtony, as the deſart of Pharan in Arabia Petrea. *The* DESART, abſolutely ſo called, is that part of Arabia, ſouth of the Holy Land, where the children of Iſrael wandered forty years.

DESCANT, in muſic, the art of compoſing in ſeveral parts. See COMPOSITION. Deſcant is three-fold, viz. plain, figurative, and double. *Plain* DESCANT is the ground-work and foundation of all muſical compoſitions, conſiſting altogether in the orderly placing of many concords, anſwering to ſimple counterpoint. See COUNTERPOINT. *Figurative or Florid* DESCANT, is that part of an air of muſic wherein ſome diſcords are concerned, as well, though not ſo much, as concords. This may be termed the ornamental and rhetorical part of muſic, in regard that there are introduced all the varieties of points, ſyncopes, diverſities of meaſures, and whatever is capable of adorning the compoſition. DESCANT *Double*, is when the parts are ſo contrived, that the treble, or any high part, may be made the baſs; and on the contrary, the baſs the treble.

DESCARTES. See CARTES.

DESCENDANT. The iſſue of a common parent, *in infinitum*, are called his deſcendants. See the article DESCENT.

DESCENSION, in aſtronomy, is either right or oblique. *Right* DESCENSION, is an arch of the equinoctial, intercepted between the next equinoctial point and the interſection of the meridian, paſſing through the centre of the object, at its ſetting, in a right ſphere. *Oblique* DESCENSION, an arch of the

equinoctial, intercepted between the next equinoctial point and the horizon, paffing through the centre of the object, at its fetting, in an oblique fphere.

DESCENT, in general, is the tendency of a body from a higher to a lower place: thus all bodies, unlefs otherwife determined by a force fuperior to their gravity, defcend towards the centre of the earth. See GRAVITY and MECHANICS.

DESCENT, or *Hereditary Succeffion*, in law, is the title whereby a man, on the death of his anceftor, acquires his eftate by right of reprefentation, as his heir at law. An heir, therefore, is he upon whom the law cafts the eftate immediately on the death of the anceftor; and an eftate fo defcending to the heir is in law called the *inheritance*. Defcent is either *lineal* or *collateral*. The former is that conveyed down in a right line from the grandfather to the father, and from the father to the fon, and from the fon to the grandfon. The latter is that fpringing out of the fide of the line or blood; as from a man to his brother, nephew, or the like.

The doctrine of defcents, or law of inheritances in fee-fimple, is a point of the higheft importance: (See the article FEE.) All the rules relating to purchafes, whereby the legal courfe of defcents is broken and altered, perpetually refer to this fettled law of inheritance, as a *datum* or firft principle univerfally known, and upon which their fubfequent limitations are to work. Thus a gift in tail, or to a man and the heirs of his body, is a limitation that cannot be perfectly underftood without a previous knowledge of the law of defcents in fee-fimple. One may well perceive, that this is an eftate confined in its defcent to fuch heirs only of the donee as have fprung or fhall fpring from his body: but who thofe heirs are, whether all his children both male and female, or the male only, and (among the males) whether the eldeft, youngeft, or other fon alone, or all the fons together, fhall be his heir; this is a point that we muft refort back to the ftanding law of defcents in fee-fimple to be informed of.

And as this depends not a little on the nature of kindred, and the feveral degrees of confanguinity, it will be neceffary to refer the reader to the article CONSANGUINITY, where the true notion of this kindred or alliance in blood is particularly ftated.

We fhall here exhibit a feries of rules or canons of inheritance, with illuftrations, according to which, by the law of England, eftates are tranfmitted from the anceftor to the heir.

1. "Inheritances fhall lineally defcend to the iffue of the perfon laft actually feifed *in infinitum*, but fhall never lineally afcend." To underftand both this and the fubfequent rules, it muft be obferved, that by law no inheritance can veft, nor can any perfon be the actual complete heir of another, till the anceftor is previoufly dead. *Nemo eft hæres viventis*. Before that time, the perfon who is next in the line of fucceffion is called *heir apparent*, or *heir prefumptive*. Heirs apparent are fuch whofe right of inheritance is indefeafible, provided they outlive the anceftor; as the eldeft fon of his iffue, who muft, by the courfe of the common law, be heirs to the father whenever he happens to die. Heirs prefumptive are fuch, who, if the anceftor fhould die immediately, would in the prefent circumftances of things be his heirs; but whofe right of inheritance may be defeated by the contingency of fome nearer heir being born: as a brother or nephew, whofe prefumptive fucceffion may be deftroyed by the birth of a child; or a daughter, whofe prefent hopes may be hereafter cut off by the birth of a fon. Nay, even if the eftate hath defcended, by the death of the owner, to fuch a brother, or nephew, or daughter; in the former cafes, the eftate fhall be diverted and taken away by the birth of a pofthumous child; and in the latter, it fhall alfo be totally diverted by the birth of a pofthumous fon.

We muft alfo remember, that no perfon can be properly fuch an anceftor as that an inheritance in lands or tenements can be derived from him, unlefs he hath had actual feifin of fuch lands, either by his own entry, or by the poffeffion of his own or his anceftor's leffee for years, or by receiving rent from a leffee of the freehold: or unlefs he hath what is equivalent to corporal feifin in hereditaments that are incorporal; fuch as the receipt of rent, a prefentation to the church in cafe of an advowfon, and the like. But he fhall not be accounted an anceftor who hath had only a bare right or title to enter or be otherwife feifed. And therefore all the cafes which will be mentioned in the prefent article, are upon the fuppofition that the deceafed (whofe inheritance is now claimed) was the laft perfon actually feifed thereof. For the law requires this notoriety of poffeffion, as evidence that the anceftor had that property in himfelf, which is now to be tranfmitted to his heir. Which notoriety hath fucceeded in the place of the ancient feodal inveftiture, whereby, while feuds were precarious, the vaffal on the defcent of lands was formerly admitted in the lord's court (as is ftill the practice in Scotland); and therefore received his feifin, in the nature of a renewal of his anceftor's grant, in the prefence of the feodal peers; till at length, when the right of fucceffion became indefeafible, an entry on any part of the lands within the county (which if difputed was afterwards to be tried by thofe peers), or other notorious poffeffion, was admitted as equivalent to the formal grant of feifin, and made the tenant capable of tranfmitting his eftate by defcent. The feifin therefore of any perfon, thus underftood, makes him the root or ftock from which all future inheritance by right of blood muft be derived; which is very briefly expreffed in this maxim, *Seifina facit ftipitem*.

When therefore a perfon dies fo feifed, the inheritance firft goes to his iffue: as if there be Geoffrey, John, and Matthew, grandfather, father, and fon; and John purchafes lands, and dies; his fon Matthew fhall fucceed him as heir, and not the grandfather Geoffrey; to whom the land fhall never afcend, but fhall rather efcheat to the lord.

2. "The male iffue fhall be admitted before the female." Thus, fons fhall be admitted before daughters; or, as our male lawgivers have fomewhat uncomplaifantly expreffed it, the worthieft of blood fhall be preferred. As if John Stiles had two fons, Matthew and Gilbert, and two daughters, Margaret and Charlotte, and dies; firft Matthew, and (in cafe of his death without iffue) then Gilbert fhall be admitted to the fucceffion in preference to both the daughters.

3. "Where there are two or more males in equal degree, the eldeft only fhall inherit; but the females all together." As, if a man hath two fons, Matthew and Gilbert, and two daughters, Margaret and Charlotte, and dies; Matthew his eldeft fon fhall alone fucceed to his eftate, in exclufion of Gilbert the fecond fon and both the daughters; but if both the fons die without iffue before the father, the daughters Margaret and Charlotte fhall both inherit the eftate as coparceners.

4. "The lineal defcendants, *in infinitum*, of any perfon deceafed, fhall reprefent their anceftor; that is, fhall ftand in the fame place as the perfon himfelf would have done had he been living."—Thus the child, grandchild, or great-grandchild, (either male or female), of the eldeft fon fucceeds before the younger fon, and fo *in infinitum*. And thefe reprefentatives fhall take neither more nor lefs, but juft fo much as their principals would have done. As if there be two fifters, Margaret and Charlotte; and Margaret dies, leaving fix daughters; and then John Stiles the father of the two fifters dies without other iffue, thefe fix daughters fhall take among them exactly the fame as their mother Margaret would have done, had fhe been living; that is, a moiety of the lands of John Stiles in coparcenary: fo that, upon partition made, if the land be divided into twelve parts, thereof Charlotte the furviving fifter fhall have fix, and her fix nieces, the daughters of Margaret, one a-piece.

5. "On failure of lineal deſcendants, or iſſue, of the perſon laſt ſeiſed, the inheritance ſhall deſcend to the blood of the firſt purchaſer; ſubject to the three preceding rules." Thus, if Geoffrey Stiles purchaſes land, and it deſcends to John Stiles his ſon, and John dies ſeiſed thereof without iſſue; whoever ſucceeds to this inheritance muſt be of the blood of Geoffrey, the firſt purchaſer of this family. The firſt purchaſer, *perquiſitor*, is he who firſt acquired the eſtate to his family, whether the ſame was transferred to him by ſale, or by gift, or by any other method, except only that of deſcent.

6. "The collateral heir of the perſon laſt ſeiſed muſt be his next collateral kinſman of the whole blood." Firſt, he muſt be his next collateral kinſman either perſonally or *jure repreſentationis*; which proximity is reckoned according to the canonical degrees of conſanguinity: See CONSANGUINITY. Therefore the brother being in the firſt degree, he and his deſcendants ſhall exclude the uncle and his iſſue, who is only in the ſecond.—Thus, if John Stiles dies without iſſue, his eſtate ſhall deſcend to Francis his brother, who is lineally deſcended from Geoffrey Stiles, his next immediate anceſtor or father. On failure of brethren or ſiſters and their iſſue, it ſhall deſcend to the uncle of John Stiles, the lineal deſcendant of his grandfather George; and ſo on *in infinitum*.

But, ſecondly, the heir need not be the neareſt kinſman abſolutely, but only *ſub modo*; that is, he muſt be the neareſt kinſman of the *whole* blood; for if there be a much nearer kinſman of the *half* blood, a diſtant kinſman of the whole blood ſhall be admitted, and the other entirely excluded.—A kinſman of the whole blood is he that is derived, not only from the ſame anceſtor, but from the ſame couple of anceſtors. For as every man's own blood is compounded of the bloods of his reſpective anceſtors, he only is properly of the whole or entire blood with another who hath (ſo far as the diſtance of degrees will permit) all the ſame ingredients in the compoſition of his blood that the other hath. Thus, the blood of John Stiles being compoſed of thoſe of Geoffrey Stiles his father and Lucy Baker his mother, therefore his brother Francis, being deſcended from both the ſame parents, hath entirely the ſame blood with John Stiles; or he is his brother of the whole blood. But if, after the death of Geoffrey, Lucy Baker the mother marries a ſecond huſband, Lewis Gay, and hath iſſue by him; the blood of this iſſue, being compounded of the blood of Lucy Baker (it is true) on the one part, but that of Lewis Gay (inſtead of Geoffrey Stiles) on the other part, it hath therefore only half the ſame ingredients with that of John Stiles; ſo that he is only his brother of the half blood, and for that reaſon they ſhall never inherit to each other. So alſo, if the father has two ſons, A and B, by different venters or wives; now theſe two brethren are not brethren of the whole blood, and therefore ſhall never inherit to each other, but the eſtate ſhall rather eſcheat to the lord. Nay, even if the father dies, and his lands deſcend to his eldeſt ſon A, who enters thereon, and dies ſeiſed without iſſue; ſtill B ſhall not be heir to this eſtate, becauſe he is only of the half blood to A, the perſon laſt ſeiſed: but had A died without entry, then B might have inherited; not as heir to A his half-brother, but as heir to their common father, who was the perſon laſt actually ſeiſed.

The rule then, together with its illuſtration, amounts to this: That in order to keep the eſtate of John Stiles as nearly as poſſible in the line of his purchaſing anceſtor, it muſt deſcend to the iſſue of the neareſt couple of anceſtors that have left deſcendants behind them; becauſe the deſcendants of one anceſtor only are not ſo likely to be in the line of that purchaſing anceſtor as thoſe who are deſcended from two.

But here a difficulty ariſes. In the ſecond, third, fourth, and every ſuperior degree, every man has many couples of anceſtors, increaſing according to the diſtances in a geometrical progreſſion upwards, the deſcendants of all which reſpective couples are (repreſentatively) related to him in the ſame degree. Thus, in the ſecond degree, the iſſue of George and Cecilia Stiles and of Andrew and Eſther Baker, the two grandſires and grandmothers of John Stiles, are each in the ſame degree of propinquity; in the third degree, the reſpective iſſues of Walter and Chriſtian Stiles, of Luke and Francis Kempe, of Herbert and Hannah Baker, and of James and Emma Thorpe, are (upon the extinction of the two inferior degrees) all equally entitled to call themſelves the next kindred of the whole blood to John Stiles. To which therefore of theſe anceſtors muſt we firſt reſort, in order to find out deſcendants to be preferably called to the inheritance? In anſwer to this, and to avoid the confuſion and uncertainty that might ariſe between the ſeveral ſtocks wherein the purchaſing anceſtor may be ſought for,—

7. The ſeventh and laſt rule or canon is, "That in collateral inheritances the male ſtocks ſhall be preferred to the female (that is, kindred derived from the blood of the male anceſtors ſhall be admitted before thoſe from the blood of the female);—unleſs where the lands have in fact deſcended from a female."—Thus the relations on the father's ſide are admitted *in infinitum*, before thoſe of the mother's ſide are admitted at all; and the relations of the father's father, before thoſe of the father's mother: and ſo on.

For the original and progreſs of the above canons, the reaſons upon which they are founded, and their agreement with the laws of other nations, ſee *Blackſtone's Commentaries*, vol. ii.

We ſhall conclude with exemplifying the rules themſelves by a ſhort ſketch of the manner in which we muſt ſearch for the heir of a perſon, as John Stiles, who dies ſeiſed of land which he acquired, and which therefore he held as a feud of indefinite antiquity. See the *Table of* DESCENTS, Plate 90.

In the firſt place ſucceeds the eldeſt ſon, Matthew Stiles, or his iſſue, (N° 1):—if his line be extinct, then Gilbert Stiles and the other ſons reſpectively, in order of birth, or their iſſue, (N° 2.):—in default of theſe, all the daughters together, Margaret and Charlotte Stiles, or their iſſue, (N° 3.):—On the failure of the deſcendants of John Stiles himſelf, the iſſue of Geoffrey and Lucy Stiles, his parents, is called in: viz. firſt, Francis Stiles, the eldeſt brother of the whole blood, or his iſſue, (N° 4.):—then Oliver Stiles, and the other whole brothers reſpectively, in order of birth, or their iſſue, (N° 5.):—then the ſiſters of the whole blood altogether, Bridget and Alice Stiles, or their iſſue, (N° 6.).—In defect of theſe, the iſſue of George and Cecilia Stiles, his father's parents; reſpect being ſtill had to their age and ſex, (N° 7.):—then the iſſue of Walter and Chriſtian Stiles, the parents of his paternal grandfather, (N° 8.):—then the iſſue of Richard and Anne Stiles, the parents of his paternal grandfather's father, (N° 9.):—and ſo on in the paternal grandfather's paternal line, or blood of Walter Stiles, *in infinitum*. In defect of theſe, the iſſue of William and Jane Smith, the parents of his paternal grandfather's mother, (N° 10.):—and ſo on in the paternal grandfather's maternal line, or blood of Chriſtian Smith, *in infinitum*; till both the immediate bloods of George Stiles, the paternal grandfather, are ſpent.—Then we muſt reſort to the iſſue of Luke and Frances Kempe, the parents of John Stiles' paternal grandmother, (N° 11.):—then to the iſſue of Thomas and Sarah Kempe, the parents of his paternal grandmother's father, (N° 12.):—and ſo on in the paternal grandmother's paternal line, or blood of Luke Kempe, *in infinitum*. In default of which, we muſt call in the iſſue of Charles and Mary Holland, the parents of his paternal grandmother's mother, (N° 13.): and ſo on in the paternal grandmother's maternal line, or blood of Frances Holland, *in infinitum*; till both the immediate bloods of Cecilia Kempe, the paternal grandmother, are alſo ſpent.—Whereby the paternal blood of John Stiles entirely

failing, recourſe muſt then, and not before, be had to his maternal relations; or the blood of the Bakers (N° 14, 15, 16.), Willis's (N° 17.), Thorpe's (N° 18, 19.), and White's (N° 20.); in the ſame regular ſucceſſive order as in the paternal line.

It is to be remembered, that during this whole proceſs, John Stiles is the perſon ſuppoſed to have been laſt actually ſeiſed in the eſtate. For if ever it comes to be veſted in any other perſon, as heir to John Stiles, a new order of ſucceſſion muſt be obſerved upon the death of ſuch heir; ſince he, by his own ſeiſin, now becomes himſelf an anceſtor, or *ſtipes*, and muſt be put in the place of John Stiles. The figures therefore denote the order in which the ſeveral claſſes would ſucceed to John Stiles, and not to each other; and before we ſearch for an heir in any of the higher figures, (as N° 8.) we muſt firſt be aſſured that all the lower claſſes (from N° 1 to 7.) were extinct at John Stiles's deceaſe.

Descent *of the Crown.* See Succession.

Descent *of Dignities.* A dignity differs from common inheritances, and goes not according to the rules of the common law: for it deſcends to the half-blood; and there is no coparcenerſhip in it, but the eldeſt takes the whole. The dignity of peerage is perſonal, annexed to the blood; and ſo inſeparable, that it cannot be transferred to any perſon, or ſurrendered even to the crown; it can move neither forward nor backward, but only downward to poſterity; and nothing but corruption of blood, as if the anceſtor be attainted of treaſon or felony, can hinder the deſcent to the right heir.

Descent, in genealogy, the order or ſucceſſion of deſcendants in a line or family; or their diſtance from a common progenitor: Thus we ſay, one deſcent, two deſcents, &c.

Descent, in heraldry, is uſed to expreſs the coming down of any thing from above; as, a lion *en deſcent* is a lion with his head towards the baſe points, and his heels towards one of the corners of the chief, as if he were leaping down from ſome high place.

DESCHAMPS (Francis), a French poet, born in Champagne, was the author of a tragedy entitled Cato of Utica, and a hiſtory of the French theatre. He died at Paris in 1747.

DESCRIPTION, in literary compoſition, is ſuch a ſtrong and beautiful repreſentation of a thing, as gives the reader a diſtinct view and ſatisfactory notion of it. See Narration *and Deſcription.*

DESEADA, or Desiderara, one of the Caribbee iſlands, ſubject to France, lying eaſtward of Guadaloupe.

DESERT, or Desart. See Desart.

DESERTER, in a military ſenſe, a ſoldier who, by running away from his regiment or company, abandons the ſervice. A deſerter is, by the articles of war, puniſhable by death; which, after conviction, is executed upon him at the head of the regiment he formerly belonged to, with his crime written on his breaſt: a flogging, however, is the moſt uſual puniſhment.

DESERTION, in law. See Law.

DESHABILLE, a French term, naturalized of late. It properly ſignifies a night-gown, and other neceſſaries, made uſe of in dreſſing or undreſſing. Thus we ſay, the gentleman is not to be ſpoken with; he is yet in his *deſhabille*, i. e. undreſſed, or in his night-gown. The word is compounded of the primitive *de* and *s'habiller*, "to dreſs one's ſelf."

DESHACHE, in heraldry, is where a beaſt has its limbs ſeparated from its body, ſo that they ſtill remain on the eſcutcheon, with only a ſmall ſeparation from their natural places.

DESIDERATUM, is uſed to ſignify the deſirable perfections in any art or ſcience; thus, it is a deſideratum with the blackſmith, to render iron fuſible by a gentle heat, and yet preſerve it hard enough for ordinary uſes; with the glaſsman and looking-glaſs maker, to render glaſs malleable; with the clock-maker; to bring pendulums to be uſeful where there are irregular motions, &c.

DESIGN, in a general ſenſe, the plan, order, repreſentation, or conſtruction of a building, book, painting, &c. See Architecture, Painting, Poetry, Oratory, History.

Design, in the manufactories, expreſſes the figures wherewith the workman enriches his ſtuff or ſilk, and which he copies after ſome painter or eminent draughtſman, as in diaper, damaſk, and other flowered ſilk and tapeſtry.

In undertaking ſuch kinds of figured ſtuffs, it is neceſſary, ſays Monſ. Savary, that, before the firſt ſtroke of the ſhuttle, the whole deſign be repreſented on the threads of the warp, we do not mean in colours, but with an infinite number of little packthreads, which, being diſpoſed ſo as to raiſe the threads of the warp, let the workmen ſee, from time to time, what kind of ſilk is to be put in the eye of the ſhuttle for woof. This method of preparing the work is called *reading the deſign*, and *reading the figure*, which is performed in the following manner: A paper is provided conſiderably broader than the ſtuff, and of a length proportionate to what is intended to be repreſented thereon. This they divide lengthwiſe, by as many black lines as there are intended threads in the warp; and croſs theſe lines, by others drawn breadthwiſe, which, with the former, make little equal ſquares; on the paper thus ſquared, the draughtſman deſigns his figures, and heightens them with colours as he ſees fit. When the deſign is finiſhed, a workman reads it, while another lays it on the ſimblot.

To read the deſign, is to tell the perſon who manages the loom, the number of ſquares or threads compriſed in the ſpace he is reading, intimating at the ſame time, whether it is ground or figure. To put what is read on the ſimblot, is to faſten little ſtrings to the ſeveral packthreads, which are to raiſe the threads named: and this they continue to do till the whole deſign is read.

Every piece being compoſed of ſeveral repetitions of the ſame deſign, when the whole deſign is drawn, the drawer, to re-begin the deſign afreſh, has nothing to do but to raiſe the little ſtrings, with ſlip-knots, to the top of the ſimblot, which he had let down to the bottom: this he is to repeat as often as is neceſſary till the whole be manufactured.

The ribbon-weavers have likewiſe a deſign, but far more ſimple than that now deſcribed. It is drawn on paper with lines and ſquares, repreſenting the threads of the warp and woof. But inſtead of lines, whereof the figures of the former conſiſt, theſe are conſtituted of points only, or dots, placed in certain of the little ſquares formed by the interſection of the lines. Theſe points mark the threads of the warp that are to be raiſed, and the ſpaces left blank denote the threads that are to keep their ſituation: the reſt is managed as in the former.

Design is alſo uſed, in painting, for the firſt idea of a large work, drawn roughly, and in little, with an intention to be executed and finiſhed in large.

In this ſenſe, it is the ſimple contour or outlines of the figures intended to be repreſented, or the lines that terminate and circumſcribe them: ſuch deſign is ſometimes drawn in crayons or ink, without any ſhadows at all; ſometimes it is hatched, that is, the ſhadows are expreſſed by ſenſible outlines, uſually drawn acroſs each other with the pen, crayon, or graver. Sometimes, again, the ſhadows are done with the crayon rubbed ſo as that there do not appear any lines: at other times, the grains or ſtroke of the crayon appear, as not being rubbed; ſometimes the deſign is waſhed, that is, the ſhadows are done with a pencil in Indian ink, or ſome other liquor; and ſometimes the deſign is coloured, that is, colours are laid on much like thoſe intended for the grand work.

Design, in muſic, is juſtly defined by Rouſſeau to be the invention and the conduct of the ſubject, the diſpoſition of every

part, and the general order of the whole. It is in a diſtribution formed with intelligence and taſte, in a juſt proportion between all the parts, that the perfection of deſign conſiſts; and it is above all, in this point, that the immortal Pergoleſo has ſhown his judgment and his taſte, and has left ſo far behind him all his competitors. His *Stabat Mater*, his *Orfeo*, his *Serva Padrona*, are, in three different ſpecies of compoſition, three maſter-pieces of *deſign* equally perfect. This idea of the general deſign of a work is likewiſe particularly applicable to every piece of which it conſiſts: thus the compoſer plans an air, a duet, a chorus, &c. For this purpoſe, after having invented his ſubject, he diſtributes it, according to the rules of a legitimate modulation, into all the parts where it ought to be perceived, in ſuch a proportion, that its impreſſion may not be loſt on the minds of the audience; yet that it may never be reiterated in their ears, without the graces of novelty. The compoſer errs in deſigning who ſuffers his ſubject to be forgot; he is ſtill more culpable who purſues it till it becomes trite and tireſome.

DESIGNATION, the act of marking or indicating, and making a thing known. The deſignation of ſuch an eſtate is made by the tenants, butments, and boundings. Among the Romans, there were deſignations of the conſuls and other magiſtrates, ſome time before their election.

DESIGNATOR, a Roman officer, who aſſigned and marked each perſon his place and rank in public ceremonies, ſhows, proceſſions, &c. The word is formed from the verb *deſignare*, to deſign. The deſignator was a kind of marſhal, or maſter of the ceremonies, who regulated the ſeats, march, order, &c. There were deſignators at funeral ſolemnities, and at the games, theatres, and ſhows, who not only aſſigned every one his place, but alſo led him to it; as appears from the prologue to the Pœnulus of Plautus. Much of the ſame nature were the *agonothetæ* of the Greeks.

DESIGNING, the art of delineating or drawing the appearance of natural objects, by lines, on a plane. To deſign, according to the rules of mathematics, makes the object of perſpective. See PERSPECTIVE.

DESPORTES (Francis), a French painter of the 18th century, was born in Champagne in 1661. He acquired great reputation, not only in France, but in England and Poland: he particularly excelled in ſtill life. He was received into the academy of painting, made pictures for the tapeſtry of the Gobelins, and died at Paris in 1743.

DESPOT, a term ſometimes uſed for an abſolute prince. The word, in its firſt origin, ſignified the ſame with the Latin *herus*, and the Engliſh *maſter*: but in time it underwent the ſame fate on medals, as, among the Latins, Cæſar did with regard to Auguſtus: ΒΑCΙΛΕΥC anſwering to Auguſtus, and ΔΕCΠΟΤΗC, *deſpotes*, to Cæſar. Thus, Nicephorus having ordered his ſon Stauracius to be crowned, the ſon, out of reſpect, would only take the name ΔΕCΠΟΤΗC, leaving to his father that of ΒΑCΙΛΕΥC. For it is to be noted, that it was juſt about the time that the emperors began to ceaſe to uſe Latin inſcriptions. This delicacy, however, did not laſt long; for the following emperors preferred the quality of ΔΕCΠΟΤΗC to that of ΒΑCΙΛΕΥC, particularly Conſtantine, Michael Ducas, Nicephorus Botoniates, Romanus Diogenes, the Comneni, and ſome others. In imitation of the princes, the princeſſes likewiſe aſſumed the title of ΔΕCΠΟΙΝΑ.

It was the emperor Alexius, ſurnamed the angel, that created the *dignity* of deſpot, and made it the firſt after that of emperor, above that of Auguſtus or Sebaſtocrator and Cæſar. See AUGUST. The deſpots were uſually the emperor's ſons or ſons-in-law, and their colleagues or co-partners in the empire, as well as their preſumptive heirs. The deſpots that were ſons of the emperors had more privileges and authority than thoſe that were only ſons-in-law. Codin, p. 38. deſcribes the habits and ornaments of the deſpot. See the notes of father Goar on that author. Under the ſucceſſors of Conſtantine the Great, the title *deſpot of Sparta* was given to the emperor's ſon or brother, who had the city of Sparta or Lacedemon by way of appennage.

DESPOT is a title of quality given in Wallachia, Servia, and ſome of the neighbouring countries.

DESPOTIC, in general, denotes any thing that is uncontrolled and abſolute; but is particularly uſed for an arbitrary government, where the power of the prince is unlimited, and his will a law to his ſubjects: ſuch as thoſe of Turkey, Perſia, and moſt of the eaſtern governments; and even thoſe of Europe, if we except the republics, and our own government.

DESPOUILLE, in heraldry, the whole caſe, ſkin, or ſlough of a beaſt, with the head, feet, tail, and all appurtenances, ſo that being filled and ſtuffed it looks like the entire creature.

DESPREAUX. See BOILEAU.

DESSAW, a city of Upper Saxony, in Germany, ſituated on the river Elbe, 60 miles north-weſt of Dreſden, and ſubject to the prince of Anhalt-Deſſaw. E. lon. 12. 40. N. lat. 51. 50.

DESSERT, or DESERT, a ſervice of fruits and ſweetmeats, uſually ſerved up laſt at table.

DESICCATIVE, in ſurgery, an epithet applied to ſuch topical medicines as dry up and promote the healing of an ulcer.

DESTINIES, in mythology. See PARCÆ.

DESTINY, among philoſophers and divines. See FATE.

DESTRUCTION, in general, an alteration of any thing from its natural ſtate to one contrary to nature; whereby it is deemed the ſame with CORRUPTION. A chemical deſtruction, or corruption, is nothing but a reſolution of the whole naturally mixt body into its parts.

DESUDATION, in medicine, a profuſe and inordinate ſweat, ſucceeded by an eruption of puſtules, called *ſudamina*, or *heat pimples*.

DESULTOR, in antiquity, a vaulter or leaper, who, leading one horſe by the bridle, and riding another, jumped from the back of one to the other, as the cuſtom was after they had run ſeveral courſes or heats. This practice required great dexterity, being performed before the uſe of either ſaddles or ſtirrups. The cuſtom was practiſed in the army when neceſſity required it: but chiefly amongſt the Numidians, who always carried with them two horſes at leaſt for that purpoſe, changing them as they tired. The Greeks and Romans borrowed the practice from them; but only uſed it at races, games, &c. The Sarmatæ were great maſters of this exerciſe, and the Huſſars have ſtill ſome remains of it.

DETACHMENT, in military affairs, a certain number of ſoldiers drawn out from ſeveral regiments or companies equally, to be employed as the general thinks proper, whether on an attack, at a ſiege, or in parties to ſcour the country.

DETENTION, from *detineo* "I detain," the poſſeſſion or holding of lands, or the like, from ſome other claimant. The word is chiefly uſed in an ill ſenſe, for an unjuſt withholding, &c.

DETENTS, in a clock, are thoſe ſtops which, by being lifted up or let fall down, lock and unlock the clock in ſtriking.

DETENT-*Wheel*, or *Hoop-Wheel*, in a clock, that wheel which has a hoop almoſt round it, wherein there is a vacancy, at which the clock locks.

DETERGENTS, in ſurgery, ſuch applications as are not only ſoothing in their nature, but alſo have a diſpoſition to cleanſe, or carry along with them ſuch foul particles as they meet with in their paſſage.

DETERIORATION, the impairing or rendering any thing worfe; being juft the reverfe of melioration.

DETERMINATION, in mechanics, fignifies much the fame with the tendency or direction of a body in motion. See MECHANICS.

DETERMINATION, among fchool-divines, is an act of divine power, limiting the agency of fecond caufes, in every inftance, to what the Deity predeftinated concerning them. See PREDESTINATION.

DETERSIVES, the fame with DETERGENTS.

DETINUE, in law, a writ or action that lies againft one who has got goods or other things delivered to him to keep, and afterwards refufes to deliver them. In this action, the thing detained is generally to be recovered, and not damages; but if one cannot recover the thing itfelf, he fhall recover damages for the thing, and alfo for the detainer. Detinue lies for any thing certain and valuable, wherein one may have a property or right; as for a horfe, cow, fheep, hens, dogs, jewels, plate, cloth, bags of money, facks of corn, &c. It muft be laid fo certain, that the thing detained may be known and recovered: and therefore, for money out of a bag, or corn out of a fack, &c. it lies not; for the money or corn cannot in this cafe be known from other money or corn; fo that the party muft have an action on the cafe, &c. Yet detinue may be brought for a piece of gold of the price of 22s. though not for 22s. in money.

DETONATION, in chemiftry, fignifies an explofion with noife made by the fudden inflammation of fome combuftible body: fuch are the explofions of *gun-powder*, *fulminating gold*, and *fulminating powder*. See CHEMISTRY, p. 381.

DETRANCHE, in heraldry, a line bend-wife, proceeding always from the dexter-fide, but not from the very angle diagonally athwart the fhield.

DETTINGEN, a village of Germany, in the circle of the Upper Rhine, and in the territory of Hanau. Here the Auftrians and the Britifh, in June 1743, were attacked by the French, who met with a repulfe; but as the allies were inferior in number, they could not make the advantage of it they might otherwife have done. E. lon. 8. 45. N. lat. 50. 8.

DEUCALION, king of Theffaly. The flood faid to have happened in his time (1500 B. C.) is fuppofed to have been only an inundation of that country, occafioned by heavy rains, and an earthquake that ftopped the courfe of the river Peneus where it ufually difcharged itfelf into the fea. On thefe circumftances the fable of Deucalion's flood is founded. According to the fable, he was the fon of Prometheus. He governed his people with equity; but the reft of mankind, being extremely wicked, were deftroyed by a flood, while Deucalion and Pyrrha his queen faved themfelves by afcending mount Parnaffus. When the waters were decreafed, they went and confulted the oracle of Themis, on the means by which the earth was to be repeopled; when they were ordered to veil their heads and faces, to unloofe their girdles, and throw behind their backs the bones of their great mother. At this advice Pyrrha was feized with horror: but Deucalion explained the myftery, by obferving, that their great mother muft mean the earth, and her bones the ftones; when taking them up, thofe Deucalion threw over his head became men, and thofe thrown by Pyrrha, women. Some have fuppofed that Deucalion, whom the Greeks have reprefented under a variety of characters, and concerning whom their poets have given many fabulous accounts, was the fame with the patriarch Noah; and that Deucalion's flood in Theffaly, as well as that of Ogyges in Attica, and of Prometheus in Egypt, were the fame with that of Noah recorded in fcripture.

DEVENTER, a large, ftrong, trading, and populous town of the United Provinces in Overyffel, with an univerfity. It is furrounded with ftrong walls, flanked with feveral towers, and with ditches full of water. It is feated on the river Iffel, 55 miles eaft of Amfterdam, and 42 weft of Benthem. E. lon. 5. 8. N. lat. 52. 18.

DEVEREUX (Robert), earl of Effex, the fon of Walter Devereux, vifcount Hereford, was born at Netherwood, in Herefordfhire, in the year 1567. He fucceeded to the title of earl of Effex at ten years of age; and about two years after was fent, by his guardian lord Burleigh, to Trinity-college in Cambridge. He took the degree of mafter of arts in 1582, and foon after retired to his feat at Lampfie in South-Wales. He did not however continue long in this retreat; for we find him, in his feventeenth year, at the court of queen Elizabeth, who immediately honoured him with fingular marks of her favour. Authors feem very unneceffarily perplexed to account for this young earl's gracious reception at the court of Elizabeth. The reafons are obvious: he was her relation, the fon of one of her moft faithful fervants, the fon-in-law of her favourite Leicefter, and a very handfome and accomplifhed youth. Towards the end of (the following year) 1585, he attended the earl of Leicefter to Holland; and gave fignal proofs of his perfonal courage during the campaign of 1586, particularly at the battle of Zutphen, where the gallant Sidney was mortally wounded. On this occafion the earl of Leicefter conferred on him the honour of knight banneret.

In the year 1587, Leicefter being appointed lord fteward of the houfehold, Effex fucceeded him in the honourable poft of mafter of the horfe; and the year following, when the queen affembled an army at Tilbury to oppofe the Spanifh invafion, Effex was made general of the horfe. From this time he was confidered as the happy favourite of the queen. And, if there was any mark yet wanting to fix the people's opinion in that refpect, it was fhown by the queen's conferring on him the order of the garter.

We need not wonder that fo quick an elevation, and to fo great a height, fhould affect fo young a man as the earl of Effex; who fhowed from henceforwards a very high fpirit, and often behaved petulantly enough to the queen herfelf, who yet did not love to be controlled by her fubjects. His eagernefs about this time to difpute her favour with Sir Charles Blunt, afterwards lord Montjoy and earl of Devonfhire, coft him fome blood; for Sir Charles, thinking himfelf affronted by the earl, challenged him, and after a fhort difpute wounded him in the knee. The queen, fo far from being difpleafed with it, is faid to have fworn a good round oath, that it was fit fomebody fhould take him down, otherwife there would be no ruling him. However, fhe reconciled the rivals; who, to their honour, continued good friends as long as they lived.

The gallant Effex, however, was not fo entirely captivated with his fituation, as to become infenfible to the allurements of military glory. In 1589, Sir John Norris and Sir Francis Drake having failed on an expedition againft Spain, our young favourite, without the permiffion or knowledge of his royal miftrefs, followed the fleet; which he joined as they were failing towards Lifbon, and acted with great refolution in the repulfe of the Spanifh garrifon of that city. The queen wrote him a very fevere letter on the occafion; but fhe was, after his return, foon appeafed. Yet it was not long before he again incurred her difpleafure, by marrying the widow of Sir Philip Sidney. In 1591 he was fent to France with the command of 4000 men to the affiftance of Henry IV. In 1596 he was joined with the lord high admiral Howard in the command of the famous expedition againft Cadiz, the fuccefs of which is univerfally known. In 1597 he was appointed mafter of the ordnance; and the fame year commanded another expedition againft Spain, called the *Ifland Voyage*, the particulars of which are alfo well known.

Soon after his return, he was created earl marſhal of England; and on the death of the great lord Burleigh, in 1598, elected chancellor of the univerſity of Cambridge. This is reckoned one of the laſt inſtances of this great man's felicity, who was now advanced too high to ſit at eaſe; and thoſe who longed for his honours and employments, very cloſely applied themſelves to bring about his fall. Indeed an opportunity for effecting this ſoon offered itſelf; for, the total reduction of Ireland being propoſed, the earl was pitched upon as the only man from whom it could be expected. This was an artful contrivance of his enemies, who hoped by this means to ruin him; nor were their expectations diſappointed, as the details of that period in Engliſh hiſtory abundantly ſhow. From what is there ſaid, queen Elizabeth's affection for the unfortunate Eſſex, notwithſtanding her conſenting at laſt to his execution, is extremely apparent. Concerning that event, however, it is ſaid her majeſty was irreſolute to the laſt, and ſent orders to countermand it; but, conſidering his obſtinacy in refuſing to aſk her pardon, afterwards directed that he ſhould die. It is reported farther, that the queen, in the height of her paſſion for the earl of Eſſex, had given him a ring, ordering him to keep it, and that whatever crime he ſhould commit, ſhe would pardon him when he ſhould return that pledge. The earl, upon his condemnation, applied to admiral Howard's lady, his relation, deſiring her, by a perſon whom ſhe could truſt, to return it into the queen's own hands; but her huſband, who was one of the earl's greateſt enemies, and to whom ſhe had imprudently told the circumſtance, would not ſuffer her to acquit herſelf of the commiſſion; ſo that the queen conſented to the earl's death, being full of indignation againſt ſo proud and haughty a ſpirit, who choſe rather to die than implore her mercy. Some time after, the admiral's lady fell ſick, and being near her death, ſhe ſent word to the queen that ſhe had ſomething of great conſequence to communicate before ſhe died. The queen came to her bedſide; and having ordered all her attendants to withdraw, the lady returned, but too late, the ring, deſiring to be excuſed that ſhe did not return it ſooner: on which, it is ſaid, the queen immediately retired, overwhelmed with grief. The earl of Eſſex died in the thirty-fourth year of his age; leaving by his lady one ſon and two daughters.

DEVICE, among painters. See DEVISE.

DEVIL, *Diabolus*, an evil angel, one of thoſe celeſtial ſpirits caſt down from heaven for pretending to equal himſelf with God. The Ethiopians paint the devil white, to be even with the Europeans, who paint him black. There is no mention of the word *devil* in the Old Teſtament, but only of the word *Satan* and *Belial:* nor do we meet with it in any heathen authors, in the ſenſe it is taken among Chriſtians, that is, as a creature revolted from God. Their theology went no farther than to evil genii or dæmons. Some of the American idolaters have a notion of two collateral independent beings, one of whom is good, and the other evil; which laſt they imagine has the direction and ſuperintendance of this earth, for which reaſon they chiefly worſhip him; whence thoſe that give us an account of the religion of theſe ſavages give out, with ſome impropriety, that they worſhip the devil. The Chaldeans, in like manner, believed both a good principle and an evil one; which laſt they imagined was an enemy to mankind. Iſaiah, ſpeaking, according to ſome commentators, of the fall of the devil, calls him *Lucifer*, from his former elevation and ſtate of glory: but others explain this paſſage of Iſaiah in reference to the king of Babylon, who had been precipitated from his throne and glory. The Arabians call Lucifer, *Eblis*; which ſome think is only a diminutive or corruption of the word *Diabolus*.

DEVIL *on the Neck*, a tormenting engine made of iron, ſtraitening and wincing the neck of a man, with his legs together, in a horrible manner; ſo that the more he ſtirs in it, the ſtraiter it preſſes him. It was formerly in uſe among the perſecuting papiſts.

DEVINCTION, *Devinctio*, in antiquity, was uſed to ſignify a love-charm or incantation to gain the affection of a perſon beloved.

It was done by tying knots; and is thus deſcribed by Virgil in his eighth Eclogue:

> *Necte tribus nodis ternos, Amarylli, colores:*
> *Necte, Amarylli, modo; et Veneris, dic, vincula necto.*

DEVISE, or DEVICE, in heraldry, painting, and ſculpture, any emblem uſed to repreſent a certain family, perſon, action, or quality; with a ſuitable motto, applied in a figurative ſenſe. See MOTTO. The eſſence of a device conſiſts in a metaphorical ſimilitude between the things repreſenting and repreſented: thus, a young nobleman, of great courage and ambition, is ſaid to have borne for his deviſe, in a carouſal at the court of France, a rocket mounted in the air, with this motto in Italian, "*poco duri purche m'inalzi*;" expreſſing, that he preferred a ſhort life, provided he might thereby attain to glory and eminence. The Italians have reduced the making of deviſes into an art, ſome of the principal laws of which are theſe: 1. That there be nothing extravagant or monſtrous in the figures. 2. That figures be never joined which have no relation or affinity with one another; excepting ſome whimſical unions eſtabliſhed in ancient fables, which cuſtom has authoriſed. 3. That the human body be never uſed. 4. The fewer figures the better. 5. The motto ſhould be every way ſuitable.

DEVISE, in law, the act whereby a perſon bequeaths his lands or tenements to another by his laſt will or teſtament.

DEUNX, in Roman antiquity, 11 ounces, or $\frac{11}{12}$ of the LIBRA.

DEVOLVED, ſomething acquired by right of devolution. Such a right is devolved to the crown: ſuch an eſtate devolved on A. by the death of B.

The word is alſo uſed for a right, acquired by a ſuperior, of conferring a benefice, when the inferior and ordinary collator has neglected to confer, or has conferred it on an unqualified perſon.

If a patron neglects to preſent to a benefice in ſix months, the preſentation lapſes or devolves upon the biſhop, from thence to the primate, and from thence to the king.

DEVOLUTION, in law, a right acquired by ſucceſſion from one to another.

DEVONSHEERING, a term uſed by the farmers to expreſs the burning of land by way of manure: the method is to cut off the turf about four inches thick, and burn it in heaps, and then ſpread the aſhes upon the land. The name is probably derived from its having been earlieſt practiſed in Devonſhire.

DEVONSHIRE, a county of England, bounded on the ſouth by the Engliſh channel, on the north by the Briſtol channel, on the eaſt by Somerſetſhire, and on the weſt by Cornwall. It is about 69 miles long, and 66 broad. The ſoil is various; in the weſtern parts of the county it is coarſe and mooriſh, bad for ſheep, but proper for black cattle. In the northern parts, the dry ſoil and downs are well adapted to ſheep, with numerous flocks of which they are well covered. Tolerable crops of corn are alſo produced there when the land is well manured. The ſoil of the reſt of the country is rich and fertile both in corn and paſture, yielding alſo in ſome places plenty of marle for manuring it. In other places they pare off and burn the ſurface, making uſe of the aſhes as a manure. Dr. Campbell ſtyles it a rich and pleaſant country; as in different parts it abounds with all ſorts of grain, produces abundance of fruit, has mines of lead, iron, and ſilver, in which it formerly exceeded Cornwall, though now it is greatly inferior. On the coaſt alſo they have herring and pilchard fiſheries. De-

vonſhire ſends two members to parliament, and gives title of Duke to the noble family of Cavendiſh.

DEVOTION, DEVOTIO, a ſincere ardent worſhip of the Deity. Devotion, as defined by Jurien, is a ſoftening and yielding of the heart, with an internal conſolation, which the ſouls of believers feel in the practice or exerciſe of piety. By devotion is alſo underſtood certain religious practices, which a perſon makes it a rule to diſcharge regularly; and with reaſon, if the exactitude be founded on ſolid piety, otherwiſe it is vanity or ſuperſtition. That devotion is vain and trifling which would accommodate itſelf both to God and to the world, two things which are utterly incompatible with each other.

DEVOTION, among the Romans, was a kind of ſacrifice or ceremony, whereby they conſecrated themſelves to the ſervice of ſome perſon. The ancients had a notion, that the life of one might be ranſomed by the death of another; whence thoſe devotions became frequent for the lives of the emperors. Devotion to any particular perſon was unknown among the Romans till the time of Auguſtus. The very day after the title of Auguſtus had been conferred upon Octavius, Pacuvius, a tribune of the people, publicly declared, that he would devote himſelf to Auguſtus, and obey him at the expence of his life (as was the practice among barbarous nations), if he was commanded. His example was immediately followed by all the reſt; till at length it became an eſtabliſhed cuſtom never to go to ſalute the emperor, without declaring that they were devoted to him. Before this, the practice of the Romans was that of devoting themſelves to their country.

DEUTEROCANONICAL, in the ſchool-theology, an appellation given to certain books of holy ſcripture, which were added to the canon after the reſt; either becauſe they were not written till after the compilation of the canon, or on account of ſome diſpute as to their canonicity. The word is Greek, being compounded of δευτερος *ſecond*, and κανονικος *canonical*.

The Jews, it is certain, acknowledged ſeveral books in their canon, which were put there later than the reſt. They ſay, that under Eſdras, a great aſſembly of their doctors, which they call by way of eminence the *great ſynagogue*, made the collection of the ſacred books which we now have in the Hebrew Old Teſtament. And they agree that they put books therein which had not been ſo before the Babyloniſh captivity; ſuch are thoſe of Daniel, Ezekiel, Haggai, &c. and thoſe of Eſdras and Nehemiah. And the Romiſh church has ſince added others to the canon, that were not, nor could be, in the canon of the Jews, ſince ſome of them were not compoſed till after. Such is the book of Eccleſiaſticus; with ſeveral of the apocryphal books, as the Maccabees, Wiſdom, &c. Others were added ſtill later, becauſe their canonicity had not been yet examined; and till ſuch examen and judgment they might be ſet aſide at pleaſure. But ſince that church has pronounced as to the canonicity of theſe books, there is no more room now for her members to doubt of them, than there was for the Jews to doubt of thoſe of the canon of Eſdras. And the deuterocanonical books are with them as canonical as the proto-canonical; the only difference between them conſiſting in this, that the canonicity of the one was not generally known, examined, and ſettled, ſo ſoon as that of the others.

The deuterocanonical books in the modern canon are the book of Eſther, either the whole, or at leaſt the ſeven laſt chapters thereof; the epiſtle to the Hebrews; that of James; and that of Jude; the ſecond of St. Peter; the ſecond and third of St. John; and the Revelation. The deuterocanonical parts of books are, in Daniel, the hymn of the three children; the prayer of Azariah; the hiſtories of Suſannah, of Bel and the Dragon; the laſt chapter of St. Mark; the bloody ſweat, and the appearance of the angel, related in St. Luke, chap. xxii; and the hiſtory of the adulterous woman in St. John, chap. viii.

DEUTERONOMY, one of the ſacred books of the Old Teſtament; being the laſt of thoſe written by Moſes: (See PENTATEUCH.) The word is Greek, compounded of δευτερος *ſecond*, and νομος *law*. Deuteronomy was written the 40th year after the delivery from Egypt, in the country of the Moabites beyond Jordan; Moſes being then in the 120th year of his age. It contains, in Hebrew, 11 paraches, though only 10 in the edition of the rabbins at Venice; XX chapters, and 955 verſes. In the Greek, Latin, and other verſions, it contains XXXIV chapters. The laſt is not of Moſes. Some ſay it was added by Joſhua immediately after Moſes's death; which is the moſt probable opinion. Others will have it added by Eſdras.

DEUTEROPOTMI, in Grecian antiquity, a deſignation given to ſuch of the Athenians as had been thought dead, and, after the celebration of the funeral rites, unexpectedly recovered. It was unlawful for the deuteropotmi to enter into the temple of the Eumenides, or to be admitted to the holy rites, till after they were purified, by being let through the lap of a woman's gown, that they might ſeem to be new born.

DEUTEROSIS, the Greek name by which the Jews called their Miſchnah, or ſecond law. See MISCHNAH.

DEW, a thin light inſenſible miſt, or rain, aſcending with a ſlow motion, and falling while the ſun is below the horizon.

To us it appears to differ from rain, as leſs from more. Its origin and matter are doubtleſs from the vapours and exhalations that riſe from the earth and water. See EXHALATION. Some define it a vapour liquefied, and let fall in drops. M. Huet, in one of his letters, ſhews that dew does not fall, but riſes; and others have adopted the ſame opinion.

M du Fay made ſeveral experiments, firſt with glaſſes, then with pieces of cloth ſtretched horizontally at different heights; and he found that the lower bodies, with their under ſurfaces, were wetted before thoſe that were placed higher, or their upper ſurfaces. And Du Fay and Muſchenbroek both found, that different ſubſtances, and even different colours, receive the dew differently, and ſome little or not at all.

From the principles laid down under the article EVAPORATION, the ſeveral phenomena of dews are eaſily accounted for. Such as, for inſtance, that dews are more copious in the ſpring, than in the other ſeaſons of the year; there being then a greater ſtock of vapour in readineſs than at other times, by reaſon of the ſmall expence of it in the winter's cold and froſt. Hence it is too, that Egypt, and ſome other hot countries, abound with dews throughout all the heats of ſummer; for the air there being too hot to conſtipate the vapours in the day-time, they never gather into clouds; and hence they have no rain: but in climates that are exceſſively hot, the nights are remarkably cold; ſo that the vapours raiſed after ſun-ſet are readily condenſed into dews.

It is natural to conclude, from the different ſubſtances which are combined with dew, that it muſt be either ſalutary or injurious, both to plants and animals.

It is not eaſy to aſcertain the quantity of dew that riſes every night, or in the whole year, becauſe of the winds which diſperſe it, the rains which carry it down, and other inconveniences: but it is known that it riſes in greater abundance after rain than after dry weather, and in warm countries than in cold ones. There are ſome places in which dew is obſerved only to aſcend, and not to fall; and others again in which it is carried upwards in greater plenty than downwards, being diſperſed by the winds.

Dr. Hales made ſome experiments, to determine the quantity of dew that falls in the night. For this purpoſe, on the 15th of Auguſt, at ſeven in the evening, he filled two glazed earthen pans with moiſt earth; the dimenſions of the pans being 3 inches deep, and 12 inches diameter: and he obſerves, that the moiſter the earth, the more dew falls on it in a night; and that more than a double quantity of dew falls on a ſurface of wa-

ter, than on an equal furface of moift earth. Thefe pans increafed in weight by the night's dew, 180 grains; and decreafed in weight by the evaporation of the day, 1 oz. 282 grs.: fo that 540 grains more are evaporated from the earth every 24 hours in fummer, than the dew that falls in the night; i. e. in 21 days near 26 ounces from a circular area of a foot diameter. Now if 180 grains of dew, falling in one night on fuch an area, which is equal to 113 fquare inches, be equally fpread on the furface, its depth will be the 159th part of an inch. He likewife found that the depth of dew in a winter's night was the 90th part of an inch. If therefore we allow 159 nights for the extent of the fummer's dew, it will in that time amount to one inch in depth; and reckoning the remaining 206 nights for the extent of the winter's dew, it will produce 2·28 inches depth; and the dew of the whole year will amount to 3·28 inches depth. But the quantity which evaporated in a fair fummer's day from the fame furface, being 1 oz. and 282 grs. gives the 40th part of an inch deep for evaporation, which is four times as much as fell at night. Dr. Hales obferves that the evaporation of a winter's day is nearly the fame as in a fummer's day; the earth's greater moifture in winter compenfating for the fun's greater heat in fummer. Hales's Vegetable Statics, vol. i. p. 52 of 4th edit. See Evaporation.

Signor Beccaria made feveral experiments to demonftrate the exiftence of the electricity that is produced by dew. He obferves in general, that fuch electricity took place in clear and dry weather, during which no ftrong wind prevailed; and that it depends on the quantity of the dew, as the electricity of the rain depends on the quantity of the rain. He fometimes found that it began before fun-fet; at other times not till 11 o'clock at night. See his *Artificial Electricity*: Appendix, letter 3.

May-Dew whitens linen and wax; the dew of autumn is converted into a white froft. Out of dew are produced a variety of infects, which change apace from one fpecies into another: and what remains is converted into a fine white falt, with angles like thofe of nitre. A fpirit has been drawn from May-dew, to which wonderful virtues were once attributed. The method of collecting and preparing it, is defcribed by Hanneman, phyfician at Kiel. It is apparently from the preparation of this dew, that the brothers of the Rofy-Crofs took their denomination. See Rosicrucians.

Dew-*Born*, in country affairs, a diftemper in cattle, in which there is a fwelling in the body, as much as the fkin can hold, fo that fome are in danger of burfting. This diftemper proceeds from the greedinefs of the animal's feeding, when put into a rank pafture. In this cafe the beaft fhould be ftirred up and down, and made to purge well: bleeding in the tail is alfo proper; then he fhould take a grated nutmeg, made into a ball with yolk of egg and a little oatmeal.

Dew-*Worm*. See Lumbricus.

DE WIT (John), the famous penfionary, was born in 1625, at Dort; where he profecuted his ftudies fo diligently, that, at the age of 23, he publifhed *Elementa Curvarum Linearum*, one of the deepeft books in mathematics at that time. After taking his degrees, and travelling, he, in 1650, became penfionary of Dort, and diftinguifhed himfelf very early in the management of public affairs. He oppofed with all his power the war between the Englifh and the Dutch; and when the event juftified his predictions, he was unanimoufly chofen penfionary of Holland. In this capacity he laboured to procure a peace with Cromwell; in which peace a fecret article was introduced by one fide or other, for the exclufion of the houfe of Orange. In the war with England after the king's reftoration, when it was thought expedient, on Opdam's defeat and death, that fome of their own deputies fhould command the fleet, he was one of the three put in commiffion; and wrote an accurate relation of all that happened during the expedition he was engaged in, for which, at his return, he received the folemn thanks of the States-General. In 1667 he eftablifhed the perpetual edict for abolifhing the office of Stadtholder, to fix the liberty of the republic, as it was hoped, on a firm bafis; which produced feditions and tumults, that reftored the office, on pretence that the De Wits were enemies to the houfe of Orange, and plundered the ftate. The penfionary begged difmiffion from his poft; which was granted, with thanks for his faithful fervices. But the invafion of the French, and the internal divifions among the Hollanders themfelves, fpread every where terror and confufion; which the Orange party heightened to ruin the De Wits. Cornelius, the penfionary's brother, was imprifoned and condemned to exile; and a report being raifed that he would be refcued, the mob armed, and furrounded the prifon where the two brothers then were together, dragged them out, barbaroufly murdered them, hung their bodies on a gallows, and cut them to pieces, which many of them even broiled, and ate with favage fury. Such was the end of one of the greateft geniufes of his age; of whom Sir William Temple, who was well acquainted with him, writes with the greateft efteem and admiration. He obferves, that when he was at the head of the government, he differed nothing in his manner of living from an ordinary citizen. His office, for the firft ten years, brought him in little more than 300l. and in the latter part of his life, not above 700l. *per annum*. He refufed a gift of 10,000l. from the States-General, becaufe he thought it a bad precedent in the government. With great reafon, therefore, Sir William Temple, fpeaking of his death, obferves, "He was a perfon that deferved another fate, and a better return from his country; after eighteen years fpent in their miniftry, without any care of his entertainments or eafe, and little of his fortune. A man of unwearied induftry, inflexible conftancy, found, clear, and deep underftanding, and untainted integrity; fo that whenever he was blinded, it was by the paffion he had for that which he efteemed the good and intereft of his ftate. This teftimony is juftly due to him from all that were well acquainted with him; and is the more willingly paid, fince there can be as little intereft to flatter, as honour to reproach, the dead."

Befides the works already mentioned, he wrote a book containing thofe maxims of government upon which he acted; which will be a never-fading monument to his immortal memory. A tranflation of it from the original Dutch, intituled, *The true intereft and political maxims of the republic of Holland*, has been printed in London; to the laft edition of which, in 1646, are prefixed hiftorical memoirs of the illuftrious brothers Cornelius and John De Wit, by John Campbell, Efq.

DEXTANS, in Roman antiquity, ten ounces, or $\frac{10}{12}$ of their libra. See Libra.

DEXTER, in heraldry, an appellation given to whatever belongs to the right fide of a fhield or coat of arms: thus we fay, *bend-dexter*, *dexter-point*, &c.

DEXTROCHERE, or Destrochere, in heraldry, is applied to the right arm painted in a fhield, fometimes naked, fometimes clothed, or adorned with a bracelet; and fometimes armed, or holding fome moveable or member ufed in the arms.

DEY, the title of the fovereign of Algiers, under the protection of the grand feignor. A prince under this title was appointed by the fultan, at the requeft of the Turkifh foldiers, in the year 1710. The term *dey*, in the Turkifh language, fignifies *an uncle* by the mother's fide; and the reafon of the denomination is this: that the Turkifh military confider the grand feignor as their father; the republic as their mother, by which they are nourifhed and maintained; and the dey as the brother of the republic, and confequently the uncle of all who are under his dominion. Befides the age, experience, and valour, which are neceffary qualifications of a perfon to be elected, he muft alfo be a native Turk, and have made the voyage to Mecca. He

has no guards nor confiderable retinue. He prefides at the divan, and is moft diftinguifhed by the refpect and fubmiffion which are paid him.

DIABETES, in phyfic, an exceffive difcharge of urine, which comes away crude, and exceeds the quantity of liquids drunk. See MEDICINE.

DIABOLUS. See DEVIL.

DIABOLUS *Marinus.* See RAIA.

DIABOLUS *Metallorum,* a title given by chemifts to jupiter or tin; becaufe, when incorporated with other metals, it renders them incapable of reduction, or at leaft very difficult to undergo that operation.

DIACAUSTIC CURVE, a fpecies of the cauftic curves formed by refraction.

DIACHYLON, in pharmacy, a well known plafter, compofed of a folution of litharge in olive oil. To this the college have lately given the name of *Emplaftrum Lithargyri.* The properties of this plafter are very generally known.

DIACODIUM, in pharmacy, a fyrup prepared from poppy-heads. It is now called the *fyrupus papaveris albi.*

DIACOUSTICS, called alfo DIAPHONICS, the confideration of the properties of refracted found, as it paffes through different mediums: (See ACOUSTICS.) The word is formed from the Greek δια *per,* "through," which intimates a paffage; and ακυω "I hear," *q. d.* the confideration of the paffage of the founds we hear. See SOUND.

DIACRII, in antiquity, was the name of a party or faction at Athens. That city, we read, was divided into two parties: the one favourers of an oligarchy, who would only have a few perfons employed in the government; the other confifted of fuch as were for a democratical or popular government, wherein the whole people fhould have a fhare. The firft were called *diacrii,* and the latter *pediaci;* the latter inhabiting the lower, and the former the ακρον, or upper quarter or part of the city. The laws of Solon decreed, that Pififtratus fhould be chief of the diacrii; though the fcholiaft on Ariftophanes's comedy entitled The Wafps, affirms, that Pandion diftributed the quarter of the diacrii among his fons, and put Lycus at their head.

DIADELPHIA, from δις "twice," and αδελφος "a brother", the 17th clafs in the fexual fyftem of botany, comprehending thofe plants which bear hermaphrodite flowers with two fets of united ftamina; but this circumftance muft not be abfolutely depended on. They are the *papilionacei* of Tournefort, the *irregulares tetrapetali* of Rivinus, and the *leguminofi* of Ray. See BOTANY, p. 43.

DIADEM, in antiquity, a head-band or fillet, worn by kings as a badge of their royalty. It was made of filk, thread, or wool, and tied round the temples and forehead, the ends being tied behind, and let fall on the neck. It was ufually white, and quite plain; though fometimes embroidered with gold, and fet with pearls and precious ftones. In latter times, it came to be twifted round crowns, laurels, &c. and even appears to have been worn on various parts of the body. See CROWN. The word comes from the Latin *diadema;* of the Greek διαδημα "a little band encompaffing the head," of the verb διαδεω, *cingo,* "I gird."

DIADEM, in heraldry, is applied to certain circles or rims ferving to inclofe the crowns of fovereign princes, and to bear the globe and crofs, or the fleur-de-lis, for their creft. The crowns of fovereigns are bound, fome with a greater and fome with a lefs number of diadems. The bandage about the heads of Moors on fhields is alfo called *diadem,* in blazoning.

DIÆRESIS, in furgery, denotes an operation ferving to divide any part whofe continuity is a hindrance to the cure.

DIÆRESIS, in medicine, is the confuming of the veffels of an animal body, when from fome corroding caufe certain paffages are made, which naturally ought not to have been; or certain natural paffages are dilated beyond their ordinary dimenfions, fo that the humours which ought to have been contained in the veffels extravafate or run out.

DIÆRESIS, in grammar, the divifion of one fyllable into two, which is ufually noted by two points over a letter, as *aulaï,* inftead of *aulæ, diffoluenda* for *diffolvenda.*

DIÆTETÆ, in Grecian antiquity, a kind of judges, of which there were two forts, the cleroti and dialecterii. The former were public arbitrators, chofen by lot to determine all caufes exceeding ten drachms, within their own tribe, and from their fentence an appeal lay to the fuperior courts. The dialecterii, on the contrary, were private arbitrators, from whofe fentence there lay no appeal, and accordingly they always took an oath to adminifter juftice without partiality.

DIAGLYPHICE, the art of cutting or engraving figures on metals, fuch as feals, intaglios, matrices of letters, &c. or coins for medals. See ENGRAVING.

DIAGNOSIS, from διαγνωσκω, *to difcern* or *diftinguifh,* the diagnoftics or the figns of a difeafe. They are of two kinds, *viz.* the adjunct and pathognomonic; the firft are common to feveral difeafes, and ferve only to point out the difference between difeafes of the fame fpecies; the latter are thofe which always attend the difeafe, and diftinguifh it from all others.

DIAGNOSTIC, in medicine, a term given to thofe figns which indicate the prefent ftate of a difeafe, its nature and caufe.

DIAGONAL, in geometry, a right line drawn acrofs a quadrilateral figure, from one angle to another; by fome called the *diameter,* and by others the *diametral,* of the figure. See GEOMETRY.

DIAGORAS, furnamed the *Atheift,* lived in the 91ft Olympiad. He was not a native of Athens, but he philofophifed there. He delighted in making verfes, and had compofed a poem which a certain poet ftole from him. He fued the thief, who fwore it was his own, and got glory by it. This tempted Diagoras to deny a Providence. The Athenians fummoned him to give an account of his doctrine. He fled, and they fet a price upon his head, promifing a reward to any who would kill him; but he took fhipping, and was caft away.

DIAGRAM, in geometry, a fcheme for explaining and demonftrating the properties of any figure, whether triangle, fquare, circle, &c. See GEOMETRY.

DIAGRAM, among ancient muficians, the fame with the fcale of the moderns. See SCALE.

DIAH, DIAT, a name given by the Arabs to the punifhment of retaliation. By the Mahometan law, a brother, or the next relation of a murdered perfon, ought to take part againft the murderer, and demand his blood in reparation for that which he has fhed. Before the time of Mahomet, the Arabs had a cuftom of putting a freeman of their prifoners to death in lieu of every flave they loft in battle, and a man for every woman that was killed. But Mahomet regulated the laws of reprifal; directing in the Alcoran, by the diat, that a freeman fhould be required for a freeman, and a flave for a flave. The Turks, probably in confequence of this law, formerly maffacred almoft all their prifoners of war; but they now content themfelves with enflaving and felling them.

DIAHEXAPLA, or DIAHEXAPTE, among farriers, a compound medicine, fo called from its containing fix ingredients, *viz.* birthwort and gentian roots, juniper-berries, bay-berries, myrrh, and ivory fhavings. It is thought good for colds, and many other diforders in horfes.

DIAL, an inftrument ferving to meafure time; which, if effected by the aid of the fun, is called a *fun-dial.* The word is from the Latin *dies* "day," becaufe indicating the hour of the day. The ancients alfo called it *fciathericum,* from its effect by the fhadow. See the article DIALING.

DIALECT, an appellation given to the language of a province in ſo far as it differs from that of the whole kingdom. The term, however, is more particularly uſed in ſpeaking of the ancient Greek, whereof there were four dialects, the Attic, Ionic, Æolic, and Doric; each of which was a perfect language in its kind, that took place in certain countries, and had peculiar beauties. In Britain, beſides the grand diverſity of Engliſh, Iriſh, and Scotch, almoſt every county has a dialect of its own, all differing conſiderably in pronunciation, accent, and tone, although one and the ſame language.

DIALECTICS, in the literary hiſtory of the ancients, that branch of logics which taught the rules and modes of reaſoning. See LOGIC. Zeno Eleates was the firſt who diſcovered the natural ſeries of principles and concluſions obſerved in reaſoning, and formed an art thereof in form of a dialogue; which, for this reaſon, was called *dialectica*.

The dialectica of the ancients is uſually divided into ſeveral kinds; the firſt was the *eleatica*, that of Zeno Eleates, which was threefold; viz. *conſecutionum*, *colloquutionum*, and *contentionum*. The firſt conſiſted of rules for deducing or drawing concluſions. The ſecond was the art of dialogue; which became of ſuch univerſal uſe in philoſophy, that all reaſoning was called *interrogation*: then, ſyllogiſm being laid aſide, the philoſophers did all by dialogue; it lying on the reſpondent to conclude and argue from the ſeveral conceſſions made. The laſt part of Zeno's dialectics, ἐριστική, was contentious, or the art of diſputing and contradicting; though ſome, particularly Laertius, aſcribe this part to Protagoras, a diſciple of Zeno.

The ſecond is the *dialectica megarica*, whoſe author is Euclid, not the mathematician, but another, of Megara. He gave much into the method of Zeno and Protagoras: though there are two things appropriated to him: the firſt, that he impugned the demonſtrations of others, not by aſſumptions, but concluſions; continually making illations, and proceeding from conſequence to conſequence: the ſecond, that he ſet aſide all arguments drawn from compariſons of ſimilitude as invalid. He was ſucceeded by Eubulides, from whom the ſophiſtic way of reaſoning is ſaid to be derived. In his time the art is deſcribed as manifold: mentiens, fallens, electra, obvelata, acervalis, cornuta, and calva. See SOPHISM.

The third is the dialectics of Plato, which he propoſes as a kind of analyſis to direct the human mind, by dividing, defining, and bringing things to the firſt truth; where being arrived, and ſtopped there a little, it applies itſelf to explain ſenſible things, but with a view to return to the firſt truth, where alone it can reſt. Such is the idea of Plato's analyſis.

The fourth is Ariſtotle's dialectics; containing the doctrine of ſimple words, delivered in his book of Prædicaments; the doctrine of propoſitions, in his book *De Interpretatione*; and that of the ſeveral kinds of ſyllogiſm, in his books of Analytics, Topics, and Elenchuſes.

The fifth is the dialectics of the Stoics; which they call a part of philoſophy, and divide into rhetoric and dialectic; to which ſome add the definitive, whereby things are juſtly defined; comprehending likewiſe the canons or criterions of truth. The Stoics, before they come to treat of ſyllogiſms, have two principal places: the one about the ſignification of words, the other about the things ſignified. On occaſion of the firſt, they conſider abundance of things belonging to the grammarian's province: what, and how many letters; what is a word, diction, ſpeech, &c. On occaſion of the latter, they conſider things themſelves, not as without the mind, but as in it, received in it by means of the ſenſes. Accordingly, they firſt teach, that *nil ſit in intellectu, quod non prius fuerit in ſenſu*; "whatever is in the mind came thither by the ſenſes;" and that *aut incurſione ſui*, as Plato, who meets the ſight; *aut ſimilitudine*, as Cæſar by his effigy; *aut proportione*, either by enlarging as a giant, or by diminiſhing as a pigmy; *aut tranſlatione*, as a Cyclops; *aut compoſitione*, as a Centaur; *aut contrario*, as death; *aut privatione*, as a blind man.

The ſixth is Epicurus's dialectics; for though he ſeems to have deſpiſed dialectic, he cultivated it with vigour. He was only averſe to that of the Stoics; who he thought attributed too much to it, as pronouncing him alone wiſe who was well verſed in dialectics. For this reaſon, Epicurus, ſeeming to ſet aſide the common dialectics, had recourſe to another way; *viz.* to certain canons which he ſubſtituted in their ſtead, the collection whereof he called *canonica*; and as all queſtions in philoſophy are either *de re* or *de voce*, he gave ſeparate rules for each. See EPICUREANS.

DIALIA, in antiquity, ſacrifices performed by the flamen dialis. See FLAMEN.

DIALING,

THE art of drawing dials on the ſurface of any given body or plane.

Dialing is a very uſeful art: for clocks and watches are frequently out of order, and in need of regulation by ſome invariable inſtrument, as a dial; by means of which the true ſolar time is found, and from thence by the equation tables the mean time.

The antiquity of dials is beyond doubt. Some attribute their invention to Anaximenes Mileſius; and others to Thales. Vitruvius mentions one made by the ancient Chaldee hiſtorian Beroſus, on a reclining plane, almoſt parallel to the equinoctial. Ariſtarchus Samius invented the hemiſpherical dial. And there were ſome ſpherical ones, with a needle for a gnomon. The diſcus of Ariſtarchus was an horizontal dial, with its limb raiſed up all round, to prevent the ſhadows ſtretching too far.

It was late ere the Romans became acquainted with dials. The firſt ſun-dial at Rome was ſet up by Papirius Curſor, about the year of the city 460; before which time, ſays Pliny, there is no mention of any account of time but by the ſun's riſing and ſetting: it was ſet up at or near the temple of Quirinus, but went ill. About 30 years after, M. Valerius Meſſala being conſul, brought out of Sicily another dial, which he ſet up on a pillar near the roſtrum; but not being made for that latitude, it could not go true. They made uſe of it 99 years; till Martius Philippus ſet up another more exact.

The Jews had dials much earlier. Witneſs the dial of Ahaz; who began to reign 400 years before Alexander, and within 12 years of the building of Rome; mentioned by Iſaiah, chap. xxxviii. verſe 8.

The firſt profeſſed writer on dialing is Clavius; who demonſtrates all, both the theory and the operations, after the rigid manner of the ancient mathematicians; but ſo intricately, that few, we dare ſay, ever read them all. Dechales and Ozanam give much eaſier demonſtrations in their *Courſes*, and Wolfius in his *Elements*. M. Picard has given a new method of making large dials, by calculating the hour-lines; and M. de la Hire, in his *Dialing*, printed in 1683, a geometrical method of drawing hour-lines from certain points determined by obſervation. Eberhardus Welperus, in 1625, publiſhed his *Dialing*, wherein he lays down a method of drawing the pri-

many dials on a very easy foundation. The same foundation is described at length by Sebastian Munster, in his *Rudimenta Mathematica*, published in 1551. Sturmius, in 1672, published a new edition of Welperus's *Dialing*, with the addition of a whole second part, about inclining and declining dials, &c. In 1708, the same work, with Sturmius's additions, was republished, with the addition of a fourth part, containing Picard's and De la Hire's methods of drawing large dials. Paterson, Michael, and Muller, have each written on dialing, in the German tongue; Coetsius in his *Horologiographia Plana*, printed in 1689; Gauppenius, in his *Gnomonica Mechanica*; Bion, in his *Use of Mathematical Instruments*; the late ingenious Mr. Ferguson, in his *Select Lectures*; Mr. Emmerson, in his *Dialing*; and Mr. W. Jones, in his *Instrumental Dialing*.

A *Dial* is a plane, upon which lines are described in such a manner, that the shadow of a wire, or of the upper edge of another plane, erected perpendicularly on the former, may show the true time of the day.

The edge of the plane by which the time of the day is found, is called the *stile of the dial*, which must be parallel to the earth's axis; and the line on which this plane is erected is called the *substile*.

The angle included between the substile and stile is called the *elevation* or *height of the stile*.

Dials are *horizontal* or *perpendicular*, according as their planes are parallel or perpendicular to the plane of the horizon.

Erect dials, whose planes directly front the north or south, are called *direct north* or *south dials*; and all other erect dials are called *decliners*.

Dials whose planes are neither parallel nor perpendicular to the plane of the horizon, are called *inclining* or *reclining dials*, according as their planes make acute or obtuse angles with the horizon; and if their planes are also turned aside from facing the south or north, they are called *declining-inclining* or *declining-reclining dials*.

The intersection of the plane of the dial, with that of the meridian, passing through the stile, is called the *meridian of the dial*, or the *hour-line of XII.*

Those meridians, whose planes pass through the stile, and make angles of 15, 30, 45, 60, 75, and 90 degrees with the meridian of the place (which marks the hour-line of XII.) are called *hour-circles*; and their intersections with the plane of the dial are called *hour-lines*.

In all declining dials, the substile makes an angle with the hour-line of XII. and this angle is called the *distance of the substile from the meridian*.

The declining plane's difference of longitude is the angle formed at the intersection of the stile and plane of the dial, by two meridians; one of which passes through the hour-line of XII. and the other through the substile.

If the whole earth *aPcp*, Plate 91. fig. 1. were transparent, and hollow, like a sphere of glass, and had its equator divided into 24 equal parts by so many meridian semicircles, *a*, *b*, *c*, *d*, *e*, *f*, *g*, &c. one of which is the meridian of any given place, as London (supposed to be at the point *a*); and if the hour of XII were marked at the equator, both upon that meridian and the opposite one, and all the rest of the hours in order on the rest of the meridians, those meridians would be the hour circles of London: then, if the sphere had an opaque axis, as *PEp*, the shadow of the axis would fall upon every particular meridian and hour, when the sun came to the plane of the opposite meridian, and would consequently show the time at London, and at all other places on the meridian of London.

If this sphere was cut through the middle by a solid plane *ABCD*, in the rational horizon of London, one half of the axis *EP* would be above the plane, and the other half below it; and if straight lines were drawn from the centre of the plane to those points where its circumference is cut by the hour circles of the sphere, those lines would be the hour-lines of a horizontal dial for London: for the shadow of the axis would fall upon each particular hour-line of the dial, when it fell upon the like hour-circle of the sphere.

If the plane which cuts the sphere be upright, as *AFCG*, fig. 2. touching the given place (London) at *F*, and being perpendicular to the meridian of London, it will then become the plane of an erect direct south-dial: and if right lines be drawn from its centre *E* to those points of its circumference where the hour circles of the sphere cut it, these will be the hour-lines of a vertical or direct south-dial for London, to which the hours are to be set as in the figure (contrary to those on a horizontal dial), and the lower half *Ep* of the axis will cast a shadow on the hour of the day in this dial.

If the plane (still facing the meridian) be made to incline, or recline, any given number of degrees, the hour-circles of the sphere will still cut the edge of the plane in those points to which the hour-lines must be drawn straight from the centre; and the axis of the sphere will cast a shadow on these lines at the respective hours. The like will still hold, if the plane be made to decline by any given number of degrees from the meridian toward the east or west: provided the declination be less than 90 degrees, or the reclination be less than the co-latitude of the place: and the axis of the sphere will be a gnomon, or stile, for the dial. But it cannot be a gnomon, when the declination is quite 90 degrees, nor when the reclination is equal to the co-latitude; because, in these two cases, the axis has no elevation above the plane of the dial.

There are several kinds of dials called *universal*, because they serve for all latitudes. One of a very ingenious construction has lately been invented by Mr. G. Wright of London. The hour-circle or arch *E*, and latitude arch *C*, Plate 91. fig. 3. are the portions of two meridian circles; one fixed, and the other moveable. The hour or dial plate *SEI* at top is fixed to the arch *C*, and has an index that moves with the hour-circle *E*; therefore the construction of this dial is perfectly similar to the construction of the meridians and hour-circle upon a common globe. The peculiar problems to be performed by this instrument are, 1. *To find the latitude of any place.* 2. *The latitude of the place being known, to find the time by the sun and stars.* 3. *To find the sun or star's azimuth and altitude.*

Previous to use, this instrument should be in a well-adjusted state: to perform which, you try the levels of the horizontal plates *Aa*, by first turning the screws *BBBB* till the bubbles of air in the glass tubes of the spirit-levels (which are at right angles to each other) are central or in the middle, and remain so when you turn the upper plate *A* half round its centre; but if they should not keep so, there are small screws at the end of each level, which admit of being turned one way or the other as may be requisite till they are so. The plates *Aa* being thus made horizontal, set the latitude arch or meridian *C* steadily between the two-grooved sides that hold it (one of which is seen at *D*), by the screw behind. On this side *D* is divided the nonius or vernier, corresponding with the divisions on the latitude arch *C*, and which may be subdivided into 5 minutes of a degree, and even less if required. The latitude arch *C* is to be so placed in *D*, that the pole *M* may be in a vertical position; which is done by making 90° on the arch at bottom coincide with the 0 of the nonius. The arch is then fixed by the tightening screw at the back of *D*. Hang a silken plumb-line on the hook at *G*: which line is to coincide with a mark at the bottom of the latitude arch at *H*, all the while you move the upper plate *A* round its centre. If it does not so, there are four screws to regulate this adjustment, two of which pass

through the base *I* into the plate *A*: the other two screws fasten the nonius piece *D* together; which when unscrewed a thread or two, the nonius piece may be easily moved to the right or left of 90° as may be found requisite.

Prob. 1. *To find the latitude of the place.* Fasten the latitude and hour circles together, by placing the pin *K* into the holes; slide the nonius piece *E* on the hour-circle to the sun's declination for the given day. The nonius piece *E* must be set on that portion of the hour-circle marked *N D* or *S D*, according as the sun has north or south declination. About 20 minutes or a quarter of an hour before noon, observe the sun's shadow or spot that passes through the hole at the axis *O*, and gently move the latitude arch *C* down in its groove at *D*, till you observe the spot exactly fall on the cross line on the centre of the nonius piece at *L*; and by the falling of this spot, so long as you observe the sun to increase in altitude, you depress the arch *C*: but at the instant of its stationary appearance the spot will appear to go no lower; then fix the arch by the screw at the back of *D*, and the degrees thereby cut by the nonius on the arch will be the latitude of the place required: if great exactness is wanted, allowance should be made for the refraction of the atmosphere, taken from some nautical or astronomical treatise.

Prob. 2. *The latitude of the place being given, to find the time by the sun or stars.* From an ephemeris as before, you find the sun's declination for the day north or south, and set the nonius piece *E* on the arch accordingly. Set the latitude arch *C*, by the nonius at *D*, to the latitude of the place; and place the magnifying glass at *M*, by which you will very correctly set the index carrying a nonius to the upper XII at *S*. Take out the pin *K*, slacken the horizontal screw *N*, and gently move, either to the right or left as you see necessary, the hour-circle *E*, at the same time with the other hand moving the horizontal plate *A* round its axis to the right and left, till the latitude-arch *C* falls into the meridian; which you will know by the sun's spot falling exactly in the centre of the nonius piece, or where the lines intersect each other. The time may be now read off exactly to a minute by the nonius on the dial-plate at top, and which will be the time required. The horizontal line drawn on the nonius piece *L*, is not seen in the figure, being the parallel of declination, or path that the sun-dial makes, it therefore can fall on the centre of that line at no other time but when the latitude arch *C* is in the meridian, or due north and south. Hence the hour-circle, on moving round with the pole, must give the true time on the dial-plate at top. There is a hole to the right, and cross hairs to the left, of the centre axis hole *O*, where the sun's rays pass through; whence the sun's shadow or spot will also appear on the right and left of the centre on the nonius piece *L*, the holes of which are occasionally used as sights to observe through. If the sun's rays are too weak for a shadow, a dark glass to skreen the eye is occasionally placed over the hole. The most proper time to find a true meridian is three or four hours before or after noon; and take the difference of the sun's declination from noon at the time you observe. If it be the morning, the difference is from noon of the preceding day; if afternoon, from noon of the following day: and the meridian being once found exact, the hour-circle *E* is to be brought into this meridian, a fixed place made for the dial, and an object to observe by it also fixed for it at a great distance. The sights *L*, *O*, must at all times be directed against this fixed object, to place the dial truly in the meridian, proper for observing the planets, moon, or bright stars by night.

Prob. 3. *To find the sun's azimuth and altitude.* The latitude-arch *C* being in the meridian, bring the pole *M* into the zenith, by setting the latitude-arch to 90°. Fasten the hour-circle *E* in the meridian by putting in the pin *K*; fix the horizontal plates by the screw *N*; and set the index of the dial-plate to XII, which is the south point: Now take out the pin *K*, and gently move the hour-circle *E*; leaving the latitude arch fixed, till the sun's rays or spot passing through the centre hole in the axis *O* fall on the centre line of the hour-circle *E*, made for that purpose. The *azimuth* in time may be then read off on the dial-plate at top by the magnifying glass. This time may be converted into degrees, by allowing at the rate of 15 for every hour. By sliding the nonius piece *E*, so that the spot shall fall on the cross line thereon, the altitude may be taken at the same time if it does not exceed 45 degrees. Or the altitude may be taken more universally, by fixing the nonius piece *E* to the o on the divisions, and sliding down the latitude-arch in such a manner in the groove at *D*, till the spot falls exactly on the centre of the nonius *E*. The degrees and minutes then shown by the nonius at *D*, taken from 90, will be the altitude required. By looking through the sight holes *L*, *O*, the altitude of the moon, planets, and stars, may be easily taken. Upon this principle it is somewhat adapted for levelling also: by lowering the nonius piece *E*, equal altitudes of the sun may be had; and by raising it higher, equal depressions.

More completely to answer the purposes of a good theodolite, of levelling, and the performance of problems in practical astronomy, trigonometry, &c. Mr. W. Jones of Holborn divides the horizontal plate *D* into 368°, and an opposite nonius on the upper plate *A*, subdividing the degrees into 5 or more minutes. A telescope and spirit-level applies on the latitude-arch at *H G* by two screws, making the latitude-arch a vertical arch; and the whole is adapted to triangular staffs with parallel plates, similar to those used with the best theodolites.

A dial better fitted for the performance of problems than the above, though in some particulars not so convenient and accurate, is made by Jones and other instrument-makers in London. It consists of the common equatorial circles reduced to a portable size, and instead of a telescope carries a plain sight. Its principal parts consist of the sight-piece *O P*, fig. 4, moveable over the declination's semicircle *D*. It has a nonius *Q* to the semicircle. A dark glass to skreen the eye applies occasionally over either of the holes at *O*: these holes on the inner side of the piece are intersected by cross lines; and to the sight *P* two pieces are fixed by a proper number of screws, the lower piece having a small hole for the sun's rays or shadow, and the upper two cross hairs or wires.

The declination circle or arch *D* is divided into two, 90° each; and is fixed perpendicularly on a circle with a chamfered edge, containing a nonius division that subdivides into single minutes the under equatorial circle *MN*, which in all cases represents the equator, and is divided into twice twelve hours, and each hour into five minutes. At right angles below this equatorial circle is fixed the semicircle of altitude *AB*, divided into two quadrants of 90° each. This arch serves principally to measure angles of altitude and depression; and it moves centrally on an upright pillar fixed in the horizontal circle *EF*. This circle *EF* is divided into four quadrants of 90° each, and against it there is fixed a small nonius plate at N. The horizontal circle may be turned round its centre or axis; and two spirit levels *LL* are fixed on it at right angles to one another.

We have not room to detail the great variety of astronomical and trigonometrical problems that may be solved by this general instrument, as described in Jones's *Instrumental Dialing*. One example connected with our present purpose may here suffice: viz. *To find the time when the latitude is given.* Supposing the instrument to be well adjusted by the directions hereafter given: The meridian of the place should be first obtained to place the instrument in, which is settled by a distant mark, or particular cavities to receive the screws at *I G H*, made in the base it

ſtands on. The meridian is beſt found by equal altitudes of the ſun. In order to take theſe, you ſet the middle mark of the nonius on the declination arch D at o, and fix it by the ſcrew behind; then ſet the horary or hour circle to XII. The circle EF being next made horizontal, you direct the ſights to the ſun, by moving the horizontal circle $E F$ and altitude ſemicircle AB: the degrees and minutes marked by the nonius on the latter will be the altitude required. To take *equal* altitudes, you obſerve the ſun's altitude in the morning two or three hours before noon by the ſemicircle AB: leave the inſtrument in the ſame ſituation perfectly unaltered till the afternoon, when, by moving the horizontal circle EF, only find the direction of the ſight or the ſun's ſpot to be juſt the ſame, which will be an equal altitude with the morning. The place of the horizontal circle EF againſt the nonius at each time of obſervation is to be carefully noted; and the middle degree or part between each will be the place where the ſemicircle AB, and ſight OP, will ſtand or coincide with, when directed to the ſouth or north, according to the ſun's ſituation north or ſouth at noon, at the place of obſervation. Set the index, or ſight-piece OP, very accurately to this middle point, by directing the ſight to ſome diſtant object; or againſt it, let one be placed up: this object will be the meridian mark, and will always ſerve at any future time. To find the time, the meridian being thus previouſly known by equal altitudes of the ſun (or ſtar), and determined by the meridian mark made at a diſtance, or by the cavities in the baſe to ſet the ſcrew in: Place the equatorial accordingly, and level the horizontal circle EF by the ſpirit-levels thereon. Set the ſemicircle AB to the latitude of the place, and the index of the ſights $O P$ to the declination of the ſun, found by the ephemeris, as before directed. Turn the ſemicircle D till the ſight-holes are accurately directed to the ſun, when the nonius on the hour circle MN will ſhow the time. It may eaſily be known when the ſun's rays are direct through, by the ſpot falling on the lower interſectors of the marks acroſs the hole at O. See the figure S adjoining.

The adjuſtments of this equatorial dial are to be made from the following trials. 1ſt, To adjuſt the levels LL on EF: Place the o of any of the diviſions on EF to the middle mark or ſtroke on the nonius at N; bring the air-bubbles in the levels in the centres of each caſe, by turning the ſeveral ſcrews at IGH: this being exactly done, turn the circle EF two 90° or half round: if the bubble of air then remains in the centre, they are right, and properly adjuſted for uſe; but if they are not, you make them ſo by turning the neceſſary ſcrews placed for that purpoſe at the ends of the level-caſes by means of a turn-ſcrew, until you bring them to that fixed poſition, that they will return when the plate EF is turned half round. 2dly, To adjuſt the line of ſight OP: Set the nonius to o on the declination arch D, the nonius on the hour-circle to VI, and the nonius on the ſemicircle AB to 90°. Direct to ſome part of the horizon where there may be a variety of fixed objects. Level the horizontal circle EF by the levels LL, and obſerve any object that may appear on the centre of the croſs wires. Reverſe the ſemicircle AB, viz. ſo that the oppoſite 90° of it be applied to the nonius, obſerving particularly that the other nonii preſerve their ſituation. If then the remote object formerly viewed ſtill continues in the centre of the croſs wires, the line of ſight OP is truly adjuſted; but if not, unſcrew the two ſcrews of the frame carrying the croſs wires, and move the frame till the interſection appears againſt another or new object, which is half way between the firſt and that which the wires were againſt on the reverſion. Return the ſemicircle AB to its former poſition: when, if the interſection of the wires be found to be againſt the half way object, or that to which they were laſt divided, the line of ſight is adjuſted; if not, the operation of obſerving the interval of the two objects, and applying half way, muſt be repeated.

It is neceſſary to obſerve, that one of the wires ſhould be in the plane of the declination circle, and the other wire at right angles; the frame containing the wires is made to ſhift for that purpoſe.

The hole at P which forms the ſun's ſpot is alſo to be adjuſted by directing the ſight to the ſun, that the centre of the ſhadow of the croſs hairs may fall exactly on the upper hole; the lower frame with the hole is then to be moved till the ſpot falls exactly on the lower ſight hole.

Laſtly, it is generally neceſſary to find the correction always to be applied to the obſervations by the ſemicircle of altitude AB. Set the nonius to o on the declination arch D, and the nonius to XII on the equator or hour-circle: Turn the ſight to any fixed and diſtinct object, by moving the arch AB and circle EF only: Note the degree and minute of the angle of altitude or depreſſion: Reverſe the declination ſemicircle by placing the nonius on the hour-circle to the oppoſite XII: Direct the ſight to the ſame object again as before. If the altitude or depreſſion now given be the ſame as was obſerved in the former poſition, no correction is wanted; but if not the ſame, half the difference of the two angles is the correction to be added to all obſervations or rectifications made with that quadrant by which the leaſt angle was taken, or to be ſubſtracted from all obſervations made with the other quadrant. Theſe ſeveral adjuſtments are abſolutely neceſſary previous to the uſe of the inſtrument; and when once well done, will keep ſo, with care, a conſiderable time.

The conſtruction of ſun-dials on all planes whatever may be included in one general rule; intelligible, if that of a horizontal dial for any given latitude be well underſtood. For there is no plane, however obliquely ſituated with reſpect to any given place, but what is parallel to the horizon of ſome other place; and therefore, if we can find that other place by a problem on the terreſtrial globe, or by a trigonometrical calculation, and conſtruct a horizontal dial for it, that dial applied to the plane where it is to ſerve will be a true dial for that place.—Thus, an erect direct ſouth dial in 51½ degrees north latitude would be a horizontal dial on the ſame meridian, 90 degrees ſouthward of 51½ degrees north latitude: which falls in with 38½ degrees of ſouth latitude. But if the upright plane declines from facing the ſouth at the given place, it would ſtill be a horizontal plane 90 degrees from that place, but for a different longitude, which would alter the reckoning of the hours accordingly.

Case I. Let us ſuppoſe that an upright plane at London declines 36 degrees weſtward from facing the ſouth, and that it is required to find a place to whoſe horizon the ſaid plane is parallel; and alſo the difference of longitude between London and that place.

Let $NESW$, fig. 5, be the horizon of London, whoſe zenith is Z, and P the north pole of the ſphere; and let Zb be the poſition of a vertical plane at Z, declining weſtward from S (the ſouth) by an angle of 36 degrees; on which plane an erect dial for London at Z is to be deſcribed. Make the ſemidiameter ZD perpendicular to Zb; and it will cut the horizon in D, 36 degrees weſt of the ſouth S. Then a plane, in the tangent HD, touching the ſphere in D, will be parallel to the plane Zb: and the axis of the ſphere will be equally inclined to both theſe planes.

Let $W Q E$ be the equinoxial, whoſe elevation above the horizon of Z (London) is 38½ degrees; and PRD be the meridian of the place D, cutting the equinoctial in R. Then it is evident, that the arc RD is the latitude of the place D (where the plane Zb would be horizontal), and the arc RQ is the difference of longitude of the planes Zb and DH.

In the spherical triangle WDR, the arc WD is given, for it is the complement of the plane's declination from S to south; which complement is 54° (*viz.* $90^\circ - 36^\circ$:) the angle at R, in which the meridian of the place D cuts the equator, is a right angle; and the angle RWD measures the elevation of the equinoctial above the horizon or Z, namely, $38\frac{1}{2}$ degrees. Say therefore, As radius is to the co-sine of the plane's declination from the south, so is the co-sine of the latitude of Z to the sine of RD the latitude of D: which is of a different denomination from the latitude of Z, because Z and D are of different sides of the equator.

As radius	- - -	10.00000
To co-sine $36^\circ\ 0' = RQ$		9.90796
So co-sine $51^\circ\ 30' = QZ$		9.79415

To sine $30^\circ\ 14' = DR$ (9.70211) = the lat. of D, whose horizon is parallel to the vertical plane Zb at Z.

N. B. When radius is made the first term, it may be omitted; and then by subtracting it mentally from the sum of the other two, the operation will be shortened. Thus, in the present case,

To the logarithmic sine of $WR =$ * $54^\circ\ 0'$	9.90796
Add the logarithmic sine of $RD =$ † $38^\circ\ 30'$	9.79415
Their sum—radius - - - - - - - - -	9.70211

gives the same solution as above. And we shall keep to this method in the following part of this article.

To find the difference of longitude of the places D and Z, say, As radius is to the co-sine of $38\frac{1}{2}$ degrees, the height of the equinoctial at Z, so is the co-tangent of 36 degrees, the plane's declination, to the co-tangent of the difference of longitudes. Thus,

To the logarithmic sine of ‡ $51^\circ\ 30'$	9.89354
Add the logarithmic tang. of § $54^\circ\ 0'$	10.13874
Their sum—radius - - - - - -	10.03228

is the nearest tangent of $47^\circ\ 8' = WR$: which is the co-tangent of $42^\circ\ 52' = RQ$, the difference of longitude sought. Which difference, being reduced to time, is 2 hours $51\frac{1}{2}$ minutes.

And thus having found the exact latitude and longitude of the place D, to whose horizon the vertical plane at Z is parallel, we shall proceed to the construction of a horizontal dial for the place D, whose latitude is $30^\circ\ 14'$ south; but anticipating the time at D by 2 hours 51 minutes (neglecting the $\frac{1}{2}$ minute in practice), because D is so far westward in longitude from the meridian of London; and this will be a true vertical dial at London, declining westward 36 degrees.

Assume any right line CSL, fig. 6, for the substile of the dial, and make the angle KCP equal to the latitude of the place (*viz.* $30^\circ 14'$), to whose horizon the plane of the dial is parallel; then CRP will be the axis of the stile, or edge that casts the shadow on the hours of the day, in the dial. This done, draw the contingent line EQ cutting the substilar line at right angles in K; and from K make KR perpendicular to the axis CRP. Then KG ($=KR$) being made radius, that is, equal to the chord of 60° or tangent of 45° on a good sector, take $42^\circ\ 52'$ (the difference of longitude of the places Z and D) from the tangents, and having set it from K to M, draw CM for the hour-line of XII. Take KN, equal to the tangent of an angle, less by 15 degrees than KM; that is, the tangent of $27^\circ\ 52'$: and through the point N draw CN for the hour-line of I. The tangent of $12^\circ\ 52'$ (which is 15° less than $27^\circ\ 42'$), set off the same way, will give a point between K and N, through which the hour-line of II is to be drawn. The tangent of $2^\circ\ 8'$ (the difference between 45° and $52^\circ\ 52'$) placed on the other side of CL, will determine the point through which the hour line of III is to be drawn: to which $2^\circ\ 8'$, if the tangent of 15° be added, it will make $17^\circ\ 8'$; and this set off from K towards Q on the line EQ, will give the point for the hour-line of IV: and so of the rest.—The forenoon hour-lines are drawn the same way, by the continual addition of the tangents 15°, 30°, 45°, &c. to $42^\circ\ 52'$ (= the tangent of KM) for the hours of XI, X, IX, &c. as far as necessary; that is, until there be five hours on each side of the substile. The sixth hour, accounted from that hour or part of the hour on which the substile falls, will be always in a line perpendicular to the substile, and drawn through the centre C.

In all erect dials, CM, the hour-line of XII, is perpendicular to the horizon of the place for which the dial is to serve; for that line is the intersection of a vertical plane with the plane of the meridian of the place, both which are perpendicular to the plane of the horizon: and any line HO or ho, perpendicular to CM, will be a horizontal line on the plane of the dial, along which line the hours may be numbered; and CM being set perpendicular to the horizon, the dial will have its true position.

If the plane of the dial had declined by an equal angle towards the east, its description would have differed only in this, that the hour-line of XII would have fallen on the other side of the substile CL, and the line HO would have a subcontrary position to what it has in this figure.

And these two dials, with the upper points of their stiles turned toward the north pole, will serve for other two planes parallel to them; the one declining from the north toward the east, and the other from the north toward the west, by the same quantity of angle. The like holds true of all dials in general, whatever be their declination and obliquity of their planes to the horizon.

Case II. If the plane of the dial not only declines, but also reclines, or inclines. Suppose its declination from fronting the south S, fig. 7, be equal to the arc SD on the horizon; and its reclination be equal to the arc Dd of the vertical circle DZ: then it is plain, that if the quadrant of altitude ZdD on the globe cuts the point D in the horizon, and the reclination is counted upon the quadrant from D to d: the intersection of the hour-circle PRd, with the equinoctial WQE, will determine Rd, the latitude of the place d, whose horizon is parallel to the given plane Zb at Z; and RQ will be the difference in longitude of the places at d and Z.

Trigonometrically thus: Let a great circle pass through the three points, W, d, E; and in the triangle WDd, right-angled at D, the sides WD and Dd are given; and thence the angle DWd is found, and so is the hypothenuse Wd. Again, the difference, or the sum, of DWd and DWR, the elevation of the equinoctial above the horizon of Z, gives the angle dWR; and the hypothenuse of the triangle WRd was just now found; whence the sides Rd and WR are found, the former being the latitude of the place d, and the latter the complement of RQ, the difference of longitude sought.

Thus, if the latitude of the place Z be $52^\circ\ 10'$ north; the declination SD of the plane Zb (which would be horizontal at d) be 36°, and the reclination be 15°, or equal to the arc Dd; the south latitude of the place d, that is the arc Rd, will be $15^\circ\ 9'$; and RQ, the difference of the longitude, $36^\circ\ 2'$. From

* The co-sine of 36.0, or of RQ. † The co-sine of 51. 30, or of QZ. ‡ The co-sine of 38. 30, or of WDR. § The co-tangent of 36.0, or of DW.

these data, therefore, let the dial (fig. 8.) be described, as in the former example.

There are several other things requisite in the practice of dialing; the chief of which shall be given in the form of arithmetical rules, simple and easy to those who have learned the elements of trigonometry.

Rule I. *To find the angles which the hour-lines on any dial make with the substile.* To the logarithmic sine of the given latitude, or of the stile's elevation above the plane of the dial, add the logarithmic tangent of the hour * distance from the meridian, or from the † substile; and the sum minus radius will be the logarithmic tangent of the angle sought.

For KC, fig. 6, is to KM in the ratio compounded of the ratio of KC to KG ($= KR$) and of KG to KM; which making CK the radius 10,000000, 10,0000, or 10, or 1, are the ratio of 10,000000, or of 10,0000, or of 10, or of 1, to $KG \times KM$.

Thus, in a horizontal dial, for latitude $51^\circ\ 30'$, to find the angular distance of XI in the forenoon, or I in the afternoon, from XII.

To the logarithmic sine of $51^\circ\ 30'$	9.89354 ‡
Add the logarithmic tang. of $51^\circ\ 0'$	9.42805
The sum — radius is - - - - -	9.32159

$= $ the logarithmic tangent of $11^\circ\ 50'$, or of the angle which the hour-line of XI or I makes with the hour of XII.

And by computing in this manner, with the sine of the latitude, and the tangents of 30, 45, 60, and 75°, for the hours of II, III, IIII, and V in the afternoon; or of X, IX, VIII, and VII in the forenoon; you will find their angular distances from XII to be $24^\circ\ 18'$, $38^\circ\ 3'$, $53^\circ\ 35'$, and $71^\circ\ 6'$; which are all that there is occasion to compare for.—And these distances may be set off from XII by a line of chords; or rather, by taking 1000 from a scale of equal parts, and setting that extent as a radius from C to XII; and then, taking 209 of the same parts, (which are the natural tangent of $11^\circ\ 50'$), and setting them from XII to XI and I, on the line *bo*, which is perpendicular to C XII; and so for the rest of the hour-lines, which, in the table of natural tangents, against the above distances, are 451, 782, 1355, and 2920, of such equal parts from XII, as the radius C XII contains 1000. And lastly, set off 1257 (the natural tangent of $51^\circ\ 30'$) for the angle of the stile's height, which is equal to the latitude of the place.

Rule II. *The latitude of the place, the sun's declination, and his hour distance from the meridian, being given, to find* (1.) *his altitude,* (2.) *his azimuth.* (1.) Let d, fig. 7, be the sun's place, dR his declination; and, in the triangle $P\ Z\ d$, Pd the sum, or the difference, of dR, and the quadrant $P\ R$, being given by the supposition, as also the complement of the latitude PZ, and the angle dPZ, which measures the horary distance of d from the meridian; we shall (by Case 4. of Keill's Oblique Spheric Trigonometry) find the base Zd, which is the sun's distance from the zenith, or the complement of his altitude.

And (2.) as sine Zd : sine Pd : : sine dPZ : dZP, or of its supplement DZS, the azimuthal distance from the south.

Or the practical rule may be as follows:

Write A for the sine of the sun's altitude, L and l for the sine and co-sine of the latitude, D and d for the sine and co-sine of the sun's declination, and H for the sine of the horary distance from VI.

Then the relation of H to A will have three varieties.

1. When the declination is toward the elevated pole, and the hour of the day is between XII and VI; it is

$$A = lD + Hld, \text{ and } H = \frac{A - LD,}{ld}$$

2. When the hour is after VI. it is $A = LD - Hld$, and

$$H = \frac{LD + A}{ld}.$$

3. When the declination is towards the depressed pole, we have $A = Hld - LD$, and $H = \dfrac{A + LD.}{ld}$

Which theorems will be found useful, and expeditious enough for solving those problems in geography and dialing which depend on the relation of the sun's altitude to the hour of the day.

Example I. Suppose the latitude of the place to be $51\frac{1}{2}$ degrees north: the time five hours distant from XII, that is, an hour after VI in the morning, or before VI in the evening; and the sun's declination 20° north. *Required the sun's altitude?*

Then to log. $L =$ log. sin. $51^\circ\ 30'$		1.89354 §
add log. $D =$ log. sin. $20^\circ\ 0'$		1.53405
	Their sum	1.42759 gives

LD = logarithm of 0.267664, in the natural sines.

And, to log. $H =$ log. sin. ‖ $15^\circ\ 0'$		1.41300
add { log. $l =$ log. sin. ¶ $38^\circ\ 0'$		1.79414
log. $d =$ log. sin. ** $70^\circ\ 0'$		1.97300
	Their sum	1.18014 gives

$Hld =$ logarithm of 0.151408, in the natural sines.

And these two numbers (0.267664 and 0.151408) make $0.419072 = A$; which, in the table, is the nearest natural sine of $24^\circ\ 47'$, the sun's altitude sought.

The same hour distance being assumed on the other side of VI, then $LD - Hld$ is 0.116256, the sine of $6^\circ\ 40\frac{1}{2}'$; which is the sun's altitude at V in the morning, or VII in the evening, when his north declination is 20°.

But when the declination is 20° south (or towards the depressed pole) the difference Hld — LD becomes negative; and thereby shows, that an hour before VI in the morning, or past VI in the evening, the sun's centre is $6^\circ\ 40\frac{1}{2}'$ below the horizon.

Exam. 2. From the same *data,* to find the sun's *azimuth.* If H, L, and D, are given, then (by par. 2. of Rule II.) from H having found the altitude and its complement Zd; and the arc Pd (the distance from the pole) being given; say, As the cosine of the altitude is to the sine of the distance from the pole, so is the sine of the hour-distance from the meridian to the sine of the azimuth distance from the meridian.

* That is, of 15, 30, 45, 60, 75°, for the hours of I, II, III, IIII, V, in the afternoon; and XI, X, IX, VIII, VII, in the forenoon.

† In all horizontal dials, and erect north or south dials, the substile and meridian are the same; but in all declining dials, the substile line makes an angle with the meridian.

‡ In which case, the radius CK is supposed to be divided into 10,0000 equal parts.

§ Here we consider the radius as unity, and not 10,00000: by which, instead of the index 9, we have -1 as above; which is of no farther use than making the work a little easier.

‖ The distance of one hour from VI.

¶ The co-declination of the sun.

** The co-latitude of the place.

Let the latitude be 51° 30′ north, the declination 15° 9′ south, and the time II h. 24 m. in the afternoon, when the sun begins to illuminate a vertical wall, and it is required to find the position of the wall.

Then by the foregoing theorems, the complement of the altitude will be 81° 32½′, and *Pd* the distance from the pole being 105° 5′, and the horary distance from the meridian, or the angle *dPZ*, 36°.

To log. sin. 74° 51′	- -	1.98464
Add log. sin. 36° 0′	- -	1.76922
And from the sum	- -	1.75386
Take the log. sin. 81° 32½′	-	1.99525
Remains		1.75861 = log. sin.

35°, the azimuth distance sought.

When the altitude is given, find from thence the hour, and proceed as above.

This praxis is of singular use on many occasions; in finding the declination of vertical planes more exactly than in the common way, especially if the transits of the sun's centre are observed by applying a ruler with sights, either plain or telescopical, to the wall or plane whose declination is required. In drawing a meridian line, and finding the magnetic variation. In finding the bearings of places in terrestrial surveys; the transits of the sun over any place, or his horizontal distance from it, being observed, together with the altitude and hour. And thence determining small differences of longitude. In observing the variations at sea, &c.

The *declination, inclination,* and *reclination* of planes, are frequently taken with a sufficient degree of accuracy by an instrument called a *declinator* or *declinatory*. The construction of this instrument, as somewhat improved by Mr. Jones, is as follows: On a mahogany board *ABIK*, fig. 9, is inserted a semicircular arch *AGEB* of ivory or box-wood, divided into two quadrants of 90° each, beginning from the middle *G*. On the centre *C* turns a vertical quadrant *DFE*, divided into 90°, beginning from the base *E*; on which is a moveable index *CF*, with a small hole at *F* for the sun's rays to pass through, and form a spot on a mark at *C*. The lower extremity of the quadrant at *E* is pointed, to mark the linear direction of the quadrant when applied to any other plane; as this quadrant takes off occasionally, and a plumb-line *P* hangs at the centre on C, for taking the inclinations and reclinations of planes. At *H*, on the plane of the board, is inserted a compass of points and degrees, with a magnetical needle turning on a pivot over it. The addition of the moveable quadrant index considerably extend the utility of the declinator, by rendering it convenient for taking *equal altitudes* of the sun, the sun's altitude, and bearing, at the same time, &c.

To apply this instrument in *taking the declination of a wall or plane:* Place the side *ACB* in an horizontal direction to the plane proposed, and observe what degree or point of the compass the *N* part of the needle stands over from the north or the south, and it will be the *declination* of the plane from the north or south accordingly. In this case, allowance must be made for the variation of the needle (if any) at the place; and which, if not previously known, will render this operation very inaccurate. At London it is now 22° 30′ to the west.

Another way more exact may be used, when the sun shines out half an hour before noon. The side *ACB* being placed against the plane, the quadrant must be so moved on the semicircle *AGB*, and the index *CF* on *DE*, till the sun's rays passing through the hole at *F* fall exactly on the mark at *G*, and continued so till the sun requires the index to be raised no higher: you will then have the meridian or greatest altitude of the sun; and the angle contained between *G* and *E* will be the declination required. The position of *CE* is the meridian or 12 o'clock line. But the most exact way for taking the declination of a plane, or finding a meridian line, by this instrument, is, in the forenoon, about two or three hours before 12 o'clock, to observe two or three heights or altitudes *EF* of the sun; and at the same time the respective angular polar distances *GE* from *G*: write them down; and in the afternoon watch for the same, or one of the same altitudes, and mark the angular distances or distance on the quadrant *AG*: Now, the division or degree exactly *between* the two noted angular distances will be the true meridian, and the distance at which it may fall from the *C* of the divisions at *G* will be the declination of the plane. The reason for observing two or three altitudes and angles in the morning is, that in case there should be clouds in the afternoon, you may have the chance of one corresponding altitude.

The quadrant occasionally takes off at *C*, in order to place it on the surface of a pedestal or plane intended for an horizontal dial; and thereby from equal altitudes of the sun, as above, draw a meridian or 12 o'clock line to set the dial by.

The base *ABIK* serves to take the inclination and reclination of planes. In this case, the quadrant is taken off, and the plummet *P* is fitted on a pin at the centre *C*: then the side *IGK* being applied to the plane proposed, as *QL* (fig. 10.) if the plumb-line cuts the semicircle in the point *G*, the plane is horizontal; or if it cut the quadrant in any point at *S*, then will *GCS* be the angle of inclination. Lastly, if applying the side *ACB* (fig. 10.) to the plane, the plummet cuts *G*, the plane is vertical; or if it cuts either of the quadrants, it is accordingly the angle of reclination. Hence, if the quantity of the angle of inclination be compared with the elevation of the pole and equator, it is easily known whether the plane be inclined or reclined. Dials are made in a variety of forms, some of which are very fantastical, but for real use the simplest are the best. For various mechanical modes of making them, Ferguson, Emerson and Martin may be consulted with advantage. The theory is simple; and the principles laid down in the beginning of this treatise form the basis for universal practice in this art.

DIALING *Lines*, or *Scales*, are graduated lines, placed on rules, or the edges of quadrants, and other instruments, to expedite the construction of dials.

DIALING-*Sphere*, is an instrument made of brass, with several semicircles sliding over one another, on a moving horizon, to demonstrate the nature of the doctrine of spherical triangles, and to give a true idea of the drawing of dials on all manner of planes.

DIALING, in a mine, called also *Plumming*, is the using of a compass (which they call *dial)*, and a long line, to know which way the load or vein of ore inclines, or where to shift an air-shaft, or bring an adit to a desired place.

DIALIS, in antiquity, a Latin term signifying something that belongs to Jupiter. The word is formed from Διος, the genitive of Ζευς, *Jupiter*.

Flamen Dialis. See FLAMEN.

DIALITHA, in the writings of the ancients, a word used to express the elegant ornaments of the Greeks and Romans, composed of gold and gems. They also called these *lithocolla*, "cemented stones or gems;" the gold being in this case as a cement to hold the stones together. They wore bracelets and other ornamental things about their habits thus made; and their cups and table-furniture, for magnificent treats, were of this kind. The green stones were found to succeed best of all

Fig. 1.

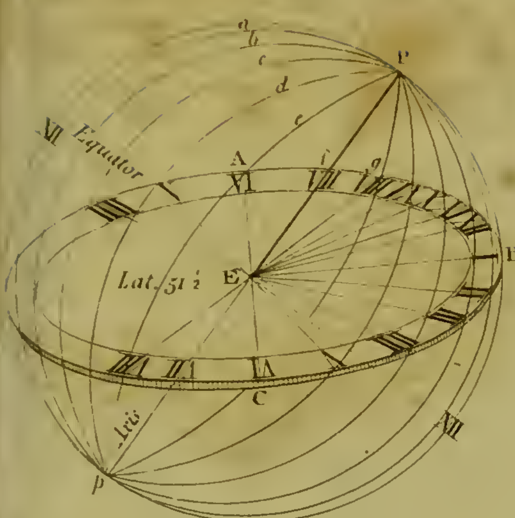


Fig. 2.

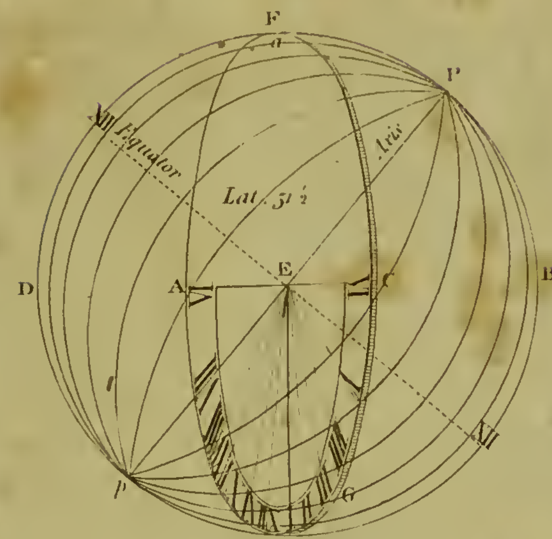


Fig. 3.

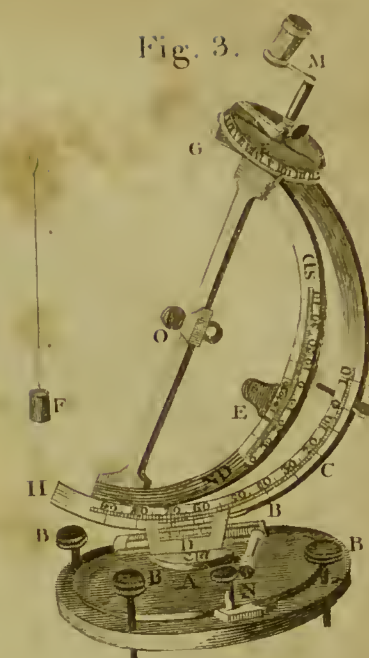


Fig. 4.

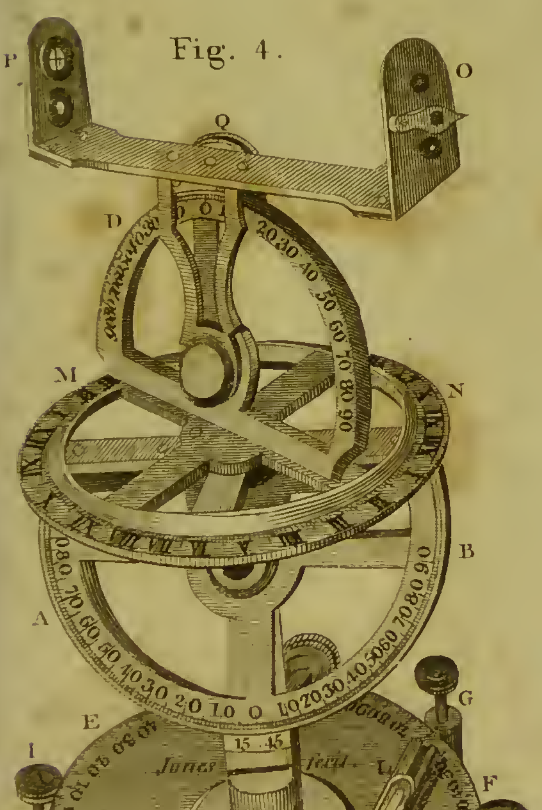


Fig. 5.

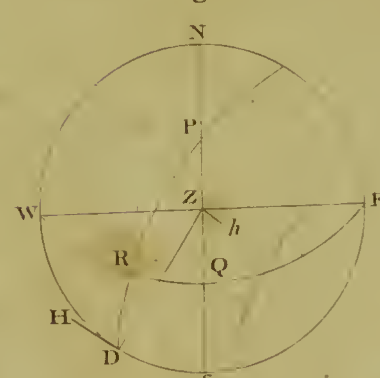


Fig. 6.

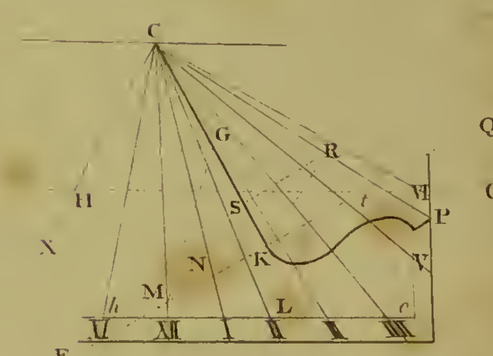


Fig. 7.

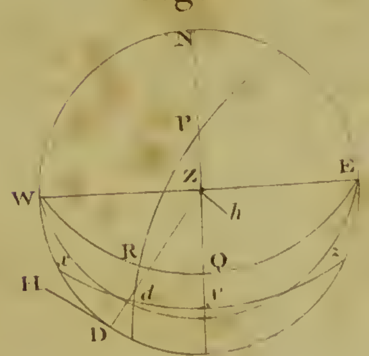


Fig. 8.

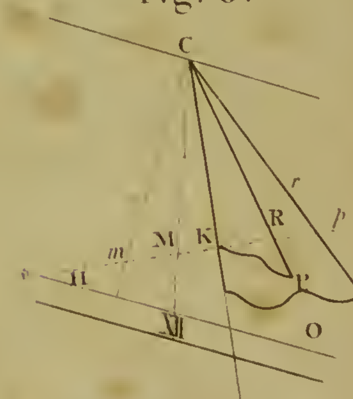


Fig. 10.

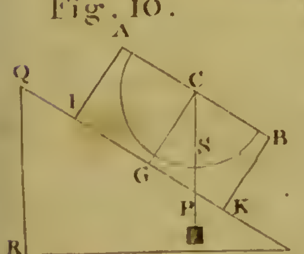
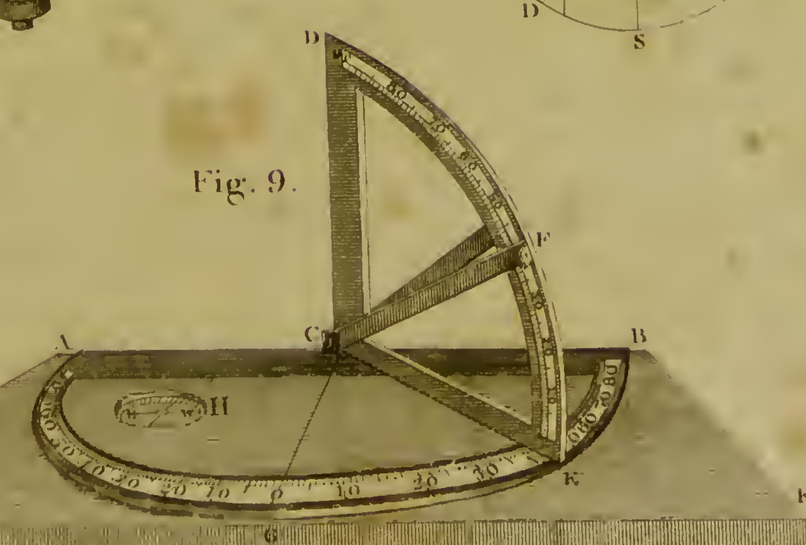


Fig. 9.



Gnomon

in theſe things; and the emerald and greeniſh topaz, or, as we call it, chryſolite, were moſt in eſteem for this purpoſe. This uſe of the ſtones explains what Pliny very often ſays of them in his deſcription: *Nihil jucundius aurum decet*, "Nothing becomes gold better:" this he ſays of the green topaz or chryſolite; and this and many other like paſſages have greatly perplexed the critics, who did not hit upon this explication.

DIALOGISM, in rhetoric, is uſed for the ſoliloquy of perſons deliberating with themſelves. See SOLILOQUY.

DIALOGUE, in matters of literature, a converſation between two or more perſons either by writing or by word of mouth.

Compoſition and Stile of written DIALOGUE. As the end of ſpeech is converſation, no kind of writing can be more natural than dialogue, which repreſents this. And accordingly we find it was introduced very early, for there are ſeveral inſtances of it in the Moſaic hiſtory. The ancient Greek writers alſo fell very much into it, eſpecially the philoſophers, as the moſt convenient and agreeable method of communicating their ſentiments and inſtructions to mankind. And indeed it ſeems to be attended with very conſiderable advantages, if well and judiciouſly managed. For it makes the drieſt ſubjects entertaining and pleaſant, by its variety, and the different characters of the ſpeakers. Beſides, things may be canvaſſed more minutely, and many leſſer matters, which ſerve to clear up a ſubject, may be introduced with a better grace, by queſtions and anſwers, objections and replies, than can be conveniently done in a continued diſcourſe. There is likewiſe a further advantage in this way of writing, that the author is at liberty to chooſe his ſpeakers: and therefore, as Cicero has well obſerved, when we imagine that we hear perſons of an eſtabliſhed reputation for wiſdom and knowledge talking together, it neceſſarily adds a weight and authority to the diſcourſe, and more cloſely engages the attention. The ſubject-matter of it is very intenſive; for whatever is a proper argument of diſcourſe, public or private, ſerious or jocoſe; whatever is fit for wiſe and ingenious men to talk upon, either for improvement or diverſion, is ſuitable for a dialogue.

From this general account of the nature of dialogue, it is eaſy to perceive what kind of ſtyle beſt ſuits it. Its affinity with EPISTLES ſhows there ought to be no great difference between them in this reſpect. Indeed, ſome have been of opinion, that it ought rather to ſink below that of an epiſtle, becauſe dialogues ſhould in all reſpects repreſent the freedom of converſation; whereas epiſtles ought ſometimes to be compoſed with care and accuracy, eſpecially when written to ſuperiors. But there ſeems to be little weight in this argument, ſince the deſign of an epiſtle is to ſay the ſame things, and in the ſame manner, as the writer judges would be moſt fit and proper for him to ſpeak, if preſent. And the very ſame thing is deſigned in a dialogue, with reſpect to the ſeveral perſons concerned in it. Upon the whole, therefore, the like plain, eaſy, and ſimple ſtyle, ſuited to the nature of the ſubject, and the particular characters of the perſons concerned, ſeems to accord with both.

But as greater ſkill is required in writing dialogues than letters, we ſhall give a more particular account of the principal things neceſſary to be regarded in their compoſition, and illuſtrate them chiefly from Cicero's excellent Dialogues concerning an Orator. A dialogue, then, conſiſts of two parts; an *introduction*, and *the body of the diſcourſe*.

1. The *introduction* acquaints us with the place, time, perſons, and occaſion, of the converſation. Thus Cicero places the ſcene of his dialogues at Craſſus's country ſeat; a very proper receſs, both for ſuch a debate and the parties engaged in it. And as they were perſons of the firſt rank, and employed in the greateſt affairs of ſtate, and the diſcourſe held them for two days; he repreſents it to have happened at the time of a feſtival, when there was no buſineſs done at Rome, which gave them an opportunity to be abſent.

And becauſe the greateſt regard is to be had in the choice of the perſons, who ought to be ſuch as are well acquainted with the ſubject upon which they diſcourſe; in theſe dialogues of Cicero, the two principal diſputants are Craſſus and Antony, the greateſt orators of that age, and therefore the moſt proper perſons to diſpute upon the qualifications neceſſary for their art. One would think it ſcarce neceſſary to obſerve, that the conference ſhould be held by perſons who lived at the ſame time, and ſo were capable to converſe together. But yet ſome good writers have run into the impropriety of feigning dialogues between perſons who lived at diſtant times. Plato took this method, in which he has been followed by Macrobius. But others, who have been willing to bring perſons to diſcourſe together, who lived in different ages, without ſuch inconſiſtency, have wrote dialogues of the dead. Lucian has made himſelf moſt remarkable in this way. As to the number of perſons in a dialogue, they may be more or leſs; ſo many as can conveniently carry on a converſation without diſorder or confuſion may be admitted. Some of Cicero's dialogues have only two, others three or more; and thoſe concerning an orator, ſeven. And it is convenient they ſhould all, in ſome reſpects, be perſons of different characters and abilities; which contributes both to the variety and beauty of the diſcourſe, like the different attitudes of figures in a picture. Thus, in Cicero's dialogues laſt mentioned, Craſſus excelled in art, Antony principally for the force of his genius, Catullus for the purity of his ſtyle, Scævola for his ſkill in the law, Cæſar for wit and humour; and though Sulpitius and Cotta, who were young men, were both excellent orators, yet they differed in their manner. But there ſhould be always one chief perſon, who is to have the main part of the converſation; like the hero in an epic poem or a tragedy, who excells the reſt in action; or the principal figure in a picture, which is moſt conſpicuous. In Plato's dialogues, this is Socrates; and Craſſus, in thoſe of Cicero above mentioned.

It is uſual likewiſe in the introduction, to acquaint us with the occaſion of the diſcourſe. Indeed this is not always mentioned; as in Cicero's dialogue of the parts of oratory, where the ſon begins immediately with deſiring his father to inſtruct him in the art. But it is generally taken notice of, and moſt commonly repreſented as accidental. The reaſon of which may be, that ſuch diſcourſes appear moſt natural; and may likewiſe afford ſome kind of apology for the writer in managing his different characters, ſince the greateſt men may be ſuppoſed not always to ſpeak with the utmoſt exactneſs in an accidental converſation. Thus Cicero, in his dialogues concerning an orator, makes Craſſus occaſionally fall upon the ſubject of oratory, to divert the company from the melancholy thoughts of what they had been diſcourſing of before with relation to the public diſorders, and the dangers which threatened their country. But the introduction ought not to be too long and tedious. Mr. Addiſon complains of this fault in ſome authors of this kind. "For though (as he ſays) ſome of the fineſt treatiſes of the moſt polite Latin and Greek writers are in dialogue, and many very valuable pieces of French, Italian, and Engliſh, appear in the ſame dreſs; yet in ſome of them there is ſo much time taken up in ceremony, that, before they enter on their ſubject, the dialogue is half over."

2. We come now to the *body* of the diſcourſe, in which ſome things relating to the perſons, and others to the ſubject, are proper to be remarked. And as to the *perſons*, the principal thing to be attended to is to keep up a juſtneſs of character through the whole. And the diſtinct characters ought to be ſo perfectly obſerved, that from the very words themſelves it may be always known who is the ſpeaker. This makes dialogue more difficult than ſimple deſcription, by reaſon of the number and variety of characters which are to be drawn at the ſame time, and each of them managed with the greateſt propriety.

The principal ſpeaker ſhould appear to be a perſon of great ſenſe and wiſdom, and beſt acquainted with the ſubject. No queſtion ought to be aſked him, or objection ſtarted to what he ſays, but what he ſhould fairly anſwer. And what is ſaid by the reſt ſhould principally tend to promote his diſcourſe, and carry it through in the moſt artful and agreeable manner. Where the argument is attended with difficulties, one other perſon or more may be introduced, of equal reputation, or near it, but of different ſentiments, to oppoſe him, and maintain the contrary ſide of the queſtion. This gives opportunity for a thorough examination of the point on both ſides, and anſwering all objections. But if the combatants are not pretty equally matched, and maſters of the ſubject, they will treat it but ſuperficially. And through the whole debate there ought not to be the leaſt wrangling, peeviſhneſs, or obſtinacy; nothing but the appearance of good humour and good breeding, the gentleman and the friend, with a readineſs to ſubmit to conviction and the force of truth, as the evidence ſhall appear on one ſide or the other. In Cicero, theſe two characters are Craſſus and Antony. And from them Mr. Addiſon ſeems to have taken his Philander and Cynthio, in his *Dialogues upon the uſefulneſs of ancient medals*, which are formed pretty much on Cicero's plan. Where younger perſons are preſent, or ſuch who are not equally acquainted with the ſubject, they ſhould be rather upon the enquiry than diſpute: and the queſtions they aſk ſhould be neither too long nor too frequent; that they may not too much interrupt the debate, or appear over talkative before wiſer and more experienced perſons. Sulpitius and Cotta ſuſtain this character in Cicero, and Eugenius in Mr. Addiſon. And it is very convenient there ſhould be one perſon of a witty and jocoſe humour, to enliven the diſcourſe at proper ſeaſons, and make it the more entertaining, eſpecially when the dialogue is drawn out to any conſiderable length. Cæſar has this part in Cicero. And in Mr. Addiſon, Cynthio is a perſon of this turn, and oppoſes Philander in a merry way. Mr. Addiſon's ſubject admitted of this: but the ſeriouſneſs and gravity of Cicero's argument required a different ſpeaker for the jocoſe part. Many perſons ought not to ſpeak immediately one after another. Horace's rule for plays is:

> To crowd the ſtage is odious and abſurd.
> Let no fourth actor ſtrive to ſpeak a word.

Though Scaliger and others think a fourth perſon may ſometimes be permitted to ſpeak in the ſame ſcene without confuſion. However, if this is not commonly to be allowed upon the ſtage, where the actors are preſent, and may be diſtinguiſhed by their voice and habit; much leſs in a dialogue, where you have only their names to diſtinguiſh them.

With regard to the *ſubject*, all the arguments ſhould appear probable at leaſt, and nothing be advanced which may ſeem weak or trivial. There ought alſo to be an union in dialogue, that the diſcourſe may not ramble, but keep up to the main deſign. Indeed, ſhort and pleaſant digreſſions are ſometimes allowable for the eaſe and entertainment of the reader. But every thing ſhould be ſo managed, that he may ſtill be able to carry on the thread of the diſcourſe in his mind, and keep the main argument in view, till the whole is finiſhed. The writers of dialogue have not confined their diſcourſes to any certain ſpace of time; but either concluded them with the day, or broke off when their ſpeakers have been tired, and reaſſumed them again the next day. Thus Cicero allows two days for his three dialogues concerning an orator; but Mr. Addiſon extends his to three days, allowing a day for each. Nor has the ſame method always been obſerved in compoſing dialogues. For ſometimes the writer, by way of narrative, relates a diſcourſe which paſſed between other perſons. Such are the dialogues of Cicero and Mr. Addiſon laſt mentioned, and many others both of the ancients and moderns. But, at other times, the ſpeakers are introduced in perſon, as talking to each other. This, as Cicero obſerves, prevents the frequent repetition of thoſe words, *he ſaid*, and *he replied*; and by placing the hearer, as it were, in the converſation, gives him a more lively repreſentation of the diſcourſe, which makes it the more affecting. And therefore Cicero, who wrote his *dialogue of old age* in this manner, in which Cato, who was then in years, largely recounts the ſatisfactions of life which may be enjoyed in old age, tells his friend Atticus he was himſelf ſo affected with that diſcourſe, that when he reviewed it ſometimes, he fancied they were not his own words, but Cato's. There are ſome other dialogues of Cicero, written in the ſame way; as that *Of friendſhip*, and *Of the parts of oratory*. And both Plato and Lucian generally choſe this method.

Dialogue, in dramatic compoſition. See the article Poetry.

DIALTHÆA, in pharmacy, an unguent formerly uſed as a reſolvent; ſo called from Althæa, or marſhmallows, which is the principal ingredient in it.

DIALUM, in botany; a genus of the monogynia order, belonging to the diandria claſs of plants. The corolla is pentapetalous; no calyx; the ſtamina at the upper ſide of the receptacle.

DIALYSIS, in grammar, a mark or character, conſiſting of two points, ¨, placed over two vowels of a word, in order to ſeparate them, becauſe otherwiſe they would make them a diphthong, as *Moſaïc*, &c.

DIAMASTIGOSIS, a feſtival at Sparta in honour of Diana Orthia, which received that name απο του μαςιγουν, from *whipping*, becauſe boys were whipped before the altar of the goddeſs. Theſe boys, called Bomonicæ, were originally free-born Spartans, but in the more delicate ages they were of mean birth, and generally of a ſlaviſh origin. This operation was performed by an officer in a ſevere and unfeeling manner; and that no compaſſion ſhould be raiſed, the prieſt ſtood near the altar with a ſmall light ſtatue of the goddeſs, which ſuddenly became heavy and inſupportable if the laſh of the whip was more lenient or leſs rigorous. The parents of the children attended the ſolemnity, and exhorted them not to commit any thing either by fear or groans, that might be unworthy of Laconian education. Theſe flagellations were ſo ſevere, that the blood guſhed in profuſe torrents, and many expired under the laſh of the whip, without uttering a groan, or betraying any marks of fear. Such a death was reckoned very honourable; and the corpſe was buried with much ſolemnity with a garland of flowers on its head. The origin of this feſtival is unknown. Some ſuppoſe that Lycurgus firſt inſtituted it to inure the youth of Lacedemon to bear labour and fatigue, and render them inſenſible to pain and wounds. Others maintain, that it is a mitigation of an oracle, which ordered that human blood ſhould be ſhed on Diana's altar; and according to their opinion, Oreſtes firſt introduced that barbarous cuſtom, after he had brought the ſtatue of Diana Taurica into Greece. There is another tradition, which mentions, that Pauſanias, as he was offering up prayers and ſacrifices to the gods, before he engaged with Mardonius, was ſuddenly attacked by a number of Lydians, who diſturbed the ſacrifice, and were at laſt repelled with ſtaves and ſtones, the only weapons with which the Lacedemonians were provided at that moment. In commemoration of this, therefore, the whipping of boys was inſtituted at Sparta, and after that the Lydian proceſſion.

DIAMETER, in geometry, a right line paſſing through the centre of a circle, and terminated at each ſide by the circumference thereof. See Geometry.

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